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Affective Regulation of Stereotype Activation: It's the (Accessible) Thought That Counts

Jeffrey R. Huntsinger[1], Stacey Sinclair[2], Elizabeth Dunn[3], and Gerald L. Clore[4]

Abstract

Prior research has found that positive affect, compared to negative affect, increases stereotype activation. In four experiments the authors explore whether the link between affect and stereotype activation depends on the relative accessibility of stereotype-relevant thoughts and response tendencies. As well as manipulating mood, the authors measured or manipulated the accessibility of egalitarian response tendencies (Experiments 1 and 2) and counterstereotypic thoughts (Experiments 2 through 4). In the absence of such response tendencies and thoughts, people in positive moods displayed greater stereotype activation—consistent with past research. By contrast, in the presence of accessible egalitarian response tendencies or counterstereotypic thoughts, people in positive moods exhibited less stereotype activation than those in negative moods. Implications of these results for existing affect–cognition models are discussed.

People are cognitive gamblers (Miller, Galanter, & Pribram, 1960; Moskowitz, 2005). In order to successfully negotiate the complexities of daily life, people regularly deploy a variety of cognitive shortcuts, including scripts, schemas, judgmental heuristics, and stereotypes (Bruner, 1957; Macrae & Bodenhausen, 2000). This tendency is so entrenched that it typically unfolds automatically, exerting a nearly invisible impact on thought and behavior (Bargh, 1999). Stereotypes, for example, are commonly thought to be activated whenever one encounters or merely considers members of stereotyped groups. Given the wide variety of social categories that elicit automatic stereotype activation, including race (Devine, 1989), gender (Banaji & Hardin, 1996), and age (Hense, Penner, & Nelson, 1995), this propensity is often considered to be an unavoidable consequence of our cognitive architecture.

Recent research, however, reveals that automatic stereotype activation can be short-circuited by a variety of motivational and contextual forces (Blair, 2002; Kunda & Spencer, 2003). Both chronic and temporary motivational states can curb the activation of stereotypes. People motivated by a chronic goal to be egalitarian, for example, display less gender stereotype activation than people not so motivated (Moskowitz, Gollwitzer, Wasel, & Schall, 1999). Likewise, when a stereotype conflicts with a short-term self-enhancement goal, stereotype activation is undermined or even inhibited (e.g., Sinclair & Kunda, 1999). Similar reductions in stereotype activation occur when people are exposed to counterstereotypic exemplars (e.g., strong female leaders) because exposure to such exemplars makes counterstereotypic thoughts more accessible than stereotypical ones (Dasgupta & Asgari, 2004; see also Blair & Banaji, 1996; Blair, Ma, & Lenton, 2001). Finally, people who form implementation intentions (Gollwitzer, 1999) to think counterstereotypic thoughts (i.e., safe) when they encounter African Americans display less stereotype activation than those who do not form such intentions (Stewart & Payne, 2008). Thus, although stereotypes are often automatically activated when people encounter members of stereotyped groups, stereotype activation can be curbed—or even reversed—by an array of motivational and contextual factors.

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Affect and Stereotype Activation

Frequently experiencing positive affect has many advantages, including enhanced creativity and success in myriad life domains (Lyubomirsky, King, & Diener, 2005), but positive affect also carries some disadvantages in certain situations. Positive affect seems to elevate people's reliance on a range of cognitive short-cuts, including scripts, schemas, judgmental heuristics, and—most germane to the present research—stereotypes (for a review, see Schwarz & Clore, 2007). When judging a defendant's guilt, for example, people in positive moods rely more on stereotypes than those in negative moods (Bodenhausen, Kramer, & Susser, 1994; Krauth-Gruber & Ric, 2000). People in positive moods are also more likely than those in negative moods to make stereotype-tinged evaluations of individual group members and groups as a whole (Lambert, Khan, Lickel, & Fricke, 1997). These effects on judgment may occur because positive mood increases stereotype *activation*, stereotype *application*, or both.

Although most studies in this area simply examine downstream judgments, rather than disentangling the role of stereotype activation versus application, some recent research suggests that the effects of affect occur at the stereotype activation stage. On Payne's (2001) weapon identification task, people in positive moods displayed greater stereotypical bias than did those in negative moods. Process-dissociation analyses (Jacoby, 1991; Payne, 2001) were used to decompose performance into separate estimates of automatic and controlled processing (Huntsinger, Sinclair, & Clore, 2009). These analyses revealed that mood directly influenced activation of race-related stereotypes rather than mood influencing the extent of controlled, data-driven processing (i.e., stereotype application). The finding that mood regulates activation of mental content is not limited to stereotypes. People in positive moods, as compared to those in negative moods, display greater activation of race attitudes and math-arts attitudes (Huntsinger et al., 2009) and, outside the realm of stereotypes and attitudes, they display greater activation of general semantic and affective mental content (Storbeck & Clore, 2008).

Despite differing in important ways, we see the influence of affect on the application and activation of stereotypes, and other mental content, as reflecting a more general principle by which affect shapes cognition. Specifically, by signaling their value or validity, affect regulates the use of accessible thoughts and responses and therefore also the activation of stereotypes and attitudes that would be elicited by such thoughts and responses (Clore & Huntsinger, 2007, 2009; for a related perspective, see Briñol, Petty, & Barden, 2007). From this view, positive affect signals that any accessible thoughts and response tendencies are valuable whereas negative affect signals they are not valuable, thereby regulating the extent to which they become activated and thus inform subsequent responses. Specifically, according to this idea, relative to negative affect, positive affect should promote activation of whatever cognitions and response tendencies happen to be accessible in mind at the moment. We set aside a detailed discussion of how this perspective compares and contrasts with other affect–cognition models, and the implications of the present research for these models, for the General Discussion.

The Present Research

In the present research, we asked whether and how motivational and contextual factors known to regulate stereotype activation would moderate the aforementioned link between affect and stereotype activation. If affect signals the value of any accessible mental content or response tendency (e.g., Clore & Huntsinger, 2007, 2009), then the connection between affect and stereotype activation should depend on the accessibility of stereotype-relevant thoughts and response tendencies. When thoughts and response tendencies that undermine, or directly counter, stereotype activation are most accessible, positive affect should actually lead to less stereotype activation than negative affect—reversing the usual association between affect and stereotyping. When such thoughts and response tendencies are not accessible, as is often the case, positive affect should increase stereotype activation, consistent with past research. For example, compared to negative mood, positive mood should reduce stereotype activation among individuals for whom the goal to be egalitarian is chronically accessible, but should increase stereotype activation among individuals for whom this goal is not chronically accessible. Similarly, compared to negative mood, positive mood should reduce stereotype activation among individuals for whom counterstereotypic exemplars are made accessible (e.g., strong female leaders), but should increase stereotype activation among individuals for whom such exemplars are not currently salient.

Across four experiments, we tested whether the link between affect and stereotype activation hinges on the relative accessibility of stereotype-relevant thoughts and response tendencies. In Experiment 1, the relative accessibility of egalitarian versus nonegalitarian response tendencies was measured, and in Experiment 2, the accessibility of egalitarian response tendencies was manipulated. In Experiments 3 and 4, counterstereotypic thoughts were or were not made accessible. We manipulated mood in two ways and measured stereotype activation, the outcome of interest. With respect to measuring stereotype activation, Experiment 1 used a lexical decision task (see Moskowitz et al., 1999), Experiments 2 and 3 used the implicit association task (IAT; Greenwald, McGhee, & Schwartz, 1998), and Experiment 4 used the weapon identification task (Payne, 2001).

Experiment 1

In Experiment 1, we examined the effect of mood on stereotype activation among men for whom the goal of being

egalitarian toward women was, or was not, chronically accessible. We hypothesized that positive mood should lead to decreased stereotype activation compared to negative mood for participants with a chronic goal to be egalitarian. In contrast, we hypothesized that for participants without a chronic goal to be egalitarian, the usual link between mood and stereotyping would be observed—increased stereotype activation among positive mood participants compared to negative mood participants.

Method

Participants. From a sample of 194 male undergraduates, we selected 16 men who held chronic egalitarian goals and 16 who did not, using a screening procedure validated and described in detail by Moskowitz et al. (1999). In brief, we identified chronic egalitarians by forcing men to endorse stereotypic explanations of women's behavior and then observing whether these men exhibited compensatory behavior, as would be expected if they held strong, chronic egalitarian goals. Participants completed the main study in groups of 1 to 4 in exchange for course credit or payment.

Procedure. In the main experimental session, which took place at least 10 days after the preselection phase, participants were randomly assigned to spend 10 minutes listening to either happy or sad music, thereby inducing positive or negative mood. To mask the true purpose of the mood induction, participants were told that we were pretesting a series of musical selections for use in another experiment. All participants agreed to take part in the pretesting and were randomly assigned to either the positive or the negative mood induction. Next, they completed a measure of gender stereotype activation, and finally they rated their moods as a manipulation check.

Materials

Mood manipulation. Participants listened to one of two musical selections previously shown to induce positive (Mozart's *Eine Kleine Nacht Musik*) and negative mood (Mozart's *Requiem* [*Introitus*]; e.g., Niedenthal & Setterlund, 1994; Storbeck & Clore, 2005).

Stereotype activation measure. We assessed stereotype activation using a lexical decision task. On each trial, a male or female face appeared for 200 milliseconds, followed immediately by a letter string. Participants were instructed to press one key if the letter string was a real word and a different key if it was a nonword. Participants were presented with 18 words related to the female stereotype (e.g., *gentle*, *irrational*) as well as 18 stereotype-irrelevant words (e.g., *sleepy*, *colorful*) and 36 nonwords (for a total of 72 trials). Following Wittenbrink, Judd, and Park (1997), incorrect responses (3.9%) and latencies less than 150 milliseconds and greater than 3,000 milliseconds were deleted. Next response latencies
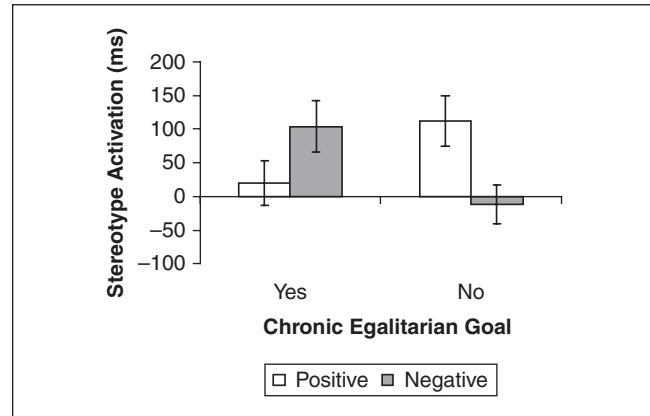

Figure 1. Experiment 1: Stereotype activation (in milliseconds) as function of presence of chronic egalitarian goal and mood
Note: Higher numbers indicate greater stereotype activation.

were log-transformed to reduce skew. Finally, to create a measure of stereotype activation, for trials preceded by a female face prime, we subtracted responses to stereotype-relevant words from responses to stereotype-irrelevant words. Higher numbers indicated greater female stereotype activation. For ease of interpretation, raw response latencies are reported. Due to computer error, responses from 2 participants were lost.

Manipulation checks. To evaluate the efficacy of the mood manipulation, we asked participants to report how pleasant and gloomy they felt while listening to the music, 1 = *not at all* to 7 = *very*. We averaged participants' ratings of how pleasant they felt and how gloomy they felt (reverse-scored) to create a composite measure of positive mood.

Results

All hypotheses were evaluated via a 2 (mood: positive, negative) × 2 (egalitarian goal: yes, no) analysis of variance (ANOVA).

Manipulation checks. The mood manipulation was successful. Participants in the positive mood condition reported significantly more positive affect ($M = 6.18$, $SD = 0.80$) than participants in the negative mood condition ($M = 5.38$, $SD = 1.14$), $F(1, 27) = 5.01$, $p = .03$, all other Fs < 1, ps > .3.

Stereotype activation. We predicted that when the motivation to be egalitarian was present, participants in positive moods would exhibit less stereotype activation than those in negative moods. In contrast, in the absence of chronic motivation to be egalitarian, participants in positive moods would exhibit greater stereotype activation than those in negative moods.

When we submitted the log-transformed measure of stereotype activation to the ANOVA described previously, the only reliable effect to emerge was the predicted significant interaction between mood and egalitarianism, $F(1, 26) = 8.05$, $p = .009$, $\eta_p^2 = .24$ (see Figure 1). For participants with a chronic

goal to be egalitarian, positive mood tended to lead to decreased stereotype activation as compared to negative mood, $t(26) = 2.00$, $p = .076$, $d = .78$. In contrast, for participants without a chronic goal to be egalitarian, positive mood led to increased stereotype activation relative to negative mood, $t(26) = 2.20$, $p < .05$, $d = .86$.

Discussion

As hypothesized, the effect of mood on gender stereotype activation hinged on whether participants were chronically motivated to be egalitarian. For the motivated participants, positive mood led to less gender stereotype activation than negative mood. In the absence of this chronic motivation, however, positive mood led to increased stereotype activation compared to negative mood, conceptually replicating past research (e.g., Huntsinger et al., 2009). Of course, drawing strong causal inferences would require manipulating—rather than measuring—egalitarian goals. Past research demonstrates that motivations and goals can be triggered by repeated exposure to goal-relevant stimuli in the environment (Bargh, Gollwitzer, Chai, Barndollar, & Troetschel, 2001; Moskowitz, Li, & Kirk, 2004). Thus, in Experiment 2, we manipulated the temporary accessibility of egalitarian goals. We hypothesized that when an egalitarian goal was temporarily accessible, positive mood would lead to decreased stereotype activation compared to negative mood, whereas positive (vs. negative) mood would lead to increased stereotype activation in the absence of an accessible egalitarian goal.

Experiment 2
Method

Participants. As part of a course requirement, 40 participants (33 women) completed this experiment.

Procedure. After signing consent forms, participants were told that they would listen to some music for the purpose of pretesting them for another experiment and complete a series of computer-based measures and a brief questionnaire. Participants then spent 4 minutes listening to the same music as in Experiment 1, thereby manipulating mood. As the music continued to play, participants completed a lexical decision task, which subliminally exposed them to either egalitarian or neutral words. After the lexical decision task, participants completed the measure of stereotype activation and answered a series of questions assessing the effectiveness of the mood manipulation, as well as some demographic items. Finally, the experimenter thoroughly debriefed participants via a funneled debriefing procedure (Bargh & Chartrand, 2000). During debriefing, no participants expressed awareness of the true purpose of the priming manipulation or mood induction.

Materials

Priming procedure. A lexical decision task was used to subliminally prime participants with either words related or unrelated to egalitarianism. During this task, participants were instructed to respond with one key if the stimulus was a word and a different key if the stimulus was a nonword. Prior to each word or nonword appearing on the screen, participants were exposed to either a word related to egalitarianism (e.g., *egalitarian*, *fair*, *equality*) or an unrelated word (e.g., *chair*, *desk*, *television*) for 40 milliseconds, with 10 words included in each category; the target words that participants consciously viewed were always unrelated to egalitarianism. A mask (e.g., XXXXXXX) preceded and followed presentation of each prime word. The forward and backward masks remained on the screen for approximately 150 and 15 milliseconds, respectively. Masks were included to minimize the chance that participants would be able to consciously recognize the prime words, and indeed no participants reported seeing the prime words during debriefing. The entire task consisted of 10 practice and 60 test trials and all stimuli appeared in the center of the computer screen. Words or nonwords remained on the screen until participants provided the correct answer. Incorrect answers elicited a red error message in the middle of the screen.

Stereotype activation. An implicit association task was used to measure stereotype activation. Specifically, this measure was designed to assess the extent to which participants associated men + leader and female + supporter versus men + supporter and female + leader and was modeled after previous research (see Dasgupta & Asgari, 2004, for complete details). Response latencies were dealt with following the recommendations of Greenwald, Nosek, and Banaji (2003) and analyses used the D-600 measure of stereotype activation. Higher values on this measure indicate greater stereotype activation (i.e., a greater activation of an association of men + leader and female + supporter than the reverse).

Mood manipulation check. We assessed the efficacy of the mood manipulation by asking participants to rate how positive, negative, happy, and sad they had felt while listening to music on 7-point scales (1 = *not at all* to 7 = *very much*); after appropriate rescoring, a composite measure was formed, such that higher numbers indicated more positive mood ($\alpha = .90$).

Results

All predictions were examined via a 2 (mood: positive, negative) × 2 (prime: egalitarian, neutral) ANOVA.

Mood manipulation check. The mood induction was successful. Participants felt more positive during the positive mood induction ($M = 5.67$, $SD = .90$) than the negative mood induction ($M = 4.48$, $SD = 1.34$), $F(1, 36) = 10.72$, $p = .002$, $\eta_p^2 = .23$, all other Fs < 1, ps > .5.
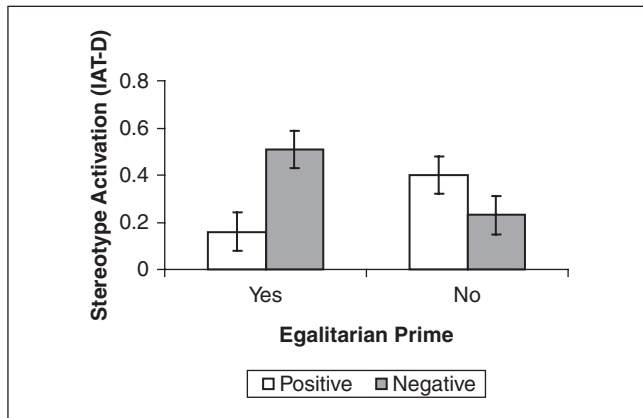
Figure 2. Experiment 2: Gender-stereotype activation (IAT-D score) as a function of egalitarian prime (yes vs. no) and mood
Note: Error bars represent standard errors. IAT = implicit association task.

Stereotype activation. We hypothesized that when an egalitarian goal was made accessible, positive mood would empower this response, leading to less stereotype activation compared to negative mood. In contrast, we predicted that when an egalitarian goal was not made accessible, positive mood would lead to greater stereotype activation compared to negative mood. When the measure of stereotype activation was submitted to the ANOVA described previously, the only reliable effect to emerge from these analyses was the predicted interaction, $F(1, 36) = 11.52$, $p < .002$, $\eta_p^2 = .24$ (see Figure 2). As predicted, when an egalitarian goal was made accessible, participants in positive moods displayed less stereotype activation than those in negative moods, $t(36) = 3.11$, $p = .003$, $d = 1.04$. When an egalitarian goal was not accessible, however, participants in positive moods exhibited somewhat greater stereotype activation than those in negative moods, $t(36) = 1.63$, $p = .11$, $d = .54$, consistent with previous research.

Discussion

Dovetailing with Experiment 1, we found that temporarily accessible goals moderated the influence of mood on stereotype activation. Positive (vs. negative) mood reduced stereotype activation when an egalitarian goal was accessible. By contrast, and consistent with past research, when this goal was not made accessible the effect of mood was in the opposite direction—positive mood led to greater stereotype activation than negative mood.

Experiment 3

To provide converging evidence that the link between affect and stereotype activation hinges on the accessibility of stereotype-relevant thoughts and responses, we manipulated the accessibility of counterstereotypic thoughts (rather than

egalitarian goals) in Experiment 3. We manipulated mood and exposed half the participants to strong female leaders, thereby priming counterstereotypic thoughts, before measuring stereotype activation. Previous research (e.g., Dasgupta & Asgari, 2004) found that participants exhibited less stereotype activation when exposed to strong female leaders than when exposed to a neutral category (flowers). We predicted that when counterstereotypic thoughts were most accessible, people in positive moods would display less stereotype activation than those in negative moods. In contrast, we predicted that when such thoughts were not accessible, people in positive moods would display greater stereotype activation than those in negative moods.

We also examined another account of affective regulation of stereotype activation, namely, possible arousal differences between the positive and negative mood inductions. It is possible, for example, that the positive mood induction increased arousal compared to the negative mood induction, which could have led participants in positive moods to utilize, and those in negative moods to reject, accessible thoughts and response tendencies (Bargh & Cohen, 1978; Zajonc, 1965). Following past research (Huntsinger & Smith, 2009; Tamir, Robinson, & Clore, 2002), we measured participants' self-reported arousal to address this possibility.

Method

Participants. To partially fulfill a course requirement, 39 participants (24 women) completed the experiment.

Procedure. After signing consent forms, participants were given an overview of the study and asked to listen to music, following exactly the same protocol as in Experiment 2. As the music continued to play, participants viewed photos and descriptions of strong female leaders (to prime counterstereotypic thoughts) or pictures of flowers (to provide a neutral control), depending on their randomly assigned condition. Next, participants completed the measure of stereotype activation and answered mood and demographic questions. Finally, participants were given a funneled debriefing (Bargh & Chartrand, 2000), during which no participants expressed awareness of the true purpose of the thoughts manipulation or mood induction.

Materials

Thoughts manipulation. Using a manipulation from past research (Dasgupta & Asgari, 2004), we made counterstereotypic thoughts accessible by exposing participants to 16 photos of well-known female leaders (i.e., Ruth Bader Ginsberg, Gloria Steinem, etc.), accompanied by brief paragraphs describing each woman's accomplishments. In the neutral thoughts condition, participants viewed 16 photos and descriptions of flowers (i.e., rose, tulip, etc.). At the beginning of this task, instructions on the computer screen informed participants

that the photos and descriptions they were about to view were being pretested for another experiment that would take place next semester. Suggesting that the thoughts manipulation was equally successful across conditions, the average time participants spent reading the slides did not differ as a function of induced mood, thought accessibility condition, or the interaction between the two, all Fs < 1.0, ps >.7.

Stereotype activation. Stereotype activation was assessed using the same IAT as in Experiment 2, with scores calculated in the same way.

Mood manipulation check and arousal. We used the same measures as in Experiment 2 to create a composite measure of positive mood (α = .90). To determine whether the positive and negative mood inductions elicited different levels of arousal, participants were asked to rate how alert and tired they felt while listening to the music on 7-point scales (1 = *not at all* to 7 = *very much*). After appropriate rescoring, a composite measure was formed, such that higher numbers indicated greater arousal (r = .74). One participant's responses were lost due to computer error.

Results

All predictions were examined via a 2 (mood: positive, negative) × 2 (prime: female leader, flowers) ANOVA.

Mood manipulation check and arousal. The mood induction was successful. Participants felt more positive during the positive mood induction (M = 5.99, SD = .80) than the negative mood induction (M = 5.25, SD = 1.08), $F(1, 34)$ = 6.14, p = .018, η_p^2 = .15. No other effects were significant, Fs < 1.8, all ps > .2. Inconsistent with an arousal-based account, participants reported feeling similar levels of arousal while listening to the positive (M = 4.31, SD = 1.50) and negative (M = 4.15, SD = 1.40) music, $F(1, 34)$ = .12, p = .73, η_p^2 = .04. No other effects were significant, Fs < 1.3, all ps > .25.

Stereotype activation. We predicted that when counterstereotypic thoughts were made accessible, positive mood would reduce stereotype activation compared to negative mood. When counterstereotypic thoughts were not made accessible, positive mood was expected to increase stereotype activation compared to negative mood. Only the predicted interaction between prime and mood was significant, $F(1, 35)$ = 8.79, p = .005, η_p^2 = .20 (see Figure 3). Consistent with predictions, participants exposed to strong female leaders exhibited less stereotype activation if they were in a positive versus negative mood, $t(35)$ = 2.09, p = .045, d = .71. In contrast, participants exposed to flowers displayed greater stereotype activation if they were in a positive versus negative mood, $t(35)$ = 2.12, p = .042, d = .72.

Discussion

Consistent with Experiments 1 and 2, the results of Experiment 3 demonstrate that the effect of mood on gender
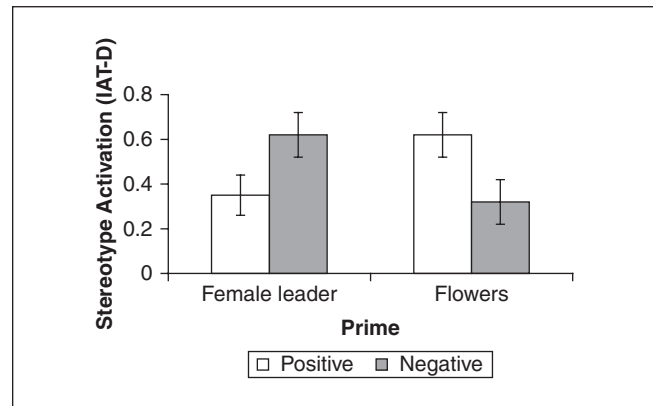

Figure 3. Experiment 3: Gender stereotype activation (IAT-D score) as a function of exemplar exposure (strong female leader vs. flowers) and mood
Note: Error bars represent standard errors. IAT = implicit association task.

stereotype activation depends on the relative accessibility of counterstereotypic thoughts and response tendencies. In Experiment 4, we extended our investigation to racial stereotypes and we included a neutral mood condition to identify whether the previous findings stemmed from the presence of positive mood or the presence of negative mood.

Experiment 4

In Experiment 4, we examined activation of race-related stereotypes in the weapon identification task (Payne, 2001) in which participants are briefly exposed to either a Black or White face and then must judge whether a presented object is a weapon or a tool. Previous research indicates that participants are more likely to mistakenly categorize a tool as a weapon if it follows exposure to a Black face and to make the converse error following exposure to a White face (Payne, 2001). Direct evidence of stereotype activation on the weapon identification task comes from application of process-dissociation procedures (PDP) designed to parse individuals' responses in this task into the product of controlled and automatic processing (Jacoby, 1991; Payne, 2001).

Fundamental to the process-dissociation procedure is the idea that controlled and automatic processes are independent, concurrently contributing to behavior on a given task. The relative contribution of controlled and automatic processes responses can be measured within this task by comparing performance on stereotype-congruent (i.e., Black face/weapon; White face/tool) versus stereotype-incongruent (i.e., Black face/tool, White face/weapon) trials. In congruent trials, accurate identification of a weapon or tool could result from controlled processing (i.e., efforts to constrain processing to task-relevant information) or automatic processing (i.e., automatic stereotype activation; Payne, 2005). In congruent trials, for example, both controlled efforts to execute the correct response to the

presented object and automatically activated stereotypes linking African Americans with criminality/danger could lead to a correct response when presented with a weapon. In incongruent trials, however, these controlled and automatic processes stand in conflict; that is, controlled processing should facilitate correct responding (e.g., respond tool when presented with a tool), but the influence of automatic stereotype activation (e.g., an association between African Americans and crime/danger) should facilitate errors (e.g., respond weapon when presented with a tool).

Given these conditions, the PDP can estimate the contribution of controlled and automatic processing to behavior in the weapon identification task (Payne, 2001). Specifically, on congruent trials, correct responses could be driven by either controlled processing (C) or automatic processing (A) given a failure of control (1 – C). This can be expressed by the following equation:

$$P \text{ (correct | congruent)} = C + A (1 - C). \text{ (1)}$$

On incongruent trials, these two processes are opposed to one another. If control fails, automatic processing (i.e., activated stereotypes) drives participants' responses, leading to incorrect responses. This can be expressed by the following equation:

$$P \text{ (error | incongruent)} = A (1 - C). \text{ (2)}$$

Based on these two equations, one can algebraically solve for estimates of controlled and automatic processing:

$$C = P \text{ (correct | congruent)} - P \text{ (error | incongruent) (3)}$$

$$A = P \text{ (error | incongruent)} / (1 - C). \text{ (4)}$$

Existing research has successfully estimated the role of controlled and automatic processes in the weapon identification task and established that the PDP controlled estimate reflects controlled efforts to constrain processing to task demands or goal-relevant information and the PDP automatic estimate represents the degree of automatic stereotype activation (for a review, see Payne & Stewart, 2007).

Automatic stereotype activation on the weapon identification task initially appeared quite resistant to change. Explicitly instructing participants to avoid stereotypical bias on the weapon identification task, for example, ironically increases stereotypical mistakes, and, as revealed by process-dissociation analysis, this is driven by increases in stereotype activation and not increased controlled processing (Payne, Lambert, & Jacoby, 2002). Recent research, however, demonstrated that making accessible counterstereotypic thoughts and response tendencies by means of implementation intentions (Gollwitzer, 1999) reduced stereotype activation (Stewart & Payne, 2008). Specifically, in this research participants instructed to think "safe" in response to Black faces exhibited

few stereotypical mistakes in the weapon identification task compared to those instructed to think "quick" or to think "accurate" in response to Black faces, who displayed the usual pattern of stereotypical mistakes. Process-dissociation procedures revealed that this reduction in stereotypical mistakes was driven by change in stereotype activation and not increased controlled processing on the part of participants to offset the impact of activated stereotypes on their responses (Stewart & Payne, 2008).

As well as examining these underlying processes, we included a neutral mood condition to explore whether our previous results were driven by the presence of positive mood or the presence of negative mood or both. Because most people experience positive moods most of the time (Diener & Diener, 1996), studies that include a condition in which no mood is induced typically find that responses of people in this condition mirror those of people in positive mood induction conditions (Gasper & Clore, 2002; Huntsinger & Smith, 2009; Ruder & Bless, 2003; Storbeck & Clore, 2005, 2008). Thus, we anticipated that the neutral and positive mood conditions would produce similar results, with the negative mood condition driving the observed differences. Finally, in Experiment 4 we used an autobiographical writing task, rather than music, to manipulate mood to demonstrate that the results of previous experiments were not an artifact of the musical mood induction.

In summary, Experiment 4 extends our investigation beyond the previous studies by (a) examining racial stereotypes, (b) disentangling the underlying processes, (c) manipulating mood via another means, and (d) including a neutral mood condition. We predicted that when instructed to think "safe," participants in positive and neutral moods would display fewer stereotypical mistakes on the weapon identification task than those in negative moods. By contrast, when instructed to think "accurate," we predicted that participants in positive and neutral moods would exhibit more stereotypical mistakes than those in negative moods. Based on prior research (e.g., Huntsinger et al., 2009; Stewart & Payne, 2008), we expected variation in stereotypical mistakes across conditions to be driven by change in stereotype activation and not change in controlled processing, a prediction we investigated via process-dissociation analyses.

Method

Participants. For partial fulfillment of a course requirement, 96 (51 women) participants completed this experiment.

Procedure. After signing consent forms, participants were given an introduction to the study, which was similar to the previous studies, but the experimenter explained that participants would complete a writing task in the service of creating a Life Events Inventory. Depending on their randomly assigned mood condition (positive, negative, or neutral),

participants were asked to describe a positive, negative, or neutral event. The instructions were modeled on past research (Schwarz & Clore, 1983) and were designed to focus participants' attention on emotional aspects of the positive/negative events, thereby evoking a strong emotional response, or mundane aspects of the event in the neutral mood induction. Following the mood induction, participants completed (a) a practice version of the weapon identification task, (b) the thoughts manipulation, (c) the critical version of the weapon identification task, and (d) items assessing mood and demographics. Finally, participants were thoroughly debriefed.

Materials

Weapon identification task. The weapon identification task used in this experiment was identical to Payne's (2001) Experiment 2. Participants were informed that the task measured speed and accuracy and that they would see two pictures briefly presented on the computer screen. They were told to ignore the first picture, a face, and only respond to the second picture by indicating whether it was a gun or tool using one of two computer keys. Participants were told to respond as quickly and accurately as possible and if they made a mistake to continue to the next trial.

In both practice (24 trials) and test trials (192 trials split into three equal blocks), participants were first exposed to a prime (a White or Black face) and then a target (a tool or gun). The prime remained on the screen for 200 milliseconds and was immediately replaced by the target. The target remained on the screen for 200 milliseconds and was then replaced by a visual mask, which remained on the screen until participants responded. For each trial, a response deadline was imposed—participants were required to respond within 800 milliseconds from the presentation of the target stimulus. Failure to respond in that timeframe was counted as an error. After completing the practice trials, participants were exposed to the thoughts manipulation task described in the following and then completed the test trials.

Thought manipulation task. In the thought manipulation task, virtually identical to Stewart and Payne (2008), all participants were first informed that the race of the primes influences how they classify the second object. They then read a few sentences describing how making a resolution to respond in a certain way can change one's reactions. After reading this passage, participants were randomly assigned to either the counterstereotypic condition or the accuracy condition. In the counterstereotypic condition, participants were instructed to think the word *safe* whenever they saw a Black face on the screen, whereas in the accuracy condition, participants were told to think the word *accurate* whenever they saw a Black face (for complete instructions used in this task, see Stewart & Payne, 2008, p. 1334). Immediately after reading these instructions, participants in both conditions completed the weapon identification test trials.

Mood manipulation check. As a manipulation check, participants were asked to rate how positive, negative, happy, sad, good, and bad they had felt while listening to the musical selection on six scales from 1 = *not at all* to 7 = *very much*. After appropriate recoding, a composite measure of positive mood was formed (α = .88).

Results

Mood manipulation check. The mood manipulation was successful, $F(2, 90) = 39.38$, $p < .0005$, $\eta_p^2 = .47$. Participants felt more positive during the positive mood induction ($M = 5.47$, $SD = 1.13$) and neutral mood induction ($M = 4.98$, $SD = .97$) than the negative mood induction ($M = 3.21$, $SD = 1.08$), ps < .005. The former two conditions differed somewhat from one another, $p = .07$.

Error rates. We submitted the error rate data to a 3 (mood: positive, negative, neutral) × 2 (thought: safe, accurate) × 2 (prime: Black, White) × 2 (target: weapon, tool) mixed-model analysis of variance with the last two factors varying within participants. This analysis revealed the predicted four-way interaction, $F(2, 90) = 8.24$, $p < .005$, $\eta_p^2 = .16$ (see Figure 4). Consistent with predictions, when instructed to think "safe," participants in positive moods and neutral moods displayed fewer stereotypical mistakes on the weapon identification task than those in negative moods. By contrast, when instructed to think "accurate," participants in positive moods and neutral moods exhibited more stereotypical mistakes than those in negative moods.

PDP analyses. Estimates of controlled and automatic processing on the weapon identification task were created using Equations 1 through 4 described earlier. Following Payne (2001), for the Black prime conditions, the controlled estimate was created by subtracting the probability of incorrect responses when tool was primed with a Black face from the probability of correct responses when gun was primed with a Black face. The automatic estimate was then derived by taking the probability of incorrect responses when tool was primed with a Black face and dividing it by $(1 - C)$. Estimates of controlled and automatic processing for the White prime conditions were calculated via the same method. Higher values on the two controlled estimates represented a greater tendency to exert cognitive control upon presentation of White or Black primes. Higher values on the two automatic estimates represented a greater automatic tendency to respond gun in the presence of a White or Black prime.

We submitted the PDP controlled and automatic estimates to separate 3 (mood: positive, negative, neutral) × 2 (thought: safe, accurate) × 2 (prime: Black, White) mixed-model analyses of variance with the last factor varying within participants. These analyses revealed that our manipulations influenced stereotype activation rather than controlled processing. Specifically, there was a significant interaction for automatic estimates, $F(2, 90) = 9.72$, $p < .0005$, $\eta_p^2 = .18$
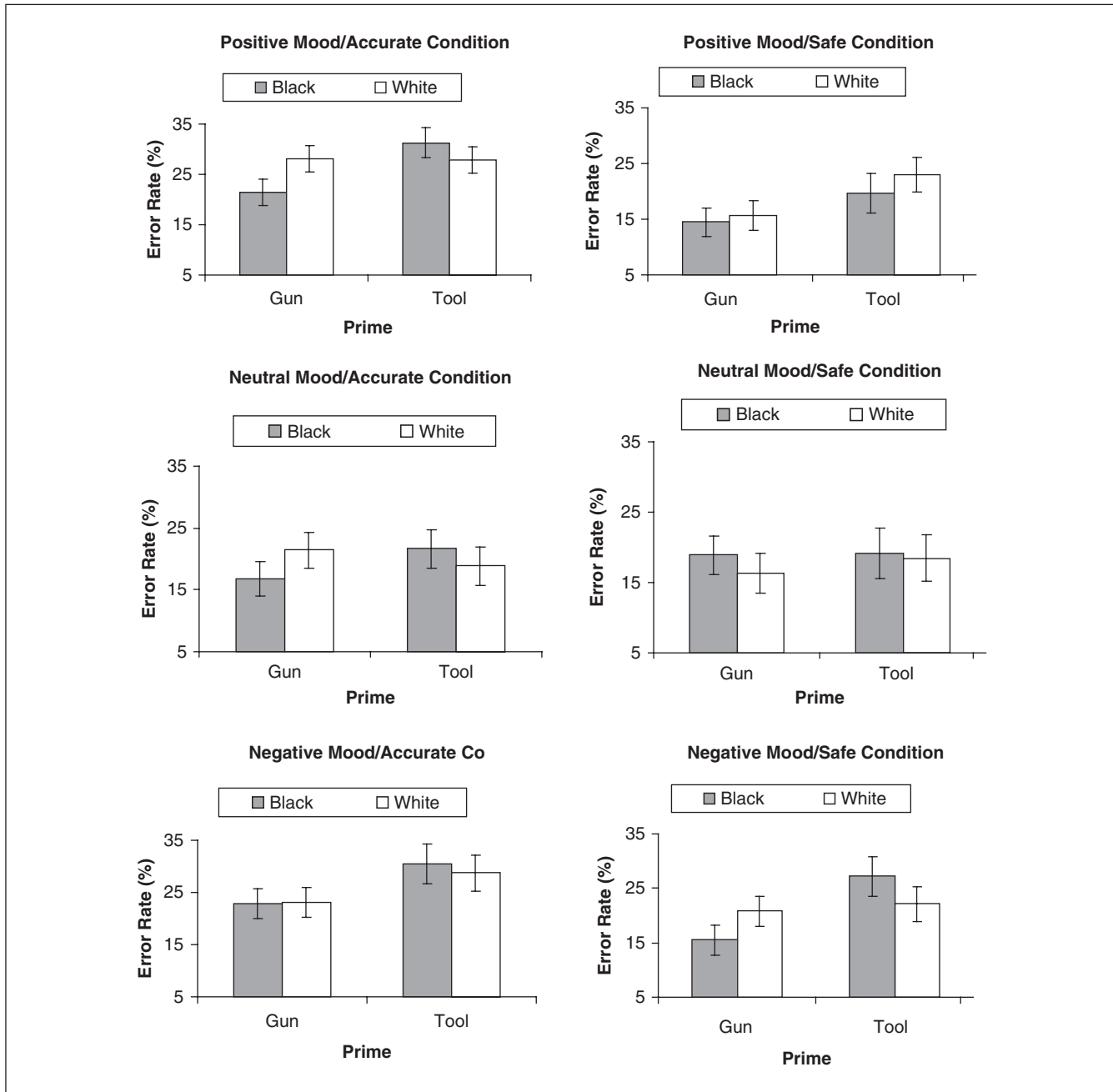
Figure 4. Experiment 4: Race-relevant stereotype activation (i.e., proportion of errors) as a function of prime (Black face vs. White face), target (weapon vs. tool), thought condition (safe vs. accuracy), and mood (positive vs. negative vs. neutral)
Note: Error bars represent standard errors.

(see Figure 5). Controlled estimates, however, did not vary as a function of mood and/or thought, all ps > .15.

In the safe condition, participants in positive moods and neutral moods displayed less stereotype activation than those in negative moods. Positive mood participants in this condition displayed a greater stereotype-*in*consistent tendency and neutral mood participants displayed no significant difference in the tendency to respond gun after presentation of White primes than Black primes, $t(90) = 1.80$, $p = .07$, $d = .38$ and $t(90) = .25$, $p = .81$, $d = .05$, respectively. Negative mood participants, by contrast, displayed a greater stereotype-consistent automatic tendency to respond gun after presentation of Black primes than White primes, $t(90) = 3.93$, $p < .005$, $d = 83$.

In the accuracy condition, the opposite pattern of stereotype activation was found—participants in positive moods and neutral moods displayed greater stereotype activation
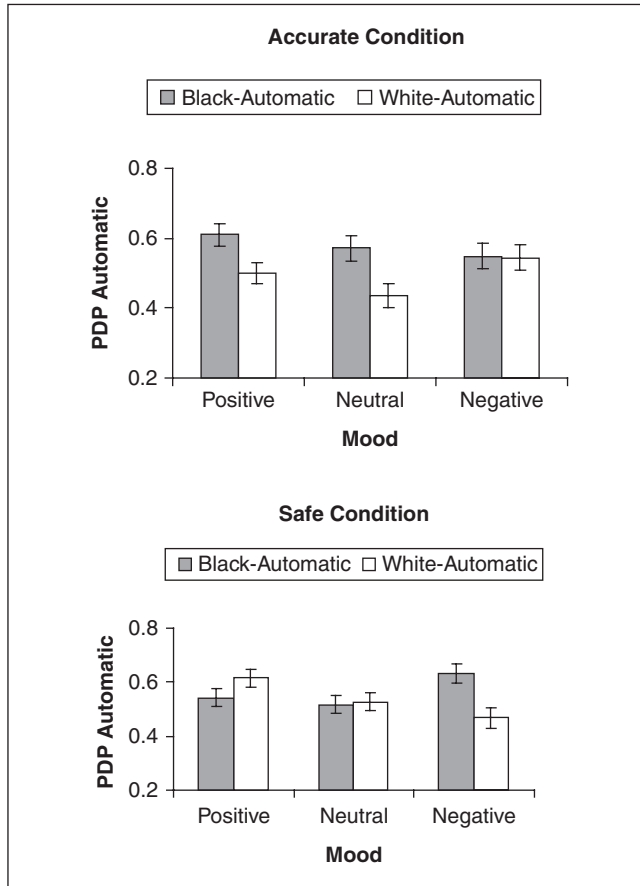
Figure 5. Experiment 4: Automatic race-stereotype activation (i.e., PDP automatic estimate) as a function of prime (Black face vs. White face), thought condition (safe vs. accuracy), and mood (positive vs. negative vs. neutral)

Note: Error bars represent standard errors. PDP = process-dissociation procedures.

than those in negative moods. Positive mood and neutral mood participants displayed a greater stereotype-consistent automatic tendency to respond gun after presentation of Black primes than White primes, $t(90) = 2.64$, $p = .011$, $d = .56$ and $t(90) = 3.19$, $p = .002$, $d = .67$, respectively. In contrast, negative mood participants in this condition displayed no difference in the tendency to respond gun after presentation of White primes than Black primes, $t(90) = .09$, $p = .93$, $d = .02$.

Discussion

The results of Experiment 4 shed light on the cognitive and affective processes underlying the findings of the preceding studies by demonstrating that mood and accessible thoughts interact to influence automatic stereotype activation rather than controlled processes. Through the inclusion of a neutral mood condition, Experiment 4 provides evidence that negative moods—as compared to both positive and neutral

moods—may serve to undermine the automatic activation of accessible mental content. The fact that the observed effects were driven by the negative mood condition is not surprising given that participants in the positive mood and neutral mood conditions expressed similarly positive moods. The pattern of responses among neutral mood participants is also consistent with past research in which mood was not induced—namely, instructing participants to think "safe" in response to Black faces reduced stereotyping compared to baseline conditions (e.g., Stewart & Payne, 2008). In contrast, negative mood appears to reverse the previously observed association between accessible thoughts and stereotype activation.

General Discussion

The results of four experiments revealed that the link between affect and stereotype activation found in previous research (Huntsinger et al., 2009) depends on the relative accessibility of stereotype-relevant thoughts and response tendencies. When thoughts and response tendencies that undermine stereotype activation are most accessible, the customary link between affect and stereotype activation reverses—positive affect now leads to less stereotype activation than negative affect. In contrast, when such thoughts and response tendencies are not accessible—as is often the case—then positive affect leads to more stereotype activation than negative affect. Underscoring the robustness of this effect, this pattern was found across four experiments that employed three different measures or manipulations of accessible thoughts and response tendencies, two different mood manipulations, three different measures of stereotype activation, and activation of both gender and race stereotypes.

Theoretical and Practical Implications

As discussed earlier, we consider the relationship between affect and stereotype activation observed in the present research to reflect a more general manner by which affect regulates cognition—namely, that positive affect confers positive value on accessible thoughts and response tendencies and negative affect confers negative value on such thoughts and tendencies, which then regulates their use and consequently their activation and impact on responses (for a review of this view, see Clore & Huntsinger, 2009). There are, of course, a variety of affect–cognition models that differ to varying degrees from this view. In what follows, we discuss the implications of the present research, and theoretical perspective, for these models.

The finding that affect regulates activation of stereotypes is difficult to reconcile with affect–cognition models that limit the influence of affect to controlled or explicit judgments and responses (e.g., Bower & Mayer, 1985; Forgas, 1995). These models would not expect mood to shape automatic activation of stereotypes. Thus, the viability of these

older models must be questioned in light of the present findings, along with other recent research demonstrating that affect may regulate the automatic activation of attitudes and other mental content (Huntsinger et al., 2009; Storbeck & Clore, 2008).

The present results are also inconsistent with depth-of-processing accounts, which argue that positive affect triggers heuristic, superficial information processing whereas negative affect triggers systematic, detailed information processing (Fiedler, 2001; Forgas, 1995; Mackie & Worth, 1991). In Experiment 4, for example, process-dissociation analyses revealed no differences in systematic or detailed processing between participants in positive and negative moods on the weapon identification task. This result is in harmony with other research that also found no mood-related differences in depth or extent of processing (e.g., Gasper & Clore, 2002; Huntsinger et al., 2009; Krauth-Gruber & Ric, 2000).

Still other perspectives propose that positive and negative affect are dedicated to different styles of cognitive processing. According to this view, for example, positive affect is thought to prompt a global focus whereas negative affect is thought to prompt a local focus (Fredrickson & Branigan, 2005; Gasper & Clore, 2002). This idea was recently used to explain how mood regulates the use of accessible information when making judgments (Avramova & Stapel, 2008). In this research, the judgments of people in positive moods were assimilated to primed information whereas those of people in negative moods were contrasted away from primed information. This was thought to occur because positive mood leads people to focus on global features of accessible information, which leads to assimilation, and negative mood leads people to focus on local features of accessible information, which leads to contrast.

There may, however, be another way of understanding the standard link between mood and global-local focus. A global focus is frequently a dominant or highly accessible orientation toward incoming information (Bruner, 1957; Kimchi, 1992). In past research, then, positive affect may have had its influence by conferring value on this highly accessible and routine response orientation, rather than by directly sparking a global focus. If this is the case, then making a local focus more accessible than a global focus should reverse the usual relation between mood and global–local orientation. Consistent with this idea, recent research reveals that whether positive or negative affect leads to a global or local focus depends on which one is most accessible in mind at the moment (Huntsinger, Clore, & Bar-Anan, in press).

Of the existing affect–cognition models, our perspective most closely aligns with the mood-and-general-knowledge model (Bless, 2001; Bless et al., 1996). There are, however, important differences. First, this model is agnostic about whether affect regulates *activation* of stereotypes and accessible response tendencies. Second, according to a strict reading of this model, positive affect signals a benign environment, which encourages reliance on *only* preexisting general knowledge structures, such as stereotypes, and negative mood signals a problematic environment, which discourages reliance on such structures. In light of this direct, exclusive connection between affect and preexisting knowledge structures such as stereotypes then, people in positive moods should display greater stereotyping than those in negative moods, regardless of the presence or absence of egalitarian response tendencies, exposure to counterstereotypic exemplars, and so forth. In contrast, our results suggest that affect is not inextricably connected to the use of stereotypes and that previously observed relationships between affect and stereotypes are reversed when counterstereotypic responses are accessible. Finally, unlike state-of-the-environment models, we favor the idea that affect directly signals the value (or validity) of accessible thoughts and responses, which then regulates cognitive processing, rather than indirectly via shaping perceptions of the environment (see also Clore & Huntsinger, 2007, 2009).

Broadly speaking, our results suggest that previous models of affect and cognition are not wrong per se, but—to varying degrees—incomplete. Although older models of affect and cognition can account for many findings in the extant literature (e.g., Bower & Mayer, 1985; Forgas, 1995), proponents of these models may have too quickly discounted the potential for affect to influence the major sphere of automatic processing. Conversely, researchers may have been too quick to accept evidence for depth-of-processing accounts. From our perspective, findings that appear to support these models may have emerged because heuristic, superficial responses happened to be accessible for participants in psychology experiments. Similarly, the evidence for theoretical perspectives emphasizing the direct link from positive affect to global focus and stereotypes may reflect the fact that global focus and stereotypes are frequently—though certainly not always—highly accessible. Thus, metaphorically speaking, each of these previous approaches may have successfully modeled important parts of the elephant, but we believe that a broader view is necessary in order to understand this complex beast.

Moreover, as previous research amply demonstrates (e.g., Hirt, Levine, McDonald, Melton, & Martin, 1997; Wegener & Petty, 2001), affect may influence cognition in a variety of ways—even within the same experiment. Future research is essential to delineate when affect regulates cognition by signaling the value of accessible mental content and when affect exerts its influence in other ways. Finally, given that stereotypes often spring to mind whenever people encounter or merely consider members of stereotyped groups, for most people and in most circumstances, positive affect will frequently lead to greater stereotype activation than negative affect.

Beyond its theoretical implications for understanding the influence of affect on cognition, the present work holds practical implications for the status of happiness. As the pursuit of happiness has become a centerpiece of Western culture, there

have emerged two divergent views of happiness and its consequences for cognition and behavior. On one side are those who emphasize the usefulness of happiness, often pointing to the potential for happiness to enhance creativity, social bonding, well-being, and so forth. On the other are those who highlight the hazards of happiness, often pointing to the potential for happiness to promote stereotyping and simplistic thinking. Although we hesitate to enter into this debate, we do believe our research and theoretical approach provides something of a middle ground between these opposing perspectives. From our view, whether the impact of happiness on cognition and behavior is beneficial or detrimental depends on what thoughts and response tendencies happen to be in mind at the moment. While it is certainly possible for happiness to promote stereotyping, this need not be the case. Indeed, for the growing number of people who are deeply committed to equality, it is negative affect—rather than positive affect—that may serve as the enemy of egalitarianism.

Conclusion

In closing, the present research demonstrates that the link between affect and stereotype activation is quite malleable and hinges on the relative accessibility of stereotype-relevant thoughts and response tendencies. When thoughts and response tendencies that undermine stereotyping are accessible—whether because of a chronic or temporary goal to be egalitarian or having people entertain counterstereotypic thoughts— positive affect reduces stereotype activation compared to negative affect. When, however, such thoughts and response tendencies are not accessible, as is often the case, positive affect then enhances stereotype activation compared to negative affect. More broadly, and to return to the gambling metaphor with which we began, people in positive moods appear to cognitively gamble with whatever cards they are initially dealt whereas those in negative moods, dissatisfied with these cards, ask for another hand from which to play.

Authors' Note

Portions of this research were conducted as part of the first author's dissertation.

Declaration of Conflicting Interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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