

Emotion

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Positivity Bias in Judging Ingroup Members' Emotional Expressions

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We investigated how group membership impacts valence judgments of ingroup and outgroup members' emotional expressions. In Experiment 1, participants, randomized into 2 novel, competitive groups, rated the valence of in- and outgroup members' facial expressions (e.g., fearful, happy, neutral) using a circumplex affect grid. Across all emotions, participants judged ingroup members' expressions as more positive than outgroup members' expressions. In Experiment 2, participants categorized fearful and happy expressions as being either positive or negative using a mouse-tracking paradigm. Participants exhibited the most direct trajectories toward the "positive" label for ingroup happy expressions and an initial attraction toward positive for ingroup expressions of fear, with outgroup emotion trajectories falling in between. Experiment 3 replicated Experiment 2 and demonstrated that the effect could not be accounted for by targets' gaze direction. Overall, people judged ingroup faces as more positive, regardless of emotion, both in deliberate and implicit judgments.

Keywords: emotion, judgment, groups

In 2012, *The New York Times* reported that a behavior-detection program developed for the Transportation Security Administration (TSA) had contributed to a surge in racial profiling at airport security checkpoints (Schmidt & Lichtbau, 2012). The behavior-detection program, which mandated that trained assessors scan passengers for unusual activity (e.g., fidgeting, sweating, other suspicious emotional displays), had been instituted at 161 airports nationwide. The racial profiling problem was brought to light when officers at Boston's Logan airport lodged complaints with TSA officials, spurring a larger program evaluation. According to officers quoted in the article, "The practice [of racial profiling] has become so prevalent . . . that Massachusetts State Police officials have asked why minority members appear to make up an overwhelming number of the cases that the airport refers to them." Though there are many factors that likely contributed to the racial profiling phenomenon—stereotyping, pressure to demonstrate that the behavior-detection program was working—one understudied factor that may have fueled the problem is group-based biases in the judgments of passersby's emotional expressions.

People have divergent emotional reactions to others' emotional expressions as a function of group membership. For example,

viewing ingroup members' expressions lead to more intense congruent affective responses than when viewing outgroup members' expressions (Weisbuch & Ambady, 2008). In competitive contexts, people may even feel the opposite of what an outgroup member expresses (i.e., the intergroup empathy bias; Cikara, Bruneau, & Saxe, 2011; Cikara, Bruneau, Van Bavel, & Saxe, 2014; Cikara & Fiske, 2013). In the three experiments presented here, we examined how group membership impacted judgments of *others'* emotional expressions.

Interpretations of emotional expressions are reliably biased by context (Aviezer et al., 2008; Carroll & Russell, 1996), culture (Matsumoto, 1989; Matsumoto & Ekman, 1989; Matsumoto, Kasri, & Kookan, 1999), and expectations (Inzlicht, Kaiser, & Major, 2008). Mounting evidence has indicated that social groups exert a similar effect. By several accounts, individuals display an "ingroup advantage" when judging the emotions of ingroup members; that is, individuals have a higher degree of accuracy in recognizing the emotional displays of their own racial and ethnic ingroups, relative to outgroups (for review, Elfenbein & Ambady, 2002; Thibault, Bourgeois, & Hess, 2006). Follow up studies indicated that ingroup advantage appears not only for real social groups, but also for arbitrary groups to which people have just been assigned (Elfenbein & Ambady, 2003; Young & Hugenberg, 2010). These differences in emotion recognition between in- and outgroup targets may be due to ingroup members' faces being more strongly encoded and more readily processed than outgroup members' faces (Ratner & Amodio, 2013). Ingroup faces may also be processed more holistically than outgroup faces when group identity is made salient (Hugenberg & Corneille, 2009). In addition to categorizing the emotions of ingroup faces more accurately, people also categorize them more quickly (though the results vary by emotion across studies). For example, people categorized same-

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race targets' happy, angry, and neutral expressions faster than those of other-race targets (Elfenbein & Ambady, 2003; Kubota & Ito, 2007).

In contrast to the collection of results indicating greater emotion expression judgment accuracy for ingroup targets, several findings have indicated that individuals exhibit a stereotype-congruent bias instead. For example, White participants categorized same-race happy expressions more quickly than those with angry and sad expressions; however, this pattern was reversed for Black targets (Hugenberg, 2005; see also Bijlstra, Holland, & Wigboldus, 2010). Furthermore, participants who exhibited stronger stereotype associations displayed a stronger bias in emotion recognition (e.g., faster for same-race/happy and other-race/angry relative to the inverse pairing; Bijlstra, Holland, Dotsch, Hugenberg, & Wigboldus, 2014; Hugenberg & Bodenhausen, 2003). This stereotype-congruent finding has extended to gender as well: Neutral male faces are more likely to be categorized as angry than neutral female faces (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007). Finally, and most relevant for the present investigation, participants, even in minimal groups contexts, have been found to more likely categorize angry targets as outgroup than ingroup (Dunham, 2011).

Competing Predictions: Accuracy Versus Positivity Bias

Because previous research has shown that individuals experience more intense affective responses to ingroup than outgroup members' emotional expressions, it is possible that those reactions may influence judgments of others' emotions (Weisbuch & Ambady, 2008). Specifically, outgroup emotions may be judged as relatively less extreme (i.e., blunted) making ingroup judgments appear more extreme by comparison. In other words, ingroup fearful faces may be judged as more negative and ingroup happy faces judged as more positive than outgroup faces, making these judgments appear more accurate.

Alternatively, stereotypes and evaluations may exert a top-down bias on judgments of emotion expressions (for a recent review, see Freeman & Johnson, 2016). Though there are no stereotypes associated with arbitrary groups, people reliably evaluate even minimal ingroups more positively than outgroups (Tajfel, Billig, Bundy, & Flament, 1971; Tajfel & Turner, 1979). As such, these evaluations may bias participants to judge arbitrary ingroup faces as more positive, regardless of emotion.

Current Research Overview and Hypotheses

All of the previous research in this area is steeped in the basic emotion theory tradition (Ekman, 1992). In this past research, valence was assumed to be an intrinsic property of the expression: an angry face may be judged equally negatively across group conditions, it is just identified as angry more or less quickly, or is judged to be more or less likely to be an ingroup face. Alternative models of emotion, such as the circumplex model, focus more on the underlying dimensions that distinguish different emotions rather than the categorical distinctions highlighted in the basic emotions approach (Barrett & Russell, 1999; Russell, 1980; Russell & Barrett, 1999; Russell, Weiss, & Mendelsohn, 1989). These underlying dimensions may be more sensitive to top-down influences of group membership information. Thus, in contrast to

previous research, which has focused on accuracy and bias for discrete emotions, here we examined subtle biases in judgments of the *valence* of arbitrarily assigned ingroup and outgroup targets' emotional expressions (see previous work in positivity–negativity bias in judging emotional expressions in interpersonal contexts, e.g., Neta, Davis, & Whalen, 2011; Neta, Norris, & Whalen, 2009; Neta & Whalen, 2010).

Second, much of the extant research has focused on race as the group membership of interest, making it difficult to parse which factors are responsible for this ingroup advantage or bias (e.g., morphological differences, familiarity, stereotypes). Here we used novel groups (see also Dunham, 2011; Young & Hugenberg, 2010) to control for all of these factors and test specifically for group-driven effects on judgments of others' emotional expressions.

Across three experiments, we randomly assigned participants to one of two competitive teams to control for confounds associated with real-world social groups (e.g., race, stereotypes, familiarity). We induced competition between teams to mimic real-world situations in which the outgroup poses a threat to the ingroup. In Experiment 1, participants rated the valence and arousal of targets' expressions on a circumplex affect grid. In Experiments 2 and 3, we used a computer mouse-tracking paradigm to measure biases that emerge during the process of judging valence but that may not manifest in an explicit decision (Freeman & Ambady, 2010). Materials, data, and data-analysis code for all three experiments can be downloaded at: <https://osf.io/rsyja/>

Experiment 1: Circumplex Affect Grid Judgments

In Experiment 1 we hypothesized that participants would judge ingroup members' expressions (i.e., fearful, happy, neutral) more positively than competitive outgroup members' expressions.

Method

Participants. We recruited 100 participants via Amazon.com's Mechanical Turk (AMT; 34 women, $M_{\text{age}} = 32.48$ years, $SD = 9.83$ years, age range = 21–67 years). We initially recruited 50 participants, observed the predicted trend, but a small effect size. Thus we doubled our sample to have 80% power to detect a small effect. Participants received \$2.00 for completing the experiment. Manipulation check questions at the end of the experiment (i.e., "What team are you on?" "Which team is also playing today?" "What is the relationship of the teams?") assessed whether participants were engaged in the task; none of the participants failed the manipulation checks.

Stimuli. A total of 16 identities were used as ingroup and outgroup targets, modified from the FACES database (Ebner, Riedinger, & Lindenberger, 2010). Half of the identities were male, the other half female. For each identity, there was a total of three images—a fearful expression, a happy expression, and a neutral expression—yielding a total of 48 images. Target identities were randomly assigned to the ingroup or outgroup for each participant and counterbalanced across participants. We used shirt color to indicate targets' team membership. Specifically, we used Photoshop to alter the color of each target's shirt, generating both a blue and a green version for each image, such that each identity had an equal probability of being assigned to either team (though no identity ever appeared in both colored shirts within a participant).

Procedure. The experiment was framed as a problem-solving challenge (see Cikara et al., 2014 for greater details involving the design setup and randomized team assignment). Participants were assigned to one of two teams and believed they were competing against another team. Participants were provided with a back story as to why they would be rating other players' facial expressions:

Scientific evidence suggests that the more people get to know other players, the better people perform in these particular problem-solving challenges. We're going to give you the opportunity to get to know the other players—Rattlers and Eagles team members—by showing you pictures of people who have been previously classified as Rattlers and Eagles. You will know whether it's a Rattlers or Eagles team member by the *color of each person's shirt*. You will see a total of 48 faces before the problem solving challenge. Some of the faces are expressing emotions. We would like you to tell us how you think each person is feeling, using the grid below each picture.

Eagles targets wore blue shirts and Rattlers targets wore green shirts.

Participants were then shown how to use and interact with the circumplex affect grid (see Figure 1; Russell, 1980; Russell & Barrett, 1999). The instructions were as follows:

The vertical dimension of the map represents degree of arousal. Arousal has to do with how wide awake, alert, or activated a person feels—independent of whether the feeling is positive or negative. The top half is for feelings that are above average in arousal. The lower half for feelings below average. The bottom represents sleep, and the higher you go, the more awake a person feels. At the top of the square is maximum arousal. If you imagine a state we might call frantic excitement, remembering that it could be either positive or negative, then this feeling would define the top of the grid. The right half of the grid represents pleasant feelings—the farther to the right the more pleasant. The left half represents unpleasant feelings—the farther to the left, the more unpleasant. Up and to the right are feelings of ecstasy, excitement, joy. Opposite these, down and to the left, are feelings of depression, melancholy, sadness, and gloom. Up and to the left are feelings of stress and tension. Opposite these, down and to the right, are feelings of calm, relaxation, serenity. Feelings are complex.

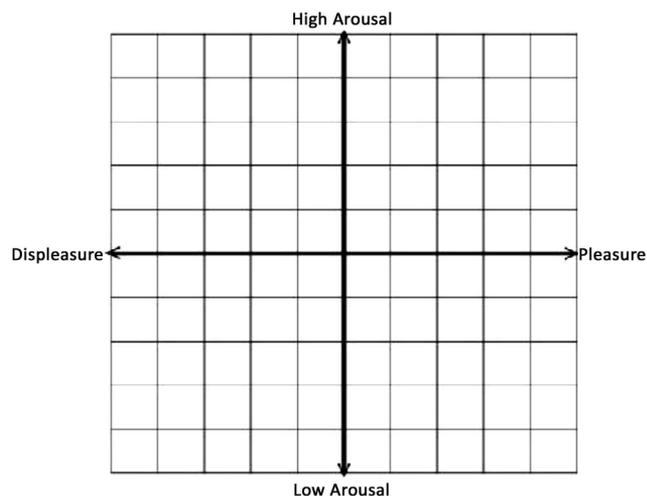


Figure 1. Circumplex affect grid used in Experiment 1. Participants selected one box to represent the valence and arousal levels for each target's emotional expression.

They come in all shades and degrees. The labels we have given are merely landmarks to help you understand the circumplex affect grid. When actually using the grid, click on a box anywhere in the grid to indicate the exact shade and intensity of feeling. Please look over the entire grid to get a feel for the meaning of the various areas.

Participants were then instructed to click only on one box within the grid to represent what they perceived the target face was feeling.

Identification questions. As an additional manipulation check, participants answered six questions to assess their collective identification with ingroup and outgroup teams (see Van Bavel & Cunningham, 2012) on unmarked slider scales, ranging from 0 (*strongly disagree*) to 100 (*strongly agree*): "I [value/like/feel connected to] the [Eagles/Rattlers]." Composite scales for ingroup and outgroup identification scores were calculated by averaging the three items for each team together (ingroup items $\alpha = .85$, outgroup items $\alpha = .88$).

Demographic questions. At the end of the survey, participants reported their gender, age, ethnicity, occupation, and state of residence.

Analyses. Valence and arousal scores were calculated by separating the coordinates selected on the circumplex affect grid, such that valence scores corresponded to the x axis and arousal scores corresponded to the y axis. Scores were then averaged across trials so that each participant had six valence scores and six arousal scores: a valence and arousal score for each expression (3: fearful, happy, neutral) and group (2: ingroup, outgroup). If a participant selected more than one box in a trial, then the coordinates selected were averaged together, only if all selections were in the same quadrant. If multiple boxes were selected and were not in the same quadrant, then that trial was excluded from the analyses (<1% of trials).

Results

Identification scores. Across conditions, participants identified with their ingroup ($M = 78.96$, 95% CI [75.56, 82.36]) more than with the outgroup ($M = 32.93$, 95% CI [28.92, 36.94]), $t(99) = 16.31$, $p < .001$, mean difference = 46.03, 95% CI [40.43, 51.63], $d = 1.64$.

Valence scores. We ran a two-way repeated-measures analysis of variance (ANOVA) with emotional expression (fearful/happy/neutral) and group (ingroup/outgroup) as the independent variables on valence scores, yielding both a main effect of emotion, $F(1.64, 162.20) = 1015.07$, $p < .001$,¹ $\eta_p^2 = .911$ and a main effect of group $F(1, 99) = 7.15$, $p = .009$, $\eta_p^2 = .067$ (see Figure 2). Overall, participants judged ingroup members as having more positive expressions compared with outgroup members. There was no significant interaction between emotion and group on valence scores, $F(2, 198) = 0.35$, $p > .250$, $\eta_p^2 = .004$.

Arousal scores. As an exploratory analysis, we also examined whether group membership affected participants' judgments of arousal. A second two-way repeated measures ANOVA revealed a

¹ The assumption of sphericity was violated, $\chi^2(2) = 26.64$, $p < .0005$, therefore the degrees of freedom were corrected using the Huynh-Feldt estimate of sphericity ($\epsilon = .82$).

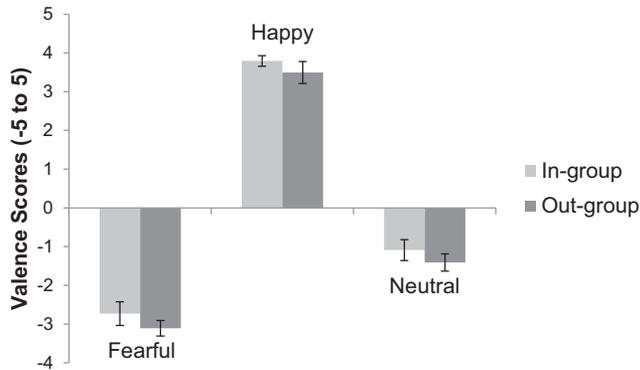


Figure 2. Valence scores by emotion and group in Experiment 1. Error bars represent 95% CIs.

main effect of emotion, $F(1.87, 184.69) = 613.64, p < .001, \eta_p^2 = .861$, and a main effect of group $F(1, 99) = 5.60, p = .02, \eta_p^2 = .054$, on arousal scores (see Figure 3). Overall, participants judged ingroup members as depicting higher arousal levels compared with outgroup members. There was no significant interaction between emotion and group on arousal scores, $F(2, 198) = 0.53, p > .250, \eta_p^2 = .005$.

Discussion

Experiment 1 supported our prediction that participants judged ingroup members' expressions as more positive (regardless of emotion) compared with outgroup members' expressions, rather than judging ingroup members' expressions as more extreme than outgroup expressions. Additionally, we found that arousal judgments paralleled those of valence judgments, such that participants saw ingroup members as more aroused compared with outgroup members, regardless of emotion.

These results could have potentially arisen due to participants' desire to judge ingroup members as more positive compared with outgroup members. The task had no time limit and was deliberative, allowing participants ample time and effort to skew their judgments. Thus, in Experiment 2, we wanted to extend Experiment 1's findings by using an implicit categorization task.

Experiment 2: Mouse-Tracking Judgments

In Experiment 2, we predicted that the ingroup positivity bias would emerge within an implicit categorization task using a two-choice mouse-tracking paradigm. Specifically, we predicted that participants would show the greatest facilitation toward the positive label for ingroup happy expressions, and the greatest interference toward the negative label for ingroup fearful expressions. In other words, even when participants explicitly judge an ingroup expression as fearful, they may be initially attracted to judge the expression as happy, due to an ingroup positivity bias.

Method

Participants. We increased the number of participants to 120 to ensure that we would recruit 100 participants who used external mice for the mouse-tracking paradigm (some participants only

have track pads). One hundred and 20 AMT participants were paid \$2.00 for completing the experiment. Six participants who had not completed the experiment or had failed the manipulation check questions at the end of the experiment (see Experiment 1 methods) were excluded from analyses. An additional 19 participants were excluded because they did not use an external mouse in the task (e.g., they used a track pad) and two participants were excluded for having at or below chance scores in the face-memorization testing section (described below). The data of four participants were compromised due to computer error, resulting in a final total of 89 participants (41 women, $M_{\text{age}} = 35.11$ years, $SD = 11.44$, age range = 18–72 years).

Stimuli. The same stimuli were used as in Experiment 1, along with an additional 32 identities (half male, half female), totaling 48 identities. As in Experiment 1, each identity had three corresponding images depicting either a fearful, happy, or neutral expression, for a total of 144 images. As in Experiment 1, each target wore a blue shirt or a green shirt; target identities were counterbalanced and randomly assigned to the ingroup or outgroup for each participant.

Procedure. The team assignment and backup story for the experiment was identical to those in Experiment 1, except for the following difference: for the basic instruction given in the backstory, participants were told that "We would like you to tell us how you think each person is feeling by categorizing whether the face has a positive or negative expression." Instead of the assessing valence and arousal of each image using the circumplex affect grid, participants categorized faces as having either positive or negative expressions using an in-house Javascript implementation of the MouseTracker software package (see Freeman & Ambady, 2010 for more details), allowing the recording of mouse movements through participants' Internet browser (e.g., Hehman, Carpinella, Johnson, Leitner, & Freeman, 2014).

Participants then read a description of the main task:

You will be categorizing faces as either having positive or negative expressions. For each trial, there will be two labels at the top. When you click the start button at the bottom, a picture of a face will appear, and you will have to categorize the expression as positive or negative by clicking one of the labels at the top.

Participants were then directed to the mouse-tracking portion of the experiment. Participants were given three minutes to memorize the neutral expression faces of their ingroup members and outgroup members and were told that they would be tested on how well they memorized the faces. Twelve identities were randomly selected from the 48 total identities and presented as ingroup members; another 12 identities were randomly selected and presented as outgroup members. Each group comprised 6 female and 6 male identities.

After the 3 minutes of memorization, participants completed four trial blocks to test their memorization of ingroup and outgroup members: one block in which the team name and corresponding shirt color was visible, two blocks in which only the shirt color was visible, and one block in which neither the team name nor corre-

² The assumption of sphericity was violated, $\chi^2(2) = 9.34, p = .009$ therefore the degrees of freedom were corrected using the Huynh-Feldt estimate of sphericity ($\epsilon = .92$).

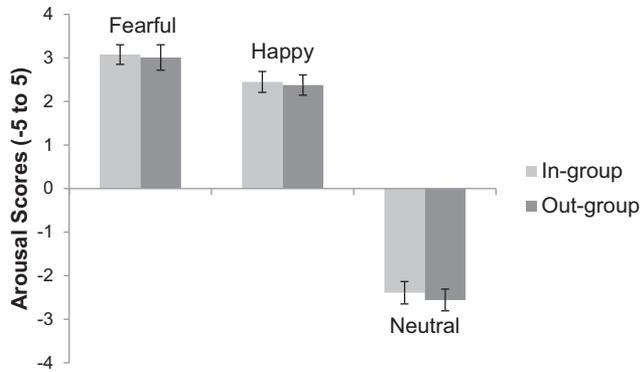


Figure 3. Arousal scores by emotion and group in Experiment 1. Error bars represent 95% CIs.

sponding shirt color was visible. During the four blocks, participants were shown one identity at a time, always depicting a neutral expression, and were instructed to press the “E” key on the keyboard if the member shown was part of the EAGLES team (labeled as “your team”/“other team” depending on team affiliation) and the “I” key if a member of the RATTLEERS was shown (labeled as “your team”/“other team” depending on team affiliation). If they responded incorrectly, a red “X” would appear in the screen to inform them of their error. All 12 members of the ingroup team and the 12 members of the outgroup team were shown in all four blocks in a random order.

Participants then completed four blocks of the face categorization task, categorizing faces as either positive or negative. Each block comprised 48 images (24 identities, 2 images per identity, depicting either a fearful or happy expression). All images were randomized within each block. Participants were instructed to click the start button at the bottom of the screen and once the face appeared, click either positive or negative labels in the top corners (see Figure 4). The location of the labels was counterbalanced between blocks. If participants responded slower than 2000 milliseconds, they were prompted to answer faster. Participants completed three practice trials before the main set of trials, with fruits and vegetables as the targets, to increase familiarization with the MouseTracker interface. At the end of the experiment, participants completed identification and demographic questions as in Experiment 1: ingroup identification items $\alpha = .91$; outgroup identification items $\alpha = .86$.

Analyses. The target measure of the MouseTracker task is the area under the curve (AUC). The AUC is calculated “as the geometric area between the actual trajectory and the idealized trajectory” (in this case a straight line between the observed trajectory’s start and endpoints; Freeman & Ambady, 2010). AUC was calculated for each trial, for every participant. AUC scores were then averaged across trials such that each participant had four aggregate AUC scores, corresponding to expression (2: fearful, happy) and group (2: ingroup, outgroup): ingroup fear, ingroup happy, outgroup fear, and outgroup happy. We did a similar calculation for initiation time, which is the time until mouse movement occurs. We only analyzed correct trials, excluding 2.24% of the total number of trials across participants.

Results

Identification scores. Replicating Experiment 1’s results, participants identified with their ingroup ($M = 76.30$, 95% CI [72.76, 79.85]) more than with the outgroup ($M = 35.78$, 95% CI [31.68, 39.87]), $t(88) = 14.05$, $p < .001$, mean difference = 40.53, 95% CI [34.80, 46.26], $d = 1.50$.

Initiation time check. We ran a two-way repeated measures ANOVA with emotional expression (fearful/happy) and group (ingroup/outgroup) as the independent variables on initiation time. There were no significant effects of emotion, $F(1, 88) = 0.74$, $p > .250$, $\eta_p^2 = .008$, or group, $F(1, 88) = 0.72$, $p > .250$, $\eta_p^2 = .008$, on initiation time, and no significant interaction between emotion and group, $F(1, 88) = 1.36$, $p = .247$, $\eta_p^2 = .015$, establishing that mouse trajectories reflected the initiation of the decision process at equal times across conditions.

AUC scores. We ran a second two-way repeated measures ANOVA with emotional expression (fearful/happy) and group (ingroup/outgroup) as the independent variables on AUC scores, yielding a main effect of emotion, $F(1, 88) = 19.04$, $p < .001$, $\eta_p^2 = .178$ (see Figure 5). There was no main effect of group, $F(1, 88) = 2.99$, $p = .087$, $\eta_p^2 = .033$. The main effect of emotion was qualified by a significant interaction between emotion and group, $F(1, 88) = 5.50$, $p = .021$, $\eta_p^2 = .059$. As predicted, participants had the most direct trajectories for ingroup members with happy expressions and the least direct trajectories for ingroup members with fearful expressions, with trajectories for outgroup members falling in between. Specifically, participants exhibited an initial attraction to select the “happy” response when categorizing ingroup members with fearful expressions ($M = 0.99$, 95% CI [0.90, 1.08]) compared with outgroup members with fearful expressions ($M = 0.92$, 95% CI [0.84, 1.01]), $t(88) = 2.86$, $p = .005$, mean difference = 0.07, 95% CI [0.02, 0.12], $d = 0.30$. The indirectness in the ingroup/fearful trajectory was also larger when compared with ingroup members with happy expressions ($M = 0.83$, 95% CI [0.75, 0.91]), $t(88) = 5.05$, $p < .001$, mean difference =



Figure 4. Example of a mouse-tracker trial. After clicking the start button, the identity’s expression appears and participants then categorize the expression as positive or negative. Adapted from “the FACES database (Ebner, Riediger, & Lindenberger, 2010)”



Figure 5. Area under the curve scores by emotion and group in Experiment 2. Error bars represent 95% CIs. *Simple effect, $p < .05$.

0.16, 95% CI [0.10, 0.22], $d = 0.54$. There was no significant difference in AUC scores between categorizing ingroup members' and outgroup members' happy expressions, $t(88) = -0.57$, $p > .250$, mean difference = -0.01 , 95% CI [-0.06 , 0.03], $d = -0.06$.

Discussion

Experiment 2 extended Experiment 1's findings with an implicit categorization task: participants exhibited the most direct trajectories for ingroup members with happy expressions and an initial attraction to positive for ingroup members with fearful expressions.

We did not assess judgments of arousal here; however, we believe arousal is unlikely to account for these effects. People process high-arousal stimuli more quickly than low-arousal stimuli (Bradley, Greenwald, Petry, & Lang, 1992). Thus, one might expect participants' trajectories to have been most direct when judging ingroup fearful expressions. However, our participants exhibited the exact opposite pattern (i.e., exhibited a partial attraction to the 'positive' response when evaluating ingroup members displaying fearful expressions). These results suggest that valence dominates arousal judgments of emotional expressions, and that people judge ingroup members as more positive overall.

Experiment 3: Mouse-Tracking Judgments, Including Averted Gaze

The results of Experiment 2 provided additional support for an ingroup positivity bias for judgments of emotional expressions; however, we wanted to confirm our results were not artifacts of the stimuli. All targets had direct eye gaze. Participants may not be accustomed to seeing ingroup members displaying direct fearful expressions or outgroup members displaying direct happy expressions. Gaze direction is important when processing facial expressions (Ganel, Goshen-Gottstein, & Goodale, 2005), because both gaze direction and emotional expression give cues to perceivers about the environment (Bayliss, Frischen, Fenske, & Tipper, 2007). Direct gaze facilitates processing of approach-oriented emotions (e.g., anger, happiness) and increases perceived intensities of those emotions, while averted gaze facilitates processing of

avoidance-oriented emotions (e.g., fear) and increases perceived intensities of those emotions (Adams & Kleck, 2003, 2005).

If gaze direction was driving our results in Experiment 2, then we would expect to see the reverse pattern of results in a gaze-averted condition: specifically, more direct mouse trajectories with ingroup members displaying averted fearful expressions and less direct trajectories for ingroup members displaying averted happy expressions. In the current experiment we directly replicate Experiment 2 and add a between-subjects gaze direction manipulation. If we replicate our results in the averted gaze condition, we can more confidently infer our results are driven by a general ingroup positivity bias.

Method

Participants. We recruited 238 participants (twice as many as in Experiment 2 owing to the between-subjects gaze manipulation in this experiment). Participants were paid \$2.00 for completing the experiment. Eleven participants who had not completed the experiment or had failed the manipulation check questions at the end of the experiment (see Experiment 1 methods) were excluded from analyses. An additional 30 participants were excluded because they did not use an external mouse in the task (e.g., they used a trackpad) and nine participants were excluded for having at or below chance scores in the face-memorization testing section (described below). Trajectory data of 11 participants was compromised due to computer error, and 12 of the recorded responses were excluded due to being second or third attempts of participants who had already completed the task, resulting in a final total of 165 participants (80 women, $M_{\text{age}} = 33.37$ years, $SD = 9.90$, age range: 18–68 years).

Stimuli and procedure. The stimuli and procedure were the same as in Experiment 2, except for the following: We used Photoshop to create a matched set of targets displaying averted gaze (assigned randomly to left or right by identity). Participants were then randomly assigned to see expressions with either direct or averted eye gaze.

Measures. Identification and demographic questions were identical to those in Experiment 1 and 2: ingroup identification items $\alpha = .87$; outgroup identification items $\alpha = .87$.

Analyses. The analysis of AUC was conducted the same as in Experiment 2, including a between-subjects gaze direction factor. We only analyzed correct trials, excluding 5.34% of the total number of trials.

Results

Identification scores. Participants identified with their ingroup ($M = 77.05$, 95% CI [74.13, 79.98]) more than with the outgroup ($M = 39.88$, 95% CI [36.43, 43.33]), $t(163) = 16.19$, $p < .001$, mean difference = 37.17, 95% CI [32.64, 41.70], $d = 1.27$.

Initiation time check. We ran a three-way mixed-model ANOVA with emotional expression (fearful/happy) and group (ingroup/outgroup) as within-subjects variables and target gaze direction (direct/averted) as a between-subjects factor on initiation time. There were no significant effects of emotion, $F(1, 163) = 0.33$, $p > .250$, $\eta_p^2 = .002$, group, $F(1, 163) = 0.02$, $p > .250$, $\eta_p^2 < .001$, or gaze direction, $F(1, 163) = 0.08$, $p > .250$, $\eta_p^2 < .001$, on

initiation time, establishing that trajectories reflected the initiation of the decision process at equal times across conditions.

AUC scores. We ran a three-way mixed-model ANOVA with emotional expression (fearful/happy) and group (ingroup/outgroup) as within-subjects factors and gaze direction (direct/averted) as a between-subjects factor on AUC scores. There was a main effect of emotion on AUC scores, $F(1, 163) = 30.48, p < .001, \eta_p^2 = .158$ (see Figure 6), and no main effect of group, $F(1, 163) = 1.76, p = .186, \eta_p^2 = .011$, replicating Experiment 2. The main effect of emotion was qualified by a significant interaction between emotion and group, $F(1, 163) = 4.91, p = .028, \eta_p^2 = .029$, also replicating Experiment 2. There was no main effect of gaze direction on AUC scores, $F(1, 163) = 1.22, p > .250, \eta_p^2 = .007$, and no significant interaction between gaze direction and emotion, $F(1, 163) = 0.08, p > .250, \eta_p^2 < .001$, or group, $F(1, 163) = 0.91, p > .250, \eta_p^2 = .006$. There was no significant three-way interaction between gaze direction, emotion, and group, $F(1, 163) = 0.001, p > .250, \eta_p^2 < .001$, confirming that our results in Experiment 2 were not the product of targets' gaze direction.

Replicating Experiment 2, participants had the most direct trajectories toward the positive label for ingroup members with happy expressions but exhibited initial attraction to the positive label for ingroup members with fearful expressions (with trajectories for outgroup members falling in between). Note, however, that the pattern of the simple effects was slightly different in Experiment 3. There was a significant difference in AUC scores between categorizing ingroup members' ($M = 0.89, 95\% \text{ CI } [0.84, 0.94]$) and outgroup members' ($M = 0.94, 95\% \text{ CI } [0.89, 1.00]$) happy expressions, $t(164) = -2.56, p = .011$, mean difference = $-0.05, 95\% \text{ CI } [-0.09, -0.01], d = -0.20$. There was not, however, a significant difference in AUC scores between ingroup members' ($M = 1.07, 95\% \text{ CI } [1.00, 1.13]$) and outgroup members' fearful expressions ($M = 1.05, 95\% \text{ CI } [0.99, 1.11]$), $t(164) = 0.98, p > .250$, mean difference = $0.02, 95\% \text{ CI } [-0.02, 0.05], d = 0.08$.

Discussion

Experiment 3 replicated the results of Experiment 2: participants had the most direct trajectories to the positive label for ingroup members with happy expressions but exhibited initial attraction to the positive label for ingroup members with fearful expressions.

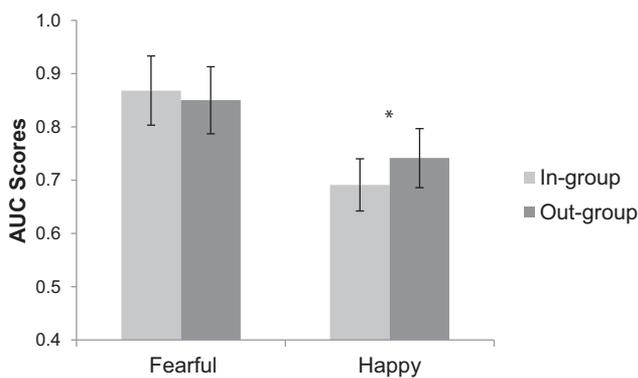


Figure 6. Area under the curve scores by emotion and group in Experiment 3. Error bars represent 95% CIs. *Simple effect, $p < .05$.

Gaze direction had no effect on categorization, indicating that a gaze-emotion (in)congruency account of our findings is unlikely.

General Discussion

Across three experiments, using both explicit and implicit measures, we found that participants judged ingroup emotional expressions as more positive, regardless of emotion, than outgroup emotional expressions. In Experiment 1, participants rated ingroup happy, fearful, and neutral expressions as more positively valenced than their outgroup counterparts. In Experiment 2, participants exhibited the most direct mouse-tracking trajectories toward the positive label for ingroup members with happy expressions, but an initial attraction to the positive label for ingroup members with fearful expressions, with outgroup happy and fearful trajectories falling in between. Experiment 3 replicated the results of Experiment 2 and eliminated target-gaze direction as an alternative explanation of our findings. Together these findings suggest that judgments of ingroup-member emotional expressions (relative to competitive outgroup), regardless of valence, are positively biased at both implicit and explicit levels. Interfacing with the broader literature, our results fit better within the stereotype-congruency framework than the ingroup accuracy framework. An important direction for future research is determining the conditions under which ingroup labels facilitate processing bias versus processing accuracy.

What is the origin of this positivity bias for ingroup emotional expressions? As we noted above, individuals reliably evaluate ingroup members more positively than outgroup members and grant preferential treatment toward them (Tajfel et al., 1971; Tajfel & Turner, 1979). Self-related concepts (including group categorization) may simply activate positivity bias in all judgments. For example, priming people with the word “us” versus “them” engenders positivity bias in subsequent trait and person evaluation (Perdue, Dovidio, Gurtman, & Tyler, 1990). In line with this semantic spillover hypothesis, learning about negative biographical information leads to negative evaluations of neutral faces (Suess, Rabovsky, & Abdel Rahman, 2015). Thus, one possibility is that activation of any ingroup concept, even with arbitrary groups, exerts top-down positivity effects on judgments of emotional expressions (Freeman & Johnson, 2016).

A complementary (or alternative) explanation is that competition between groups acts as a lever to bias judgments (Cesario, Plaks, & Higgins, 2006; Xiao & Van Bavel, 2012), including those of emotional expressions. According to the motivated-preparation account, automatic responses are tuned by individuals' social contexts to potentiate appropriate responses across a variety of interactions (Cesario, Plaks, Hagiwara, Navarrete, & Higgins, 2010). Perhaps competitive contexts engender an ingroup positivity bias because it is functional for motivating effort or perseverance on behalf of one's group.

The present studies spur a number of future directions. First, we predict that any emotions (not just fear and happiness) could be candidates for the effects we report, thus future research should investigate the generalizability of these effects to other emotion categories. Second, to distinguish semantic spillover influences from motivational influences, we could manipulate the functional relationships between groups (e.g., make teams cooperative) to examine whether the bias disappears when the outgroup is not a

threat. Finally, future experiments should determine whether group labels are changing participants' perceptions themselves or just post-perception judgments. Note, however, that recent findings indicate that even ratings of *visual* features such as skin lightness/darkness likely result from postperception judgments (Firestone & Scholl, 2015). Thus we believe an account under which group membership is somehow distorting perception is far less likely than the account under which group membership is biasing judgments of the semantic valence representations of happy and fearful.

Biases in judgments, specifically of ingroup emotional expressions, may drive or reinforce evaluative biases and discriminatory behavior. If ingroup faces are generally judged as more positive, this may drive more ingroup approach behaviors (Chen, Whalen, Freeman, Taylor, & Heatherton, 2015). Because many of our own emotions, cognitions, and behaviors are influenced by our perceptions of others' emotional expressions, the insight provided by these findings may help to attenuate intergroup biases across many consequential social contexts.

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