Anger Enhances Correspondence Between Implicit and Explicit Attitudes

Jeffrey R. Huntsinger
Loyola University Chicago

The goal of the current research was to subject to empirical examination the idea that the experience of anger would narrow the separation between implicit and explicit attitudes. Specifically, the tendency of anger to promote a sense of certainty in one's point of view was predicted to enhance the subjective validity of implicit attitudes, and that this validation of implicit attitudes by anger should increase implicit–explicit attitude correspondence. Consistent with these predictions, across three experiments, anger, as compared with neutral emotion (Experiments 1–3) and sad emotion (Experiments 1–2), was found to increase implicit–explicit attitude correspondence. Appraisals of certainty, but not individual control, mediated the effect of anger on implicit–explicit correspondence (Experiment 3). More generally, these results imply that anger may play an essential, but until now overlooked, role in directing the interplay between spontaneous and deliberative aspects of the self.

Keywords: emotion, anger, emotion-cognition interface, implicit social cognition, attitudes

In *The Emotions: Outline of a Theory*, Jean Paul Sartre proposed that when people are angry, "there is a weakening of the barriers which separate the deep and superficial layers of the self" (Sartre, 1948, p. 36). The idea of a stratified mind in which some layers are farther from and others nearer to the psychological surface is echoed in contemporary treatments of implicit and explicit self-esteem and attitudes (see, e.g., Dijksterhuis, Albers, & Bongers, 2009; Hofmann & Wilson, 2010; Olson & Fazio, 2009; Wilson & Bar-Anan, 2008). Because implicit and explicit attitudes often disagree, a focus on the reasons for separation between such attitudes has emerged as an important topic of research (Nosek, 2007). The goal of the current research was to subject to empirical scrutiny the hypothesis, inspired by Sartre's insight, that the experience of anger may narrow the separation between implicit and explicit attitudes, causing people's explicit attitudes to more faithfully reflect their implicit attitudes.

The terms "implicit attitudes" and "explicit attitudes" are regularly used, but rarely are the same assemblage of properties assigned to these constructs (cf. Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995; Petty, Brinol, & DeMarree, 2007; Wilson, Lindsey, & Schooler, 2000). Rather than attempting to adjudicate between these alternative models, in the present research the definitions of implicit and explicit attitudes contained in the associative-propositional evaluation (APE) model (Gawronski & Bodenhausen, 2011) will be taken as a "temporary given" (Zanna, 2004). According to this model, implicit attitudes are thought to reflect the output of associative processes, which involve the activation of mental associations from memory. Although people are unlikely to have access to the associative processes giving rise to implicit attitudes, they may have experiential access to the output of such processes, with implicit attitudes often

being experienced as gut feelings or intuitive reactions (Gawronski & LeBel, 2008; Huntsinger, 2011; Huntsinger & Smith, 2009; Jordan, Whitfield, & Zeigler-Hill, 2007; Ranganath, Smith, & Nosek, 2008; Smith & Nosek, 2011). Explicit attitudes are thought to reflect the output of propositional processes, which involve validation or invalidation of the information implied by activated associations.

People typically base their explicit evaluative judgments on their initial gut reactions (i.e., implicit attitudes), unless such reactions disagree with other accessible propositions (Gawronski & Bodenhausen, 2006, 2011). Although such validation of implicit attitudes in many cases arises from their consistency with the implications of other activated information, recent research revealed that affective feelings may directly modify the apparent validity of one's implicit attitudes (Huntsinger & Smith, 2009). This research found that positive affect from positive mood promotes attitudinal correspondence because it increases the subjective validity of the implicit attitude, and negative affect from negative mood promotes attitudinal divergence because it decreases the validity of implicit attitudes.

At first glance it might seem sensible to assume that, because both are negative emotions, anger might impact implicit–explicit attitude correspondence similar to sadness. Notwithstanding the intuitive appeal of such an assumption, the judgmental and cognitive consequences of anger more closely resemble that of happiness than they do sadness (Carver & Harmon-Jones, 2009; Clore & Huntsinger, 2009; Lerner & Tiedens, 2006). Thus, like happy people, angry people exhibit more optimistic beliefs about experiencing future life events than sad people (Lerner & Keltner, 2001). In studies of stereotyping, anger has been found to increase reliance on stereotypes similar to that found for happy mood (Bodenhausen, Sheppard, & Kramer, 1994). Finally, anger, like happiness, is associated with approach motivation (Carver & Harmon-Jones, 2009; Harmon-Jones & Allen, 1998).

Why does anger have these effects? An answer to this question can be found through interrogation of the pattern of appraisal accompanying the experience of anger. Anger is a relatively com-

---

plex emotion in that it involves both displeasure at undesirable outcomes and disapproval of the blameworthy actions that caused them (Ortony, Clore, & Collins, 1988). The psychological situation represented in anger, then, is one in which the angry person holds the moral high ground. Thus, although anger is a negative emotion, the information it conveys about one's own perspective is positive, and it is therefore often accompanied by feelings of confidence or certainty in one's point of view (Clore & Huntsinger, 2009; Lerner & Tiedens, 2006). Because anger is accompanied by a sense of confidence or certainty in one's position, it privileges accessible thoughts and inclinations, including stereotypes, chronically accessible scripts, and attention to superficial cues in a persuasion context (Bodenhausen et al., 1994; Tiedens, 2001; Tiedens & Linton, 2001).

In the present research, because gut reactions (i.e., implicit attitudes) are simply distillations of one's evaluative point of view toward a particular attitude object, the tendency of anger to promote a sense of certainty in one's point of view was predicted to enhance the subjective validity of such reactions. This validation of implicit attitudes by anger should lead explicit attitude reports to more faithfully reflect activated implicit attitudes. This hypothesis was tested in three experiments for two different attitude domains: academic attitudes (Experiment 1) and self attitudes (Experiments 2 and 3). In each experiment, participants first completed the measure of implicit attitudes, and then experienced the emotion manipulation in which anger or sadness or neutral emotion was induced. Following this, participants completed the measure of explicit attitudes. Anger, as compared with neutral emotion (Experiments 1–3) and sad emotion (Experiments 1–2), was predicted to increase implicit–explicit attitude correspondence. The potential mediating role of emotion-related differences in appraisals of certainty was examined in Experiment 3.

Experiment 1

Method

Participants. Two hundred and 13 participants (127 women) took part in this experiment for partial fulfillment of a course requirement.

Materials and procedure. Participants were greeted by an experimenter, and seated in front of a computer in an individual cubicle. After signing consent forms, participants first completed the measure of implicit academic attitudes. Participants then experienced the emotion manipulation, modeled after past research (Schwarz & Clore, 1983), in which, depending on their randomly assigned condition, participants were asked to describe an angry, sad, or neutral event. After the emotion manipulation, participants completed the measure of explicit academic attitudes and answered a series of manipulation checks and demographic items. A funneled debriefing (Dulany, 1962) revealed that no participants expressed awareness of the true purpose of the experiment or the emotion induction.

Implicit academic attitudes. The Implicit Association Test used to measure implicit academic attitudes, identical to that used in past research (Huntsinger, 2011; Huntsinger & Smith, 2009; Nosek, Banaji, & Greenwald, 2002), assessed associations between attitude objects (e.g., math and arts) and evaluative attributes (e.g., pleasant and unpleasant). All stimuli were taken from Nosek et al. (2002). Participants completed the task in seven blocks following the recommendations of Nosek, Greenwald, and Banaji (2005). The order of the congruent (practice + test; 40 trials each) and incongruent (practice + test; 40 trials each) blocks was counterbalanced across participants (Blocks 3–4 and 6–7, respectively). Response latencies were dealt with following the recommendations of Greenwald, Nosek, and Banaji (2003) and all reported analyses used the D measure as the measure of implicit academic attitudes. Higher values on this measure indicated a more positive implicit attitude toward arts than math. The measure of implicit academic attitudes exhibited good internal consistency (Spearman-Brown coefficient = .74).

Emotion induction. Following past research (Schwarz & Clore, 1983), participants were asked to collaborate in the construction of a life-events inventory that would be used in future research. In the anger and sad emotion conditions, participants were asked to describe as vividly and in as much detail as possible an event that made them feel "really anger" or "really sad." Participants were further instructed to focus on the emotional aspects of the angry or sad event, thereby evoking a strong emotional response. In the neutral emotion condition, participants were asked to describe as vividly and in as much detail as possible a recent ordinary event, something that happened to them on a daily basis. Participants in this condition were further instructed to focus on rather mundane aspects of the event (e.g., what happened, what they did, who was around, and so forth). Participants in all conditions were given 10 minutes to complete the task.

Explicit academic attitudes. Following past research (Huntsinger & Smith, 2009; Nosek et al., 2002), participants were asked to describe where their feelings toward mathematics (or arts) were located using the following five scale anchors: sad–happy; delightful–disgusting; ugly–beautiful; avoid–approach; unafraid–afraid (scale anchors 1 to 7). After appropriate rescoring, composite measures of math ($\alpha = .76$) and arts ($\alpha = .72$) attitudes were created. Finally, a difference score was computed by subtracting the composite measure of math attitudes from the composite measure of arts attitudes. Positive values indicated a more positive attitude toward arts than math.

Manipulation check. Participants were asked to indicate how angry and sad they felt during the writing task (1 = *not at all*, 7 = *very*).

Results

Manipulation check. Participants reports of anger and sadness varied significantly across conditions, $F(2, 210) = 14.15$, $p < .005$ and $F(2, 210) = 17.00$, $p < .005$. Participants reported feeling more anger when writing about an angry event ($M = 3.91$, $SD = 1.99$) than when writing about a sad event ($M = 2.88$, $SD = 1.78$) and when writing about a neutral event ($M = 2.36$, $SD = 1.46$), both ps < .05. Similarly, participants reported feeling more sadness when writing about a sad event ($M = 3.99$, $SD = 1.76$) than when writing about an angry event ($M = 3.31$, $SD = 1.77$) and when writing about a neutral event ($M = 2.33$, $SD = 1.48$), both ps < .05.

Main analysis. Implicit academic attitudes ($M = 0.35$, $SD = 0.39$) and explicit academic attitudes ($M = 1.18$, $SD = 1.73$) were modestly correlated ($r = .31$, $p < .005$), consistent with past research (Nosek et al., 2002). The main prediction was that par-

ticipants' emotion would regulate implicit–explicit academic attitude correspondence, with angry participants displaying greater correspondence than sad and neutral emotion participants. To test this prediction, multiple regression analyses were conducted predicting participants' explicit academic attitudes from implicit academic attitudes (mean centered), emotion condition (the three levels were represented by two dummy codes that compared the anger and sad conditions [angry = 1, sad = 0, neutral = 0] and the sad and neutral conditions [angry = 0, sad = 0, neutral = 1]; West, Aiken, & Krull, 1996), and their interactions. Main effects were entered in the first step, followed by the interactions in the second step. The second step was significant, (R^2 change = .035), $F(2, 207) = 4.15$, $p < .05$, indicating that the correspondence between implicit and explicit attitudes differs significantly across mood condition (see Figure 1).

To probe the shape of this interaction, simple slopes were computed (Aiken & West, 1991). Angry participants, as predicted, displayed significant correspondence between their implicit and explicit academic attitudes, $b = 2.37(.46)$, $t(207) = 5.19$, $p < .005$. For sad participants implicit and explicit academic attitudes were not significantly related, $b = .54(.50)$, $t(207) = 1.08$, $p = .28$. For those in the neutral emotion condition, implicit and explicit academic attitudes were somewhat positively related, $b = .92(.53)$, $t(207) = 1.73$, $p = .085$. Finally, decomposition of the interaction into the two dummy-coded vectors revealed that the degree of implicit–explicit correspondence observed in the anger condition differed significantly from that found in the sad condition, $b = .72 (.27)$, $t(207) = 2.71$, $p < .05$. The degree of correspondence found in the sad condition was not significantly different from that found in the neutral emotion condition, $b = .15 (.29)$, $t(207) = .52$, $p = .61$.[1]

Experiment 2

The purpose of this second experiment was to conceptually replicate the results of the first experiment for a different attitude domain, namely attitudes toward the self. Whereas implicit and explicit academic attitudes are moderately correlated (Nosek et al., 2002), implicit and explicit self-attitudes are only weakly, if at all, correlated (Bosson, Swann, & Pennebaker, 2000; Greenwald & Farnham, 2000). As such, this study would demonstrate that anger has the power to create attitudinal correspondence from thin air.
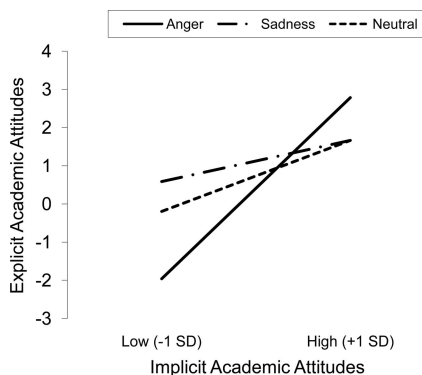

Figure 1. Experiment 1: Correspondence between implicit and explicit academic-attitudes as a function of emotion condition.

Method

Participants. One hundred and 77 participants (101 women) took part in this experiment for partial fulfillment of a course requirement.

Materials and procedure. The procedure for this experiment was identical to that of Experiment 1 with the only change being that, instead of academic attitudes, implicit and explicit self-attitudes were measured.

Implicit self-esteem. The Implicit Association Test was used to measure implicit self-esteem (Greenwald & Farnham, 2000). The IAT assesses associations between attitude objects (e.g., self and object) and evaluative attributes (e.g., pleasant and unpleasant). All stimuli were identical to that used by Jordan et al. (2007), and, as in Experiment 1, all reported analyses used the D measure as the measure of implicit self-esteem. Higher values indicated more positive implicit self-esteem (Spearman-Brown coefficient = .60).

Emotion induction. This manipulation was identical to that used in Experiment 1.

Explicit self-esteem. The 10-item Rosenberg self-esteem scale served as the measure of explicit self-esteem ($\alpha = .91$). Items on this scale include: "I feel that I am a person of worth, at least on an equal basis with other people" (1 = *very strongly disagree*, 7 = *very strongly agree*). Higher values indicated more positive explicit self-esteem.

Manipulation check. Participants completed the same manipulation checks as in Experiment 1.

Results

Manipulation check. The emotion induction was successful as participants reports of anger and sadness varied significantly across conditions, $F(2, 174) = 17.67$, $p < .005$ and $F(2, 174) = 23.88$, $p < .005$. Participants reported feeling more anger when writing about an angry event ($M = 3.81$, $SD = 1.45$) than when writing about a sad event ($M = 2.82$, $SD = 1.95$) and when writing about a neutral event ($M = 2.07$, $SD = 1.43$), both $ps < .05$. Similarly, participants reported feeling more sadness when writing about a sad event ($M = 4.27$, $SD = 1.86$) than when writing about an angry event ($M = 3.61$, $SD = 1.41$) and when writing about a neutral event ($M = 2.22$, $SD = 1.60$), both $ps < .05$.

Main analysis. Consistent with past research (Greenwald & Farnham, 2000), implicit self-attitudes ($M = 0.41$, $SD = 0.29$) and explicit self-attitudes ($M = 5.36$, $SD = 1.13$) were uncorrelated ($r = .09$, $p = .22$). As in Experiment 1, to test predictions, multiple

---

[1] The emotion inductions led to an inconsistent pattern of change in explicit attitudes. In Experiment 1, explicit academic attitudes were similar across emotion condition, $F(2, 210) = .54$, $p = .59$, $\eta_p^2 = .005$. Participants reported equally positive attitudes toward arts across the anger ($M = 1.17$, $SD = 1.93$), the sadness ($M = 1.33$, $SD = 1.60$) and the neutral emotion ($M = 1.03$, $SD = 1.62$) conditions. In Experiment 2, self-attitudes showed significant variation across emotion condition, $F(2, 174) = 3.10$, $p = .047$, $\eta_p^2 = .03$. Self-attitudes were most positive in the neutral emotion condition ($M = 5.64$, $SD = 1.05$), followed by the anger ($M = 5.31$, $SD = 1.12$) and the sadness ($M = 5.13$, $SD = 1.17$) conditions. The opposite pattern was found in Experiment 3. Now, participants in the anger condition displayed more positive self-attitudes ($M = 5.65$, $SD = 0.91$) than those in the neutral emotion condition ($M = 5.19$, $SD = 1.17$), $t(98) = 2.20$, $p = .03$, $d = .44$. Given that correlation change can occur with or without a shift in means and that a shift in means provides little information about how the correlation is changing, these results are not discussed further.

regression analyses were conducted predicting participants' explicit self-attitudes from implicit self-attitudes (mean centered), emotion condition (represented by the same two dummy codes from Experiment 1), and their interactions. Main effects were entered in the first step, followed by the interactions in the second step. The second step was significant, (R^2change $= .04$), $F(2, 171) = 3.99$, $p < .05$, indicating that the correspondence between implicit and explicit differs significantly across mood condition (see Figure 2).

As predicted, simple slopes analysis revealed that angry participants displayed significant correspondence between their implicit and explicit self-attitudes, $b = .38(.14)$, $t(171) = 2.78$, $p < .05$. For sad participants, however, implicit and explicit self-attitudes were somewhat negatively related, $b = -.16(.14)$, $t(171) = 1.20$, $p = .23$. And for participants in the neutral emotion condition, implicit and explicit self-attitudes were unrelated, $b = .07(.16)$, $t(171) = .40$, $p = .69$. Finally, decomposition of the interaction into the two dummy-coded vectors revealed that the degree of implicit–explicit correspondence observed in the anger condition differed significantly from that found in the sad condition, $b = .54$ $(.19)$, $t(171) = 2.82$, $p < .05$. The degree of correspondence found in the sad condition was not significantly different from that found in the neutral emotion condition, $b = .23 (.21)$, $t(207) = 1.07$, $p = .28$.

Experiment 3

This experiment was conducted with an eye toward providing evidence for the mechanism underlying the effects of anger on implicit–explicit attitude correspondence. One possibility discussed earlier is that the sense of certainty or confidence often accompanying the experience of anger may enhance the subjective validity of implicit attitudes, which then may lead such attitudes to be incorporated into explicit attitude reports. Anger is also associated with appraisals of individual control. In past research such appraisals have been found to play a mediating role in the effects of anger on various outcomes (Lerner & Keltner, 2001; for a review, see Lerner & Tiedens, 2006). Appraisals of individual control that accompany anger explain why angry people perceive the environment as relatively benign (Lerner & Keltner, 2001). Perceiving the world as benign has been shown to enhance reliance on usual ways of reacting to the world (Bless, 2001). Thus, the sense of individual control that goes along with anger may enhance confidence in customary ways of evaluating the world, such as
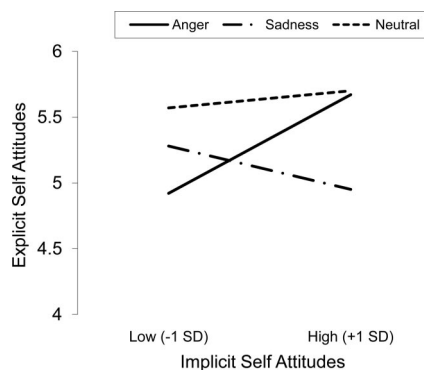

Figure 2. Experiment 2: Correspondence between implicit and explicit self-attitudes as a function of emotion condition.

implicit attitudes. For these reasons, it is possible that appraisals of control may instead (or, perhaps, also) lie behind the effects of anger on the correspondence between implicit and explicit attitudes.

To explore the possible mediating role of certainty and control appraisals, participants were asked several questions designed to measure their appraisals of certainty and control when they experienced the anger-inducing event (Lerner & Keltner, 2001). A second purpose of this experiment was to rule out the possibility that the influence of anger on implicit–explicit attitude relations found in Experiments 1 and 2 was somehow peculiar to the IAT. To this end, the Name-Letter Task (Nuttin, 1985) was used to measure implicit self-attitudes in this experiment.

Method

Participants. One hundred participants (81 women) took part in this experiment for partial fulfillment of a course requirement.

Materials and procedure. The procedure for this experiment was similar to that of Experiments 1 and 2 with the following changes. First, the Name-Letter Task was used to measure implicit self attitudes. Second, after participants completed the measure of explicit self-esteem, they answered several questions designed to measure participants' appraisals of certainty and control surrounding the event they described during the emotion induction. Finally, the entire experiment was conducted via paper-and-pencil, rather than on the computer.

Implicit self-esteem. The Name-Letter Task was used to measure implicit self-esteem (Nuttin, 1985). In this task, participants were asked to indicate how much they liked or disliked the letters of the alphabet. Below these instructions the letters of the alphabet were arranged in one of four random orders. Participants' ratings were made on a 7-point scale with the following endpoints: $1 = I$ *dislike this letter very much* to $7 = I$ *like this letter very much*. The Name-Letter Task was scored via the ipsatized double-correction algorithm, as recent research shows that this scoring algorithm exhibits the most optimal psychometric properties (LeBel & Gawronski, 2009). The internal consistency of this measure was acceptable (Spearman-Brown coefficient $= .77$). Higher values indicated more positive implicit self-esteem.

Emotion induction. This manipulation was identical to that used in Experiments 1 and 2.

Explicit self-esteem. The 10-item Rosenberg self-esteem scale again served as the measure of explicit self-esteem ($\alpha = .89$).

Appraisals. Participants' appraisals of certainty and individual control surrounding the events they recalled were measured via questions adapted from past research (Lerner & Keltner, 2001). Specifically, to measure appraisals of certainty, participants were asked four questions about the event they described during the autobiographical recall task (e.g., "How uncertain were you about what would happen next?" [reverse scored], "How well did you understand what was happening in the situation?", "To what extent did you feel certain that your perspective on the situation was correct?"; $1 = $ *not at all*, $7 = $ *very much*). Appraisals of individual control were measured via three questions (e.g., "To what extent did you feel that someone other than yourself had the ability to influence what was happening?", "To what extent did you typically feel that someone else was to blame for what was happening?"; $1 = $ *not at all*, $7 = $ *very much*). After appropriate rescoring,

these items were combined to create separate measures of certainty appraisals ($\alpha = .78$) and control appraisals ($\alpha = .59$), with higher values indicating greater appraisals of each.

Manipulation check. Participants only completed the anger manipulation check in this experiment.

Results

Manipulation check. Participants reports of anger varied significantly across conditions, $t(98) = 6.17$, $p < .005$. Participants reported feeling more anger when writing about an angry event ($M = 4.47$, $SD = 1.63$) than when writing about a neutral event ($M = 2.37$, $SD = 1.50$).

Main analysis. Implicit self-attitudes ($M = 1.55$, $SD = 1.23$) and explicit self-attitudes ($M = 5.42$, $SD = 1.06$) were uncorrelated ($r = .13$, $p = .20$). To test predictions, multiple regression analyses were conducted predicting participants' explicit self-attitudes from implicit self-attitudes (mean centered), emotion condition ($1 = anger$, $-1 = neutral$), and their interactions. This analysis yielded the predicted interaction, $b = .27(.10)$, $t(96) = 2.59$, $p < .05$ (see Figure 3). Computation of simple slopes revealed that angry participants displayed significant correspondence between their implicit and explicit self-attitudes, $b = .33(.13)$, $t(96) = 2.55$, $p < .05$. And for participants in the neutral emotion condition, implicit and explicit self-attitudes were unrelated, $b = -.21 (.16)$, $t(96) = 1.23$, $p = .21$.

Appraisals. As in past research (Lerner & Keltner, 2001), appraisals of certainty and individual control were weakly correlated, $r = .21$, $p < .05$. Thus, they were analyzed separately. As expected, participants' appraisals of certainty and appraisals of control significantly varied across conditions. Participants who recalled an angry event reported greater appraisals of certainty ($M = 5.74$, $SD = .99$) than those who recalled a neutral event ($M = 5.08$, $SD = 1.33$), $t(98) = 2.84$, $p < .05$. Similarly, participants who recalled an angry event reported greater appraisals of individual control ($M = 5.41$, $SD = 1.33$) than those who recalled a neutral event ($M = 3.80$, $SD = 1.21$), $t(98) = 6.28$, $p < .005$.

Mediation. As predicted the effect of implicit attitudes on explicit attitudes was moderated by emotion, with implicit attitudes having a greater effect on explicit attitudes in the angry condition than the control condition. This observed moderation of
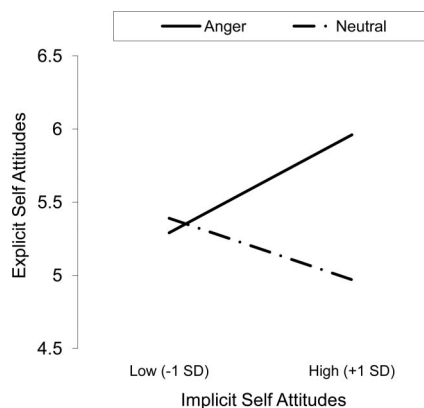

Figure 3. Experiment 3: Correspondence between implicit and explicit self-attitudes as a function of emotion condition.

the effect implicit attitudes on explicit attitudes by emotion condition was predicted to occur through the impact of emotion condition on appraisals of certainty and/or control. These mediational predictions were evaluated via a series of regression models (Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007). The potential mediating role of appraisals of certainty was examined first, followed by appraisals of control.

In the first model, explicit self-esteem was regressed on implicit self-esteem, emotion condition, and their interaction. As reported above, in this model the emotion condition by implicit self-esteem interaction significantly predicted explicit self-esteem. In the second, certainty appraisal was regressed on implicit self-esteem, emotion condition, and their interaction. Indicating that anger was associated with appraisals of certainty, emotion condition predicted appraisal certainty, $b = .33(.12)$, $t(96) = 2.80$, $p < .05$. Finally, consistent with mediation, in the third model when appraisal certainty and the appraisal certainty by implicit self-esteem interaction were included in the first model, the appraisal certainty by implicit self-esteem interaction significantly predicted explicit self-esteem, $b = .23(.11)$, $t(94) = 2.13$, $p < .05$, and the emotion condition by implicit self-esteem interaction no longer significantly predicted explicit self-esteem, $b = .17(.11)$, $t(94) = 1.59$, $p = .12$.

When the same analytic strategy was applied to the index of appraisals of individual control, a similar mediational pattern was not observed. Specifically, the first model was identical to that above. In the second model, emotion condition predicted appraisal certainty, $b = .82(.13)$, $t(96) = 6.40$, $p < .005$. However, in the third model the emotion condition by implicit self-esteem interaction remained significant, and the control appraisal by implicit self-esteem interaction did not significantly predict explicit self-esteem, $b = .39(.14)$, $t(94) = 2.84$, $p < .05$, and $b = -.18 (.13)$, $t(94) = 1.36$, $p = .18$, respectively.

General Discussion

This research tested the idea that anger would lead people's explicit attitude reports to more faithfully reflect their implicit attitudes. Across three experiments using two different attitude objects and two measures of implicit attitudes, these predictions were confirmed as people experiencing anger, as compared with sad and neutral emotion, showed greater correspondence between their implicit and explicit attitudes. Mediation analyses indicated that the impact of anger on implicit–explicit attitude correspondence resulted from changes in appraisals of certainty, but not individual control. It is important to note, however, that these results do not rule out other potential contributing mechanisms. Indeed, as with most psychological phenomena, the cognitive consequences of anger are likely multiply determined. Future research may examine other possible mechanisms, including approach motivation (Carver & Harmon-Jones, 2009), that may contribute to the effects of anger on implicit–explicit attitude correspondence. In summary, these experiments reveal that the experience of anger narrows the separation between implicit and explicit attitudes, causing people's activated implicit attitudes to inform their explicit attitude reports.

Implications and Future Directions

These results complicate conclusions from past research concerning the role played by affect in implicit−explicit attitude

correspondence. Past research found that positive affect increased and negative affect decreased the degree to which explicit attitudes faithfully reflected implicit attitudes. The present research suggests that it would be unwise to classify exclusively by valence the effects of specific emotions on implicit−explicit attitude correspondence. Rather, to understand whether a specific emotion (e.g., disgust) will increase or decrease such correspondence, one must look to the pattern of appraisal that accompanies each emotion.

Although this research concerned the influence of anger on agreement between implicit and explicit attitudes, these results have implications beyond this particular domain of inquiry. Specifically, if the experience of anger validates any accessible thoughts and processing inclinations, as suggested elsewhere (Clore & Huntsinger, 2009; see also Briñol & Petty, 2009), this implies a more flexible role for anger in adjusting the course of cognitive activity than is usually assumed.

Past research, for example, appeared to reveal a fixed connection between anger and tendencies to rely on activated stereotypes and other cognitive shortcuts (Bodenhausen et al., 1994; Lerner & Tiedens, 2006). This connection, however, might merely result from the fact that stereotypes are often highly accessible thoughts when one encounters or merely imagines members of stereotyped groups (Bargh, 1999). If one replaces the usually highly accessible stereotypical response with a counter−stereotypical one, then anger should in fact lead to less stereotyping. Likewise, from past research there would appear to be a direct link between anger and superficial information processing (for a review, see Lerner & Tiedens, 2006). This link, however, might result from the fact that people's general inclination is to conserve cognitive resources (Fiske & Taylor, 1984). In past research, then, anger may have merely boosted confidence in this customary way of processing information, leading to the appearance of a fixed link between anger and superficial treatment of incoming information. Support for this reasoning can be found in recent research showing a similar flexibility in what appeared to be a fixed connection between mood and stereotyping (Huntsinger, Sinclair, Dunn, & Clore, 2010) and mood and perceptual focus (Huntsinger, in press; Huntsinger, Clore, & Bar-Anan, 2010).

These results also suggest that feelings of certainty or confidence arising from sources other than the experience of anger should regulate consistency between implicit and explicit attitudes in a similar fashion. Bodily cues, such as head nodding, and cognitive feelings, such as fluency, have been shown to boost the certainty or confidence with which activated thoughts are held (Briñol & Petty, 2003; Greifeneder & Bless, 2010; Tormala, Falces, Briñol, & Petty, 2007; Tormala, Petty, Briñol, 2002). Merely imagining being in a powerful role or enacting a self-assured body posture, for example sitting erect while pushing out one's chest, also heightens confidence and certainty in activated thoughts (Briñol, Petty, Valle, Rucker, & Becerra, 2007; Briñol, Petty, & Wagner, 2009). Each of these bodily cues, cognitive feelings and other subjective states, by enhancing feelings of confidence and certainty, should also lead explicit attitude reports to more closely reflect activated implicit attitudes. This possibility awaits future empirical examination.

The current research focused on the role played by anger in regulating the impact of implicit attitudes on explicit attitude reports. This focus was chosen because, from one evaluative moment to the next, people's implicit reactions generally form the starting point from which more explicit judgments emerge (Cunningham & Zelazo, 2007; Fazio, 2007; Gawronski & Bodenhausen, 2011; Huntsinger, 2011). The experimental design was specifically set up to examine if anger adjusted this bottom-up influence of implicit attitudes on the construction of explicit attitude reports, and excluded examination of the reverse direction of influence. As recent research shows, however, the process of constructing an explicit attitude report may exert a top-down influence on implicit attitudes (for a review, see Gawronski & Bodenhausen, 2011).

Such a top-down influence is illustrated in recent research examining the interplay between implicit and explicit self-concepts (Peters & Gawronski, 2011). In this research, participants were presented with information that implied having a particular personality characteristic, in this case being extraverted or introverted, was beneficial to future success. Because participants wanted to see themselves as having this personality trait, they searched autobiographical memory for instances of past behavior consistent with the trait. This process of motivated reasoning resulted in a biased activation of associations that influenced participants' implicit self-concept (Peters & Gawronski, 2011). In such circumstances, anger might increase confidence in this newly constructed explicit attitude, or more precisely, perhaps, anger might validate the associations recently activated or newly created while completing the explicit report. As a result, the implicit attitudes of people experiencing anger may come to closely resemble explicit attitudes. Alternatively, anger might have no influence on implicit−explicit correspondence. Future research is necessary to explore this issue.

Coda

Consistent with Sartre's (1948) proposal, this research shows that the experience of anger narrows the separation between deep and superficial aspects of the self, causing people's explicit attitudes to more directly reflect their implicit attitudes. More generally, these results indicate that anger may play an important, but until now overlooked, role in directing the interplay between spontaneous and deliberative aspects of the self.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

Bargh, J. A. (1999). The cognitive monster. In S. Chaiken, & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 361–382). New York, NY: Guilford Press.

Bless, H. (2001). Mood and the use of general knowledge structures. In L. L. Martin, & G. L. Clore (Eds.), *Theories of mood and cognition: A user's guidebook* (pp. 9–29). Mahwah, NJ: Lawrence Erlbaum.

Bodenhausen, G. V., Sheppard, L., & Kramer, G. P. (1994). Negative affect and social judgment: The different impact of anger and sadness. *European Journal of Social Psychology, 24,* 45–62. doi:10.1002/ejsp.2420240104

Bosson, J. K., Swann, W. B., & Pennebaker, J. W. (2000). Stalking the perfect measure of implicit self esteem: The blind men and the elephant revisited? *Journal of Personality and Social Psychology, 79,* 631–643. doi:10.1037/0022-3514.79.4.631

Briñol, P., & Petty, R. E. (2003). Overt head movements and persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 84,* 1123–1139. doi:10.1037/0022-3514.84.6.1123

Briñol, P., & Petty, R. E. (2009). Persuasion: Insights from the self-validation hypothesis. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 69–118). New York, NY: Elsevier.

Briñol, P., Petty, R. E., Valle, C., Rucker, D. D., & Becerra, A. (2007). The effects of message recipients' power before and after persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 93,* 1040–1053. doi:10.1037/0022-3514.93.6.1040

Briñol, P., Petty, R. E., & Wagner, B. (2009). Body posture effects on self-evaluation: A self-validation approach. *European Journal of Social Psychology, 39,* 1053–1064. doi:10.1002/ejsp.607

Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin, 135,* 183–204. doi:10.1037/a0013965

Clore, G. L., & Huntsinger, J. R. (2009). How the object of affect guides its impact. *Emotion Review, 1,* 39–54. doi:10.1177/1754073908097185

Cunningham, W. A., & Zelazo, P. D. (2007). Attitudes and evaluations: A social cognitive neuroscience perspective. *TRENDS in Cognitive Sciences, 11,* 97–104.

Dijksterhuis, A., Albers, L. W., & Bongers, K. C. A. (2009). Digging for the real attitude: Lessons from research on implicit and explicit self-esteem. In R. E. Petty, R. H. Fazio, & P. Briñol (Eds.), *Attitudes: Insights from the new implicit measures* (pp. 229–250). New York, NY: Psychology Press.

Dulany, D. E. (1962). The place of hypotheses and intentions: An analysis of verbal control in verbal conditioning. *Journal of Personality, 30,* 102–129. doi:10.1111/j.1467-6494.1962.tb02310.x

Fazio, R. H. (2007). Attitudes as object-evaluation associations of varying strength. *Social Cognition, 25,* 603–637.

Fiske, S. T., & Taylor, S. E. (1984). *Social cognition.* New York, NY: Random House.

Gawronski, B., & Bodenhausen, G. V. (2006). Associate and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin, 132,* 692–731. doi:10.1037/0033-2909.132.5.692

Gawronski, B., & Bodenhausen, G. V. (2011). The associative-propositional evaluation model: Theory, evidence, and open questions. *Advances in Experimental Social Psychology, 44,* 59–127. doi:10.1016/B978-0-12-385522-0.00002-0

Gawronski, B., & LeBel, E. P. (2008). Understanding patterns of attitude change: When implicit measures show change, but explicit measures do not. *Journal of Experimental Social Psychology, 44,* 1355–1361. doi:10.1016/j.jesp.2008.04.005

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102,* 4–27. doi:10.1037/0033-295X.102.1.4

Greenwald, A. G., & Farnham, S. D. (2000). Using the Implicit Association Test to measure self-esteem and self-concept. *Journal of Personality and Social Psychology, 79,* 1022–1038. doi:10.1037/0022-3514.79.6.1022

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology, 85,* 197–216. doi:10.1037/0022-3514.85.2.197

Greifeneder, R., & Bless, H. (2010). The fate of activated information in impression formation: Fluency of concept activation moderates the emergence of assimilation versus contrast. *British Journal of Social Psychology, 49,* 405–414. doi:10.1348/014466609X479699

Harmon-Jones, E., & Allen, J. J. B. (1998). Anger and prefrontal brain activity: EEG asymmetry consistent with approach motivation despite negative affective valence. *Journal of Personality and Social Psychology, 74,* 1310–1316. doi:10.1037/0022-3514.74.5.1310

Hofmann, W., & Wilson, T. D. (2010). Consciousness, introspection, and the adaptive unconscious. In B. Gawronski, & B. K. Payne (Eds.), *Handbook of Implicit Social Cognition: Measurement, Theory, and Applications* (pp. 197–215). New York, NY: Guilford Press.

Huntsinger, J. R. (in press). Does positive affect broaden and negative affect narrow attentional scope? A new answer to an old question. *Journal of Experimental Psychology: General.*

Huntsinger, J. R. (2011). Mood and trust in intuition interactively orchestrate correspondence between implicit and explicit attitudes. *Personality and Social Psychology Bulletin, 37,* 1245–1258. doi:10.1177/0146167211410069

Huntsinger, J. R., Clore, G., & Bar-Anan, Y. (2010). Mood and global-local focus: Priming a local focus reverses the link between mood and global-local processing. *Emotion, 10,* 722–726. doi:10.1037/a0019356

Huntsinger, J. R., Sinclair, S., Dunn, E. W., & Clore, G. L. (2010). Affective regulation of automatic stereotype activation: It's the (accessible) thought that counts. *Personality and Social Psychology Bulletin, 36,* 564–577. doi:10.1177/0146167210363404

Huntsinger, J. R., & Smith, C. T. (2009). First thought, best thought: Positive mood maintains and negative mood disrupts implicit–explicit attitude correspondence. *Personality and Social Psychology Bulletin, 35,* 187–197. doi:10.1177/0146167208327000

Jordan, C. H., Whitfield, M., & Zeigler-Hill, V. (2007). Intuition and the correspondence between implicit and explicit self-esteem. *Journal of Personality and Social Psychology, 93,* 1067–1079. doi:10.1037/0022-3514.93.6.1067

LeBel, E. P., & Gawronski, B. (2009). How to find what's in a name: Scrutinizing the optimality of five scoring algorithms for the name-letter task. *European Journal of Personality, 23,* 85–106. doi:10.1002/per.705

Lerner, J. S., & Keltner, D. (2001). Fear, anger and risk. *Journal of Personality and Social Psychology, 81,* 146–159. doi:10.1037/0022-3514.81.1.146

Lerner, J. S., & Tiedens, L. Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making, 19,* 115–137. doi:10.1002/bdm.515

Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is meditated and when mediation is moderated. *Journal of Personality and Social Psychology, 89,* 852–863. doi:10.1037/0022-3514.89.6.852

Nosek, B. A. (2007). Implicit–explicit relations. *Current Directions in Psychological Science, 16,* 65–69. doi:10.1111/j.1467-8721.2007.00477.x

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Math = male, me = female, therefore math ≠ me. *Journal of Personality and Social Psychology, 83,* 44–59. doi:10.1037/0022-3514.83.1.44

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2005). Understanding and using the Implicit Association Test: II. Method variables and construct validity. *Personality and Social Psychology Bulletin, 31,* 166–180.

Nuttin, J. M. (1985). Narcissism beyond Gestalt and awareness: The name letter effect. *European Journal of Social Psychology, 15,* 353–361.

Olson, M. A., & Fazio, R. H. (2009). Implicit and explicit measures of attitudes: The perspective of the MODE model. In R. E. Petty, R. H. Fazio, & P. Briñol (Eds.), *Attitudes: Insights from the new implicit measures* (pp. 19–63). New York, NY: Psychology Press.

Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions.* New York, NY: Cambridge University Press. doi:10.1017/CBO9780511571299

Peters, K. R., & Gawronski, B. (2011). Mutual influences between the implicit and explicit self-concepts: The role of memory activation and motivated reasoning. *Journal of Experimental Social Psychology, 47,* 436–442.

Petty, R. E., Briñol, P., & DeMarree, K. G. (2007). The meta-cognitive model (MCM) of attitudes: Implications for attitude measurement, change, and strength. *Social Cognition, 25,* 657–686. doi:10.1521/soco.2007.25.5.657

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42,* 185–227.

Ranganath, K. A., Smith, C. T., & Nosek, B. A. (2008). Distinguishing automatic and controlled components of attitudes from direct and indirect measurement. *Journal of Experimental Social Psychology, 44,* 386–396. doi:10.1016/j.jesp.2006.12.008

Sartre, J. P. (1948). *The emotions: Outline of a theory*. (B. Frechtman, Trans.). Secaucus, NJ: Citadel Press. (Original work published 1939)

Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45,* 513–523. doi:10.1037/0022-3514.45.3.513

Smith, C. T., & Nosek, B. A. (2011). Affective focus increases concordance between implicit and explicit attitudes. *Social Psychology, 42,* 300–313. doi:10.1027/1864-9335/a000072

Tiedens, L. Z. (2001). The effect of anger on the hostile inferences of aggressive and nonaggressive people: Specific emotions, cognitive processing, and chronic accessibility. *Motivation and Emotion, 25,* 233–251. doi:10.1023/A:1012224507488

Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions and their associated certainty appraisals on cognitive processing. *Journal of Personality and Social Psychology, 81,* 973–988. doi:10.1037/0022-3514.81.6.973

Tormala, Z. L., Falces, C., Briñol, P., & Petty, R. E. (2007). Ease of retrieval effects in social judgment: The role of unrequested cognitions. *Journal of Personality and Social Psychology, 93,* 143–157. doi:10.1037/0022-3514.93.2.143

Tormala, Z. L., Petty, R. E., & Briñol, P. (2002). Ease of retrieval effects in persuasion: A self-validation analysis. *Personality and Social Psychology Bulletin, 28,* 1700–1712. doi:10.1177/014616702237651

West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality, 64,* 1–48. doi:10.1111/j.1467-6494.1996.tb00813.x

Wilson, T. D., & Bar-Anan, Y. (2008). The unseen mind. *Science, 321,* 1046–1047. doi:10.1126/science.1163029

Wilson, T. D., Lindsey, S., & Schooler, T. (2000). A model of dual attitudes. *Psychological Review, 107,* 101–126. doi:10.1037/0033-295X.107.1.101

Zanna, M. P. (2004). The naive epistemology of a working social psychologist (or the working epistemology of a naive social psychologist): The value of taking "temporary givens" seriously. *Personality and Social Psychology Review, 8,* 210–218. doi:10.1207/s15327957pspr0802_15