

## Research article

# Emotions in context: Anger causes ethnic bias but not gender bias in men but not women

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### Abstract

*Emotions influence information processing because they are assumed to carry valuable information. We predict that induced anger will increase ethnic but not gender intergroup bias because anger is related to conflicts for resources, and ethnic groups typically compete for resources, whereas gender groups typically engage in relations of positive interdependence. Furthermore, we also predict that this increased ethnic intergroup bias should only be observed among men because men show more group-based reactions to intergroup conflict than women do. Two studies, with 65 and 120 participants, respectively, indeed show that anger induction increases ethnic but not gender intergroup bias and only for men. Intergroup bias was measured with an implicit measure. In Study 2, we additionally predict (and find) that fear induction does not change ethnic or gender intergroup bias because intergroup bias is a psychological preparation for collective action and fear is not associated with taking action against out-groups. We conclude that the effect of anger depends on its specific informational potential in a particular intergroup context. These results highlight that gender groups differ on a crucial point from ethnic groups and call for more attention to the effect of people's gender in intergroup relations research. Copyright © 2012 John Wiley & Sons, Ltd.*

In the past 25 years, many researchers have examined affective influences on information processing (Schwarz & Clore, 2003). Among other domains, this research has been applied to intergroup attitudes, showing that inducing anger increases intergroup bias in minimal and real groups as long as anger is relevant to the intergroup context (Dasgupta, DeSteno, Williams, & Hunsinger, 2009; DeSteno, Dasgupta, Bartlett, & Cajdric, 2004). Here, we build on the effect of anger on intergroup bias to show that intergroup processes for gender groups differ from those for ethnic groups. Indeed, conflicts for resources are much more relevant to ethnic groups than to gender groups. Accordingly, we predicted that anger affects ethnic intergroup bias but not gender intergroup bias. Importantly, because men have a more group-based psychological response to intergroup conflict, we also predict that the effect of anger on intergroup bias is stronger for men.

### Emotion as Information

An influential line of research proposed that emotions carry information about the individual's environment and that this leads to a functionally appropriate style of information processing (Bless, 2001; Bless & Schwarz, 1999; Schwarz, 1990;

Schwarz & Clore, 1983). Early research contrasted happiness with sadness and found that happy moods lead people to rely more on heuristic cues than sad moods do (Bless, Schwarz, & Wieland, 1996; Bodenhausen, Kramer, & Süsser, 1994; Isbell, 2004; Krauth-Gruber & Ric, 2000; Park & Banaji, 2000). To account for these findings, Bless and Schwarz (Bless, 2001; Bless, Clore et al., 1996; Bless & Schwarz, 1999) argued that happy moods inform the individual that the situation is benign and that relying on existing general-knowledge-structures (such as stereotypes) is sufficient. Sad moods, on the contrary, inform people that the situation is problematic and that they should attempt to better understand and deal with the problem at hand. This in turn leads people to use more systematic information processing.

Recent research has gone beyond the difference between happy and sad moods and has investigated the effect of other specific emotions. For example, despite having the same valence, fear increases but anger decreases risk perception (Lerner & Keltner, 2000). This idea has also been applied to intergroup attitudes. Although both disgust and anger increase intergroup bias in minimal groups, only disgust (and not anger) increases anti-homosexuality bias, and only anger (but not disgust) increases bias against Arabs (Dasgupta et al., 2009; DeSteno et al., 2004). Dasgupta et al. (2009)

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reason that an induced emotion will only affect intergroup attitudes if it is relevant to stereotypes, threats, or goals regarding the out-group. In contrast to known groups, for minimal and unknown out-groups, all negative emotions applicable to intergroup relations are predicted to increase bias (Dasgupta et al., 2009, p. 586) given that there is no previous stereotype or goal associated with these groups. Formulating this in terms of the emotion-as-information idea, another way of describing these results is that induced emotions only have an effect on intergroup attitudes if the informational value of the emotion fits the relevant intergroup context.

In the present paper, we add to this literature in two important ways. We first use this framework to predict and show that anger does not increase gender intergroup bias, a prediction based on the fact that gender groups do not compete for resources. Second, we show that the effect of anger is limited to men.

### The Special Case of Gender Groups

Conflicts for resources and intergroup threats are key aspects of social psychological theory on intergroup relations (Riek, Mania, & Gaertner, 2006; Yzerbyt & Demoulin, 2010). When considering ethnic groups, there is indeed abundant evidence that these are often involved in conflicts over resources (LeVine & Campbell, 1972), which in turn affect intergroup attitudes (Esses, Jackson, Dovidio, & Hodson, 2005; Quillian, 1995; Sherif, 1966; Stephan & Stephan, 2000).

A different pattern is observed in gender relations. Relations between men and women are to a large extent driven by reproductive considerations (Buss, 1994; Daly & Wilson, 1983). Because men and women depend on each other for reproduction, they are, as groups, by default engaged in relationships of positive interdependence. This is consistent with the observation that women and men do not fight (nor have a history of fighting) against each other in violent intergroup conflicts. Furthermore, evolutionary theories of intergroup relations (Hamilton, 1975; Richerson & Boyd, 2005; Sidanius & Pratto, 1999; Sober & Wilson, 1998; van den Berghe, 1981) can hardly apply to gender groups because the groups in which primates and humans evolved consisted of individuals from both sexes, while being ethnically homogenous. In sum, gender intergroup relations entail different kinds of opportunities and costs than ethnic or coalitional intergroup relations.

Anger has since long been linked to intergroup conflict for resources and is associated with taking action against the out-group (van Zomeren, Spears, Fischer, & Leach, 2004; Walker & Smith, 2002). The absence of a group-based conflict among gender groups thus potentially undermines the fit between the informational value of anger as signaling competition for resources and the context in which the emotion is experienced. We therefore predict that incidental anger will increase *ethnic* intergroup bias (as found by DeSteno et al., 2004) but that it will *not* affect *gender* intergroup bias.

### Sex Differences in Intergroup Psychology

If anger signals intergroup conflict, then there are reasons to expect different effects on men and women. A series of studies

show that men have a more group-based psychological response to intergroup conflict than women do. For example, Yuki and Yokota (2009) found that priming intergroup threat increases discrimination in a minimal group paradigm in men, but not in women. Another study showed that after reading a story on group threat (strangers attacking a village), women reacted with lower accessibility of words related to coalitional groups and higher accessibility of words related to protective care than in a control condition (Bugental & Beaulieu, 2009). Men had the opposite pattern of responses. Similarly, the presence of intergroup competition increases in-group cooperation in men but not in women (Van Vugt, De Cremer, & Janssen, 2007). More generally, many authors have suggested that human ethnic intergroup conflict is mainly a male affair (Low, 2000; Manson & Wrangham, 1991; Navarrete, McDonald, Molina, & Sidanius, 2010; Sidanius & Pratto, 1999; van der Dennen, 1995; Van Vugt, 2009). To the extent that anger signals intergroup conflict, we can thus expect a more group-based reaction from men. We therefore predict that anger will increase ethnic intergroup bias more strongly for men than for women.

### Summary and Overview of Studies

Ethnic groups and gender groups differ greatly regarding the type of intergroup conflicts that they face. We investigate whether ethnic groups and gender groups react differently to induced emotions that signal intergroup conflict. We do so by comparing the effect of incidental anger on ethnic versus gender intergroup. We expect anger to increase ethnic (and *not* gender) intergroup bias. Furthermore, given that men react with more group-based responses to intergroup conflict, we predict that the effect of anger on ethnic intergroup bias is more pronounced for men than for women.

## STUDY 1

In the first study, we tested the hypothesis that induced anger increases ethnic intergroup bias but not gender intergroup bias. Anger was induced with an ostensibly unrelated writing task, and intergroup bias was measured with the Implicit Association Test (IAT). All participants completed both an "ethnic IAT" and a "gender IAT."

### Method

#### Participants

Sixty-five British participants (34 women;  $M_{\text{age}} = 23.5$  years;  $SD_{\text{age}} = 5.7$  years; 94% self-categorized as White people) were recruited for two ostensibly unrelated studies. Most participants were students at the University of Liverpool. The first 41 participants chose between taking £3 and taking part in a raffle as form of payment. The remaining participants were paid £2.50.

#### The Implicit Association Test

The implicit measure we used to assess intergroup attitudes is the IAT (see Greenwald, McGhee, & Schwartz, 1998). The

IAT measures associations between two pairs of concepts. Three different IATs were created: one ethnic IAT and two gender IATs (one for men and one for women). The ethnic IAT is similar to the one used by Ashburn-Nardo, Voils, and Monteith (2001), combining British and Surinamese names with positive and negative words. The Surinamese names are taken from the study conducted by Ashburn-Nardo et al. (2001). The British names are taken from a similar IAT presented on the BBC website in 2005 (see article and IAT on <http://news.bbc.co.uk/1/hi/magazine/4447471.stm>). Positive and negative words were taken from the study conducted by Nosek, Banaji, and Greenwald (2002). The structure of the IAT is outlined in Table 1. Block 5 had 30 trials instead of 20 because the extra trials have been shown to reduce an extraneous effect of IAT block order (Nosek, Greenwald, & Banaji, 2005). Order of combined tasks was counterbalanced between participants.

Regarding the gender IAT, one possible problem is that men have only very weak gender intergroup bias, if any at all, when simply using positive and negative words for the evaluative dimension of the IAT (as done by Rudman & Goodwin, 2004). Given that we are comparing ethnic and gender intergroup bias and that we predict an effect of participant's gender, we wanted to start with IATs that would all show significant bias. Therefore, for the gender IAT, we chose to use a positive–negative dimension that also tapped gender stereotypes, in order to make sure that there would be a gender IAT effect for both women and men. We wanted the gender IAT effect to mean that participants associate their gender in-group with positive words and their gender out-group with negative words. The first pair of concepts for the gender IAT is “masculine” versus “feminine,” and these concepts are represented by stimuli that are denotative of gender categories (father, he, his, mother, she, hers; see Nosek et al., 2002). The second pair of concepts consists of gender stereotypes that have an evaluative dimension. The attribute dimension for the women's IAT has to be typically masculine and bad on one extreme and typically feminine and good on the other extreme. For the men's IAT, we needed a dimension that is typically feminine and bad on one end and typically masculine and good on the other end. A large IAT effect then implies strong negative gender stereotyping (a strong association between gender categories and positive or negative words).

In a pretest, 81 participants (48 women) rated traits on both gender typicality (1 meaning “typically feminine” and 7 meaning “typically masculine”) and valence (1 meaning “bad” and 7 meaning “good”). The *violent* versus *gentle*

dichotomy fits these criteria for the women's gender IAT. “Violent” was seen as masculine ( $M=5.5$ ;  $SD=1.0$ ) and bad ( $M=1.4$ ;  $SD=0.8$ ), whereas “gentle” was rated feminine ( $M=3.2$ ;  $SD=1.3$ ) and good ( $M=5.6$ ;  $SD=1.2$ ). For the men's gender IAT, the *confident* versus *insecure* dichotomy came out of the preliminary study as appropriate. “Confident” was seen as masculine ( $M=4.5$ ;  $SD=1.0$ ) and good ( $M=5.7$ ;  $SD=0.9$ ), whereas “insecure” was rated feminine ( $M=3.1$ ;  $SD=1.2$ ) and bad ( $M=2.0$ ;  $SD=0.8$ ). All these means differed from the midpoint of the scale (all  $ps < .001$ ). Each concept was represented by three different words as stimuli in the IAT.

The structure of blocks and trials of the gender IATs was identical to that of the British-Surinamese IAT (Table 1). The presentation of all IATs was conducted with INQUISIT 2.0 (Inquisit, 2004), and the programming was adapted from the “Generic IAT Program” downloaded from [www.millisecond.com/samples/](http://www.millisecond.com/samples/).

To measure the IAT effects (i.e., the strength of the automatic association), we used the  $D_1$  measure (Greenwald, Nosek, & Banaji, 2003) here based only on the test trials (blocks 4 and 7 of the IAT). The  $D_1$  measure of the practice blocks had much higher variance, justifying their exclusion. Note that our IAT script only recorded latencies of correct responses and thus had a built-in error penalty. The  $D$  measure uses a metric that is calibrated by each respondent's latency variability.

#### Emotion Induction

Participants were randomly assigned to either the anger or the control condition. In a study ostensibly unrelated to the IAT task, participants were asked to write about a life event that had made them feel very angry. Instructions were given following those of Strack, Schwarz, and Gschneidinger (1985). Participants in the control condition wrote about a normal day in their life. An emotion manipulation check was embedded in a questionnaire at the end of the study. Participants rated how they felt at that moment, on three items known to tap anger (annoyed, irritated, frustrated). The emotion items were evaluated on seven-point rating scales, and items were averaged ( $\alpha = .85$ ).

#### Content of Anger Life Events

To rule out the possibility that possible sex differences are merely a result of differences in the type of life events that women and men wrote down in the anger condition, we

Table 1. Structure of the Implicit Association Test in Study 1 (in Study 2 blocks 3 and 6 were left out, and blocks 1 and 2 were switched)

| Block no. | Task   | No. of trials |
|-----------|--|---------------|
| 1         | Learn to categorize target concepts (e.g., British and Surinamese names)   | 20            |
| 2         | Learn to categorize attribute concepts (e.g., positive and negative words) | 20            |
| 3         | Combined task–practice (compatible or incompatible concept pairs)          | 20            |
| 4         | Combined task–test (compatible or incompatible concept pairs)              | 40            |
| 5         | Categorize attribute concepts, left and right response keys reversed       | 30            |
| 6         | Combined task–practice (incompatible or compatible concept pairs)          | 20            |
| 7         | Combined task–test (incompatible or compatible concept pairs)              | 40            |

analyzed the content of the reported life events.<sup>1</sup> Using nine-point Likert-type rating scales, two independent coders assessed to what extent participants were in control (correlation between coders,  $r = .57$ ), active ( $r = .74$ ), dominant ( $r = .57$ ), and showed aggressive or antagonistic behavior ( $r = .62$ ) in the life event that they wrote down.

### Procedure

Participants were randomly assigned to either the anger or the control condition. The experimenter outlined the study and told the participants to follow the instructions that were printed on six pages. The experimenter then left the room. Participants first did a round of emotion induction (for 8 minutes) and then did the first IAT on a computer. Afterwards, there was a second round of emotion induction (4 minutes; participants were instructed to continue the same writing task as before), followed by the second IAT. The order of the gender and the ethnic IAT was counterbalanced between participants. After the second IAT, the participants filled in a questionnaire with the emotion scales, some background questions, and other scales the results of which are not discussed here.

### Results

Seven participants were excluded from analyses. One person explicitly stated he did not identify with Britain (the in-group for the ethnic IAT). In spite of all efforts, three people reported they guessed that the writing about emotional memories was intended to induce an emotion. Emotion induction does not work when people are aware of its purpose (Sinclair, Mark, & Clore, 1994); therefore, these participants were excluded. Three other participants failed to follow instructions and were excluded. Fifty-eight participants (28 women) remained for analysis.

#### Emotion Manipulation Check

Participants in the anger condition ( $M = 3.44$ ;  $SD = 1.67$ ) reported more anger than participants in the control condition ( $M = 2.48$ ;  $SD = 1.14$ ),  $t(49) = 2.5$ ,  $p = .01$ .

#### Overall Analysis of Implicit Association Tests

Our hypothesis that anger leads to increased intergroup bias for ethnic groups, but not for gender groups, can be represented by an *a priori* contrast coded 3 for the ethnic IAT in the anger condition and coded 1 for the other three IATs (Rosenthal & Rosnow, 1985). The alternative hypothesis that anger also increases gender intergroup bias can be represented by another contrast coded 2 for the gender IAT in the anger condition, 1 for the two IATs in the control condition, and 0 for the ethnic IAT in the anger condition. If anger increases intergroup bias regardless of the type of group, then both the “ethnic anger” and the “ethnic gender” contrasts should be significant. If we are correct in proposing that anger only increases ethnic intergroup bias, then the “ethnic anger”

contrast should be significant, whereas the “ethnic gender” contrast should not be. We test the significance of both contrasts in a multilevel model using participants as level 2 units and the two IATs as level 1 units. Note that the contrasts are a combination of one between-subjects and one within-subjects factor, which makes it easier to assess their effect in a multilevel model. As we are only interested in the effect of the emotion induction (and how this might differ between the sexes) but not in differences in means between the different IATs or between the sexes, we *z*-standardized the IAT scores separately for men and women before running the model. The model furthermore contained the participant’s gender (coded 1 for men and 1 for women) and all possible interactions as predictors.<sup>2</sup> We also fitted a random intercept (a random-subjects effect) to take into account a possible correlation between the two IATs.

The only effect that approached significance was the interaction between the ethnic anger contrast and participant’s gender,  $B = 0.10$ ,  $p = .054$  (Table 2). Simple slope analysis (Cohen, Cohen, West, & Aiken, 2003, p. 381) showed that the ethnic anger contrast is positive for men ( $B = 0.14$ ,  $p < .05$ ) but non-significant for women ( $B = 0.06$ ,  $p = .44$ ). Consistent with our prediction, men in the anger condition had a stronger ethnic IAT effect compared with all other combinations of emotion, type of target group, and participants’ gender. The ethnic gender contrast (contrasting the gender IAT effect in the anger condition with the IATs in the control condition) was not significant nor was its interaction with gender, both  $ps > .50$ . Planned contrasts are a powerful statistical tool but can sometimes be misinterpreted (Abelson, 1996). Therefore, we subsequently analyzed both (unstandardized) IATs separately to get a more detailed view of the influence of emotion and gender on the different IATs.

#### British-Surinamese Implicit Association Test

An analysis of variance (ANOVA) with gender, emotion condition, and the order of the IATs revealed an interaction effect between emotion and gender ( $F(1, 54) = 5.02$ ,  $p < .03$ ). Figure 1 shows the direction of the interaction effect: anger increases the IAT effect but only for men. Separate analyses for women and men show that women in the anger condition ( $M = 0.41$ ;  $SD = 0.39$ ) did not differ from women in the control condition ( $M = 0.55$ ;  $SD = 0.40$ ),  $F(1, 26) = 0.83$ ,  $p = .37$ . In contrast, men in the anger condition ( $M = 0.72$ ;  $SD = 0.28$ ) showed stronger intergroup bias against Surinamese names than men in the control condition ( $M = 0.47$ ;  $SD = 0.25$ ),  $F(1, 28) = 7.03$ ,  $p < .02$ .

#### Gender Implicit Association Test

An ANOVA with participant’s gender and emotion condition as predictors only shows a main effect of participant’s gender ( $F(1, 54) = 14.07$ ,  $p < .001$ ), indicating that women ( $M = 0.64$ ;  $SD = 0.29$ ) showed much stronger gender intergroup bias than men ( $M = 0.27$ ;  $SD = 0.43$ ). In contrast to the findings for

<sup>1</sup>We thank one anonymous reviewer for pointing out this possibility.

<sup>2</sup>Order of IATs did not have a significant interaction with any of the other variables (all  $ps > .26$ ), and we therefore only included it as a main effect.



Table 2. Overall analysis for ethnic and gender intergroup bias (using multilevel modeling)

|   | Study 1                    | Study 2                    |
|---|----------------------------|----------------------------|
| Fixed part                                    |                            |                            |
| Intercept                                     | 0.009 (0.091)              | 0.000 (0.070)              |
| Ethnic IAT anger contrast                     | 0.043 (0.052)              | 0.014 (0.028)              |
| Gender IAT anger contrast                     | 0.041 (0.074)              | 0.027 (0.036)              |
| Ethnic IAT fear contrast                      | Not available              | 0.034 (0.042)              |
| Gender  | 0.006 (0.092)              | 0.000 (0.070)              |
| Ethnic IAT anger gender                       | 0.099 (0.052) <sup>†</sup> | 0.052 (0.028) <sup>†</sup> |
| Gender IAT anger gender                       | 0.041 (0.074)              | 0.045 (0.036)              |
| Ethnic IAT fear gender                        | Not available              | 0.018 (0.042)              |
| Order (first versus other)                    | 0.195 (0.089)*             | 0.109 (0.042)**            |
| Random part                                   |                            |                            |
| Level 2 residual variance ( $\sigma^2_{u0}$ ) | 0.016 (0.124)              | 0.219 (0.091)              |
| Level 1 residual variance ( $\sigma^2_{e0}$ ) | 0.927 (0.172)              | 0.751 (0.097)              |

Note: Ethnic IAT anger," "gender IAT anger," and "ethnic IAT fear" are orthogonal contrasts. The ethnic IAT anger contrast is coded 3 (5 in Study 2) for the ethnic IAT in the anger condition and -1 otherwise. Gender IAT anger is coded 2 (4 in Study 2) for the gender IAT in the anger condition, 0 for the ethnic IAT in the anger condition, and -1 otherwise. Ethnic IAT fear is coded 3 for the ethnic IAT in the fear condition, 0 for the anger condition, and -1 otherwise. Gender is coded -1 for men and 1 for women. Order is coded 1 when the IAT came first and -1 otherwise. Parameters are unstandardized regression coefficients (standard errors between brackets). The models were run using restricted iterative generalized least squares in MLwiN. Significance of fixed effects was assessed using likelihood ratio tests. IAT = Implicit Association Test.

<sup>†</sup> $p < .06$ . \* $p < .05$ . \*\* $p < .01$ .

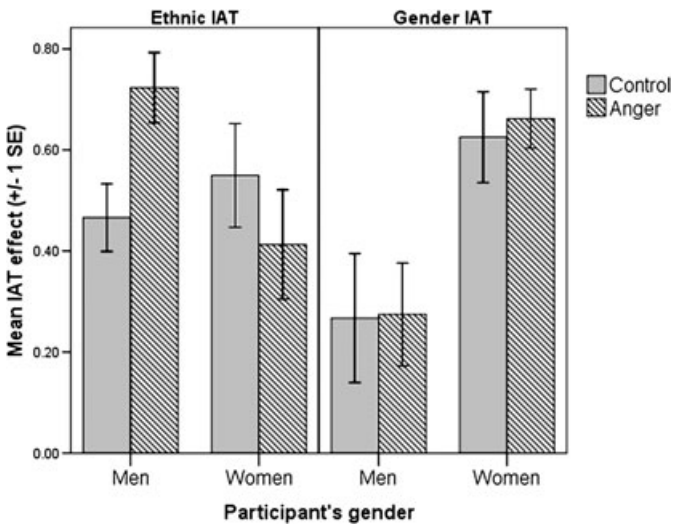


Figure 1. Mean Implicit Association Test (IAT) effects ( $D$ ) for emotion and gender categories (Study 1)

ethnic intergroup bias, there was no emotion by gender interaction, and anger did not change gender intergroup bias in men or women (all  $p > .70$ ).

The absence of an effect of anger induction on gender intergroup bias is not because there was no gender intergroup bias in the first place. The insecure–confident IAT (completed by men) has a mean  $D$  measure of 0.27 ( $SD = 0.43$ ), which is significantly different from zero ( $t(29) = 3.43$ ,  $p = .002$ ). The violent–gentle IAT (completed by women) has a mean  $D$  measure of 0.64 ( $SD = 0.29$ ), which is also significantly different from zero ( $t(27) = 11.81$ ,  $p < .001$ ). Performance on the gender IATs is thus consistent with the existing gender stereotypes, as assessed in the pretest.

#### Content of Anger Life Events

There were no sex differences in the degree of control, agency, aggressive behavior, or dominance that participants seemed to

have in the life events they wrote down (all  $ps > .27$ ). There was thus no indication that women and men recalled different types of life events in the anger condition. Furthermore, there were no correlations between any of these four dimensions and the IAT scores (all  $ps > .21$ ). Interestingly, however, for men, we did find positive correlations between the ethnic IAT score on the one hand and control ( $r = .50$ ,  $p < .05$ ) and agency ( $r = .50$ ,  $p < .05$ ) on the other hand. For women, there were no such associations (all  $ps > .89$ ). These unanticipated findings are consistent with anger's role in motivating collective action (van Zomeren et al., 2004; Walker & Smith, 2002). No correlations were found with the gender IAT scores in either sex (all  $ps > .18$ ).

#### Discussion

The results of Study 1 support our prediction that the effect of anger on intergroup attitudes depends on the type of social group that is targeted. For male participants, induced anger led to stronger associations between an ethnic in-group and positive words and/or between an ethnic out-group and negative words. Induced anger did not lead to stronger associations regarding gender groups.

The induction of anger only increased ethnic intergroup bias in men and not in women. This is consistent with the observation that ethnic intergroup conflict is mainly a male affair (e.g., Sidanius & Pratto, 1999) and growing experimental evidence that men react differently in intergroup situations than women (e.g., Van Vugt et al., 2007). There is no simple procedural explanation for this gender difference as women ( $M = 3.79$ ) do not experience less anger than men do ( $M = 3.15$ ) in the anger condition, and ethnic prejudice is not absent in women in the control group (mean  $D$  measure is 0.55,  $t(14) = 5.35$ ,  $p < .001$ ).

Study 1 has some limitations. First, the ethnic IAT and the gender IAT were not perfectly comparable. In the gender IAT, positive and negative words tapped existing gender

stereotypes (as assessed in a pretest), whereas in the ethnic IAT, the words were not ethnic stereotypes but just positive and negative words. In Study 2, we take a different approach by making the different IATs methodologically identical.

Second, the induction of anger was compared with a control condition in Study 1. As such, we cannot rule out the possibility that the effects of Study 1 are general (i.e., because the activation of negative emotions) rather than specific (i.e., because of the activation of anger). We therefore included a fear induction condition in Study 2.

## STUDY 2

In Study 2, we extend the findings of Study 1. First, the gender IAT no longer assessed negative gender out-group stereotyping but used a positive–negative dimension as in the ethnic IAT. We do not expect to find significant gender intergroup bias among men in Study 2 (see Rudman & Goodwin, 2004). The fact that no gender intergroup bias is expected for men raises the alternative explanation that our results are because of the differential salience of ethnic and gender groups for men and women. If men find being British more important than being a man, then this could explain the differential effect on the British–Suriname IAT versus the gender IAT. Moreover, it is known that the IAT is sensitive to the salience of the IAT categories (Rothermund & Wentura, 2004). Therefore, we also asked participants for the importance that different types of groups have for them.

Second, we compared the induction of anger with the induction of another emotion similar to anger but with different predictions for its effect on intergroup bias. Fear is similar to anger in that it is a goal-incongruent emotion concerning an event caused by others (e.g., Lazarus, 1991). Moreover, it can also occur in antagonistic intergroup contexts (e.g., Dumont, Yzerbyt, Wigboldus, & Gordijn, 2003). However, the main difference between anger and fear lies in the subject's coping potential. Whereas anger is associated with confrontation and aggression, fear rather triggers avoidance (e.g., Lazarus, 1991). Because intergroup bias is regarded as a psychological preparation for collective action (Scheepers, Spears, Doosje, & Manstead, 2002; Tajfel & Turner, 1986), we expect no effect of fear on intergroup bias. Furthermore, previous research suggests that fear indeed does not lead to negative evaluations of out-groups. Fear does not increase stereotyping (Tiedens & Linton, 2001) and it does not affect in-group or out-group evaluations, whereas anger does (Otten et al., n.d.). Note that this prediction runs counter to the reasoning of Dasgupta et al. (2009), who predicted that any negative emotion possibly relevant in intergroup contexts would increase bias toward unknown out-groups.

## Method

### Participants

One hundred twenty participants were recruited at Newcastle University (60 male;  $M_{\text{age}} = 19.98$ ;  $SD_{\text{age}} = 2.53$ ). All participants were White European undergraduate students from a

variety of disciplines. These participants either participated on a voluntary basis or received 5£ in exchange for their participation. Sessions were run with one to three participants at a time.

### Emotion Induction

The emotion-induction procedure was the same as in Study 1. Participants in the anger (or fear) condition were asked to write about a recent event that made them “very angry” (or “very fearful”). In the control condition, participants were asked to describe what a typical day in their life looks like. There were 40 participants (20 men and 20 women) in each emotion condition (control, anger or fear). After all the dependent variables were measured, participants rated how they felt during the writing task on items tapping anger (irritated, annoyed, frustrated,  $\alpha = .85$ ) and fear (afraid, anxious,  $\alpha = .73$ ).

### Implicit Association Test

Two IATs were constructed: an ethnic IAT and a gender IAT. The order of administration of the IATs was counterbalanced between participants. The positive and negative attribute items consisted of gender-neutral words taken from the study conducted by Rudman and Goodwin (2004) (*positive*: good, happy, vacation, gift, sunshine, paradise; *negative*: bad, awful, disease, trouble, pain, failure). These words were the same for both IATs.

The ethnic and gender categories were represented by first names. In order to control for popularity biases, we requested data from the Office of National Statistics (ONS) on the popularity of boys and girls names (ONS, unpublished data). The male and female names for the gender IAT had similar popularity; they were all among the top 25 popular names in 1984, the birth cohort of the participants, and were closely matched for length. The target stimuli for the *ethnic* IAT were the same as in Study 1.

The structure of the IAT in Study 1 consisted of seven blocks (Table 1). Because it is important that participants remain in the induced emotional state, we decided to eliminate the two training blocks (blocks 3 and 6 in Table 1, see Hugenberg & Bodenhausen, 2003), which shortens the experimental procedure. The order of combined tasks (compatible and incompatible) was again counterbalanced between participants.

The structure and stimuli of IATs were modified from the Generic IAT that is included in INQUISIT 2.0 on the points described earlier. The first trial of every block was dropped because of their much higher mean response latency; otherwise, IAT effects ( $D$  scores) were calculated by using the “ $D_4$  600 ms penalty” algorithm (Greenwald et al., 2003). A high  $D$  score represents high intergroup bias.

### Importance of Different Social Groups

As part of a questionnaire administered after the IATs, participants were presented a list of groups and asked to “rate the importance of each group for who you are.” The list included gender and nationality (i.e., British), and ratings were made on a scale from 0 (very unimportant) to 10 (very important).

### Procedure

The first emotion-induction writing task lasted 6 minutes, after which participants completed a one-page questionnaire (the content of which is not discussed here). Respondents then completed the first IAT. Next, they continued with the emotion-induction writing task for 3 minutes and then completed the second IAT. There was also a third phase of the emotion-induction writing task and a third IAT, but the results for the third IAT are not reported here. As the order of the IATs was counterbalanced and it did not moderate any of the emotion-induction effects, this did not affect the results. After the last IAT, participants completed a questionnaire including the questions about the importance of groups and the emotion manipulation check items. At the end, participants were thanked and debriefed. The tasks were presented as loosely related, and it was explained to participants that they were participating in a study on life events and reaction times.

### Results

#### Emotion Manipulation

The emotion induction was successful. Respondents in the anger condition reported significantly more anger ( $M=3.82$ ;  $SD=2.58$ ) than respondents in the control group ( $M=2.68$ ;  $SD=2.11$ ),  $t(78)=2.17$ ;  $p<.05$ . Respondents in the fear condition reported significantly more fear ( $M=3.06$ ;  $SD=2.31$ ) than respondents in the control group ( $M=1.79$ ;  $SD=1.75$ ),  $t(78)=2.78$ ;  $p<.01$ .

#### Overall Analysis of Implicit Association Tests

As in Study 1, the hypothesis that anger would lead to higher ethnic intergroup bias was represented by an *a priori* contrast. This “ethnic anger” contrast was coded 5 for the ethnic IAT in the anger condition, whereas all the other IATs were coded 1, reflecting the fact that we only expect an effect of anger, and only for ethnic intergroup attitudes. As in Study 1, a second contrast tested the alternative hypothesis that anger also increased gender intergroup bias. This “gender anger” contrast was coded 4 for gender IAT in the anger condition, coded 0 for the ethnic IAT in the anger condition, and coded 1 for the four other IATs. A third contrast represented the hypothesis that fear leads to an increase in ethnic intergroup bias. This “ethnic fear” contrast was coded 3 for the ethnic IAT in the fear condition, coded 0 for the anger condition, and coded 1 for the three other IATs. If our prediction that only anger (and not fear) leads to ethnic intergroup bias (and not gender intergroup bias) is correct, then the “ethnic anger” contrast should be significant and the other two should not be significant. We tested the significance of these contrasts in a multilevel model using participants as level 2 units and the two IATs (standardized separately for men and women as in Study 1) as level 1 units. The model also contains the participant’s gender (coded 1 for men and 1 for women) and the order of the IATs as predictors. We also added the interactions between the three contrasts and gender to the model.<sup>3</sup> As predicted, there

<sup>3</sup>The IAT order had a main effect (there was a stronger IAT effect for the IAT that came first) but did not moderate any of the other effects (all  $ps > .08$ ). All models for Study 2 therefore include IAT order as a main effect only.

was an interaction between the “ethnic anger” contrast and participant’s gender,  $B=0.05$ ,  $p=.059$  (Table 2). Consistent with Study 1, simple slopes analysis (Cohen et al., 2003, p. 381) showed that the regression coefficient for the contrast was marginally positive for males ( $B=0.07$ ,  $p<.10$ ) and nonsignificant for females ( $B=0.04$ ,  $p=.33$ ).

In order to investigate the possible role of the differential importance of different social groups for our results, we reran the overall model but included participants’ rating of the importance of the group as a covariate. Importance did neither have a main effect on the IAT effect nor did it interact with gender, the “ethnic anger” contrast, or their interaction (all  $ps > .50$ ).

#### Ethnic Implicit Association Test

In an ANOVA with emotion condition, gender, and IAT order as between-subject factors, there was a significant main effect of gender ( $F(1, 112)=5.74$ ,  $p<.02$ ) and the gender by emotion interaction was marginally significant ( $F(2, 112)=2.96$ ,  $p<.06$ ). Comparing the anger with the control condition for men and women separately showed that anger increases ethnic intergroup bias for men,  $F(1, 36)=4.34$ ,  $p<.05$ , but not for women,  $F(1, 36)=2.65$ ,  $p=.11$  (for all means and standard deviations, see Table 3 and Figure 2). The induction of fear had no such effect (both  $p > .16$ ).

#### Gender Implicit Association Test

In an ANOVA with emotion condition, gender, and IAT order as between-subject factors, there was a significant main effect of gender ( $F(1, 112)=46.9$ ,  $p<.001$ ). Women showed much more gender intergroup bias than men (for all means and standard deviations, see Table 3 and Figure 2). More importantly however, there was no main effect of emotion condition ( $F(2, 112)=0.63$ ,  $p=.54$ ) and no interaction between gender and emotion ( $F(2, 112)=1.10$ ,  $p=.34$ ).

### Discussion

Study 2 confirmed the findings in Study 1 for ethnic and gender groups. The effect of induced anger on intergroup bias again depended on the social group that was the target of the bias and on the gender of the participant. Anger led to stronger ethnic intergroup bias in men (but not women) but did not change gender intergroup bias. Furthermore, Study 2 shows that this effect does not generalize to all negative emotions:

Table 3. Means and standard deviations for the Implicit Association Tests in Study 2, by emotion and participant’s gender

|         | Ethnic IAT  | Gender IAT  |
|---------|-------------|-------------|
| Men     |             |             |
| Control | 0.58 (0.35) | 0.03 (0.50) |
| Anger   | 0.76 (0.26) | 0.05 (0.50) |
| Fear    | 0.61 (0.33) | 0.08 (0.42) |
| Women   |             |             |
| Control | 0.62 (0.32) | 0.77 (0.32) |
| Anger   | 0.43 (0.45) | 0.52 (0.52) |
| Fear    | 0.46 (0.39) | 0.58 (0.40) |



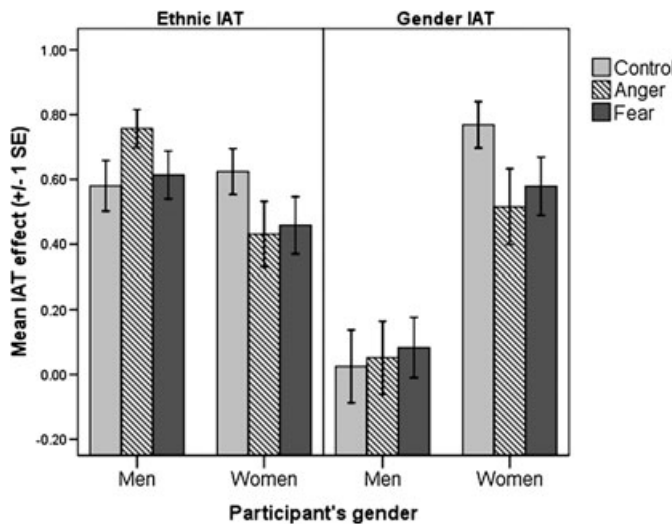


Figure 2. Mean Implicit Association Test (IAT) effects ( $D$ ) for emotion and gender categories (Study 2)

induced fear did not have any effect on intergroup bias. This strengthens our argument that the effect of anger is emotion-specific and is only valued as information when it fits the current environment.

To rule out the alternative explanation that our findings would be because of a difference in the salience of different social groups, respondents were asked to report how important a series of groups were to them. We found no relation between the importance of the group and intergroup bias. The conclusion that salience cannot explain the pattern of intergroup bias that we found is further reinforced by our analyses of the British Social Attitudes 2003 survey. This large-scale survey included a question on the importance of different social groups.<sup>4</sup> A representative sample of 306 British respondents under 30 chose their three most important self-descriptions of a list of 21 social groups that included "A woman/A man" and "British." In this study, men did not list "British" (21%) more often than "A man" (20%), and neither did they list "British" more often than women did (20%). The only significant feature of these data is that many women (51%) regard being "A woman" as an important self-description. The data from the British Social Attitudes 2003 survey are therefore not consistent with an explanation of our results in terms of differential salience of different social groups.

## GENERAL DISCUSSION

We proposed that the effect of emotion induction on intergroup bias would depend on the specific informational potential of an emotion in a particular intergroup context. We predicted and found in two studies that incidental anger increases intergroup bias for ethnic groups but not for gender groups, and only among men. Importantly, in Study 2, induced

<sup>4</sup>The British Social Attitudes 2003 survey interviewed one adult per dwelling in a representative sample of British dwellings, by means of a face-to-face questionnaire filled out in the respondent's home. More information about the British Social Attitudes surveys can be found at <http://www.natcen.ac.uk/series/british-social-attitudes>.

fear had no effect on intergroup bias, showing that the effect of anger does not generalize to other negative emotions.

### Ethnic Groups and Gender Groups

Dasgupta et al. (2009) argued that anger increases intergroup bias when it is relevant to the stereotypes, threats, or goals regarding the out-group, and they showed that anger increases intergroup bias against minimal groups and Arabs. Inspired by these results, we compared ethnic groups with gender groups, as these are very different in terms of intergroup threats. Ethnic intergroup relations are characterized by conflicts for resources (LeVine & Campbell, 1972), whereas gender groups have relations of positive interdependence. Given anger's important role in intergroup conflicts for resources (van Zomeren et al., 2004; Walker & Smith, 2002), we predicted and found that anger only affected ethnic intergroup bias and not gender intergroup bias. The fact that we used an unknown ethnic out-group (Surinamese) suggests that this effect can generalize to many other ethnic groups.

We reasoned that the absence of the anger effect for gender groups is related to the absence of group-based threats and conflicts between women and men. One possible explanation for this absence of conflict is that outright intergroup conflict between women and men, as groups, is not adaptive given that they depend on each other for reproduction (which makes confrontation costly for both). Implicit in this reasoning is that for ethnic groups, there is some functionality in the link between anger and intergroup bias. We do indeed think that processes of intergroup bias are more adaptive than irrational (see Spears, 2010). In situations of ethnic intergroup conflict, ethnic intergroup bias might have been an adaptive response in ancestral environments because it facilitates ethnic competition and exploitation (see Krebs & Denton, 1997).

### Intergroup Bias as a Preparation for Collective Action

Dasgupta et al. (2009) predicted that any negative emotion possibly relevant in intergroup situations would increase intergroup bias against unknown out-groups. Contradicting this prediction, fear did not affect intergroup bias in Study 2 (even though fear can clearly be relevant in intergroup situations). We think this is the case because intergroup bias is a preparation for collective action (Scheepers et al., 2002; Tajfel & Turner, 1986), but fear is not associated with taking action against others. In other words, the informational potential of fear does not fit the action tendencies in this intergroup context.

Study 1 also hinted at the importance of action tendencies. For men in the anger condition, there was a positive correlation between ethnic intergroup bias and the amount of control and agency found in the life event they had written down. These findings therefore suggest a more prominent role for intergroup action tendencies in determining whether an emotion will be relevant or not.

### Sex Differences in Intergroup Psychology

Men show a more group-based reaction to intergroup conflict than women do (e.g., Yuki & Yokota, 2009). Given that our dependent variable is intergroup bias (a group-based reaction),



the informational potential of anger as a signal of intergroup conflict fits the context better for men than for women. We therefore predicted that the induction of anger would have a stronger effect on men than on women. We indeed found that anger only increased ethnic intergroup bias in men and not in women. Such a gender difference is consistent with the observation that human ethnic intergroup conflict is mainly a male affair (e.g., Navarrete et al., 2010). More generally, this could be related to women's responses to stress, that is, women show a tend-and-befriend strategy instead of a fight-or-flight response as men do (Taylor et al., 2000). Such a fundamental sex difference might have wide implications for (research on) intergroup relations.

### Future Research and Conclusion

We have predicted and explained the different results for ethnic and gender groups by the negative interdependence between ethnic and the positive interdependence between gender groups. However, this does not necessarily mean that differences between ethnic and gender groups are unchangeable. For example, following the aforementioned rationale on interdependence between gender groups, if gender groups are presented to be involved in a conflict for resources, then this could increase gender intergroup bias or maybe facilitate an effect of anger on gender intergroup bias.

In conclusion, the effect of emotion on intergroup bias depends on the informational potential of the emotion and its link to action tendencies, and this explains why the effects differ between different types of groups and depend on people's gender. More generally, our results lead to two important considerations for research on intergroup relations. First, theories on intergroup relations do not always apply to gender groups. Second, gender differences between observers should systematically be taken into account in intergroup relations research (which would also mean not relying only on predominantly female psychology student samples).

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