

Negative Emotion and Perceived Social Class

R. Thora Bjornsdottir*

Nicholas O. Rule

University of Toronto

100 Saint George Street

Toronto, Ontario M5S 3G3

Canada

* Corresponding author

Email: thora.bjornsdottir@mail.utoronto.ca

Phone: +1 416-946-0411

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Abstract

People use stereotypes about the benefits of wealth and success to infer that rich people look happier than poor people. For instance, perceivers categorize smiling faces as *rich* more often than they categorize neutral faces as *rich*. Moreover, richer people's neutral faces in fact display more positive affect than poorer people's neutral faces. Applying these emotion stereotypes thus enables perceivers to accurately classify targets' social class from their neutral faces. Extant research has left unexplained whether perceivers use broad differences in valence or specific emotions when judging others' social class, however. We tested this here by examining how four negatively valenced emotions influence perceptions of social class: sadness, anger, disgust, and fear. Whereas sadness and anger relate to both stereotypes and actual correlates of lower social class (e.g., depression and hostility, respectively), no established links suggest that poorer people should express or experience greater disgust or fear. Consistent with stereotypes of lower-class people, targets expressing sadness and anger were categorized as *poor* or *working class* more often than neutral targets were. Targets expressing disgust and fear also looked lower class than neutral targets did, however. These combined findings therefore suggest that perceivers rely on valence differences rather than specific emotions to judge social class, indicating that the broad perception of low social class as a negative state (and high social class as a positive state) may drive face-based impressions of social class.

Keywords: social class, socioeconomic status, person perception, emotion, valence

Negative Emotion and Perceived Social Class

One of the most widely known benefits of occupying a higher social class is that it increases both mental and physical wellbeing. Complementarily, people with lower social class standing tend to endure more stressful life environments and experience more negative affect, including depression and anxiety (Haushofer & Fehr, 2014). These associations hold for both subjective (e.g., Adler et al., 1994, 2008) and objective measures of class standing (e.g., income, occupational grade; Aknin, Norton, & Dunn, 2009; Diener & Biswas-Diener, 2002; Singh-Manoux, Adler, & Marmot, 2003).¹ Moreover, these social class differences in wellbeing appear to leave their mark on people's faces.

Previous research found that people could accurately detect others' social class from their neutral faces based on differences in their resting affect (i.e., their "neutral" expressions; Bjornsdottir & Rule, 2017b). Specifically, participants employed a variety of stereotypes (both accurate and not) to judge others' social class, categorizing more attractive, healthier-looking, more intelligent-looking, and more positive faces as rich. However, only the last of these promoted accurate social class detection: rich individuals' neutral faces indeed appeared subtly but significantly more positive than poor individuals' neutral faces. This suggests that class differences in wellbeing manifest in facial appearance, perhaps through chronic differences in emotional experience and expression (see Adams, Garrido, Albohn, Hess, & Kleck, 2016; Malatesta, Fiore, & Messina, 1987).

¹ See Jebb, Tay, Diener, and Oishi (2018), Kahneman and Deaton (2010), and Stevenson and Wolfers (2013) for discussions of (1) satiation points of this relationship and (2) the measurement of wellbeing.

If higher-class people's faces look more positive, lower-class people's faces conversely appear more negative. As noted above, prior research links both higher social class to feeling greater happiness and lower social class to experiencing particular negative emotions. A wealth of research demonstrates that people of lower social class suffer higher rates of depression (e.g., Adler et al., 2008; Haushofer & Fehr, 2014; Singh-Manoux et al., 2003) and experience greater hostility (Marmot et al., 1991) compared to people of higher social class. Together, this work suggests that lower social class individuals may express emotions like sadness and anger more than their higher social class counterparts do. But how these real-world differences in emotional experience influence impressions of others' social class remains unexplored. That is, do perceptions of others' social class rely on one or both of these specific emotions? Alternatively, might negative valence generally lead to impressions of low social class? Not all negative emotions show greater prevalence among lower social class individuals. For example, although disgust is often directed *toward* the poor rather than expressed *by* the poor (Lawler, 2005; Tyler, 2008), it remains unclear whether perceivers would make this distinction when forming impressions of emotional faces' social class.

Here, we tested two possibilities to investigate how perceivers might use negative emotions to form impressions of others' social class: (a) that perceivers would associate specific negative emotions with low social class standing and use only these emotions to judge others' social class, or (b) that perceivers would associate general negative affect with low social class standing and use any negative emotion to judge social class. We began by conducting a pilot study to determine laypeople's stereotypes of social class and emotion, comparing these to known social class differences in experienced emotion. We then manipulated targets' expressions of sadness (Study 1A) and anger (Study 1B) and tested how these emotions

influenced perceptions of their social class, focusing on perceptions of targets as high or low social class (rich vs. poor). Next, we expanded our investigation to test whether disgust expressions would affect impressions of social class (Study 2). Finally, we explored how emotional expressions influence impressions of social class group membership across the class spectrum, rather than at just the extremes (Study 3). This research was approved by the Research Ethics Board at the University of Toronto and data from all studies are available on the Open Science Framework (Pilot Study - Study2:

https://osf.io/n5qp8/?view_only=b4b3b18a100b4480ab39c5dea43e736b; Study 3:

https://osf.io/ahqvp/?view_only=9adcf66b55184caaa2af4c43a7a6c997).

Pilot Study

Past epidemiological studies have demonstrated correlates between lower social class standing and the experience of particular negative emotions (e.g., depression and hostility, which may be expressed as sadness and anger, respectively; Adler et al., 2008; Marmot et al., 1991). We first conducted a pilot study to supplement these actual associations between emotion and social class with participants' perceived associations between emotion and social class.

Method

We asked 30 participants (12 female, 18 male; $M_{\text{age}} = 36.70$ years, $SD = 10.72$; 21 Caucasian, 3 African, 2 East Asian, 2 Hispanic, 1 mixed race, 1 Pacific Islander) from Amazon's Mechanical Turk (MTurk) to list the emotions that rich and poor people stereotypically feel, respectively, with the order of these two questions randomized. We instructed them to list as many emotions as possible and noted that they did not need to personally endorse the stereotypes that they listed. Following this, participants reported their demographic information.

Results and Discussion

We counted emotions listed by at least two participants, grouping synonymous or similar emotions together. For poor people, participants most frequently listed sadness and anger (Figure 1), paralleling the actual relation between social class and both emotions (e.g., Marmot et al., 1991). For rich people, they most frequently listed happiness and arrogance.

Importantly, participants did not associate all negative emotions with poor people. For example, they associated arrogance with rich people and associated neither fear nor disgust with either rich or poor people. This suggests that perceivers may use specific stereotypical emotions to infer social class. We tested this directly in Study 1.

Study 1

Participants in the Pilot Study associated specific negative emotions with social class. Whereas they reported stereotypes associating the rich with arrogance, they reported stereotypes associating the poor with sadness and anger. Moreover, other fundamental negative emotions went unmentioned (i.e., fear and disgust). These preliminary associations thus suggest that particular emotions might influence perceptions of social class. To determine which negative emotions lead to judgments of lower social class, we tested how sad expressions (Study 1A) and angry expressions (Study 1B) trigger social class categorizations.

Study 1A

Lower social class robustly relates to increased rates of depression (e.g., Haushofer & Fehr, 2014). Furthermore, participants in the Pilot Study primarily associated low social class with sadness. We therefore used morphing software to create sad versions of a set of neutral faces and conducted an experiment to compare whether the targets appeared lower in social class when sad than when neutral.

Method.

Stimuli. We used the 160 neutral undergraduate face photos that Bjornsdottir and Rule (2017b) validated for social class legibility. The images consisted of 80 individuals with family incomes well above the median in Canada and 80 individuals with family incomes substantially below the median; we refer to these groups as rich and poor, respectively. Equal numbers of male and female, Caucasian and East Asian targets comprised the set, with all photos grayscale and the faces cropped from their original backgrounds (Figure 2A). This sample of targets afforded over 90% power to detect an interaction in a mixed-model ANOVA based on the average effect size in social psychology ($r = .21$; Richard, Bond, & Stokes-Zoota, 2003).

We created sad versions of each target using the muscle-level morph function in FaceFilter3 (Reallusion Inc., 2013), raising the chin and inner brows by 20% and 60%, respectively, and drooping the mouth edges by 70% to approximate the facial action units associated with the sadness expressions (Figure 2B; Ekman & Friesen, 1978; Jack, Sun, Delis, Garrod, & Schyns, 2016). We verified the success of our manipulations by recruiting 60 participants (27 female, 33 male; $M_{\text{age}} = 34.43$ years, $SD = 10.47$; 44 Caucasian, 5 East Asian, 4 African, 3 Hispanic, 3 mixed race, 1 Southeast Asian) to rate either the sad or neutral faces from 1 (*not at all sad*) to 7 (*very sad*), averaging participants' ratings to create a mean score for each face (Cronbach's $\alpha = .89-.90$).² The sad versions ($M = 3.54$, $SD = 0.68$) indeed appeared significantly sadder than the original neutral faces ($M = 3.47$, $SD = 0.64$), $t(159) = 2.10$, $p = .04$, $r_{\text{effect size}} = .16$, 95% CI [.01, .31]. Moreover, a separate group of 31 participants (12 female, 19

² We excluded the data of one participant who reported trouble viewing the stimuli (remaining $n = 59$; 26 female, 33 male; $M_{\text{age}} = 34.64$ years, $SD = 10.43$; 44 Caucasian, 5 East Asian, 3 African, 3 Hispanic, 3 mixed race, 1 Southeast Asian).

male; $M_{\text{age}} = 31.61$ years, $SD = 8.96$; 24 Caucasian, 3 African, 3 East Asian, 1 Hispanic) chose which of Ekman and Friesen's (1986) seven basic emotions the sad faces expressed (anger, contempt, disgust, fear, happiness, sadness, surprise). We calculated the proportion who correctly chose sadness for each target ($M = .41$, $SD = .17$), which significantly exceeded chance (20% among the five negative emotions listed), $t(159) = 18.09$, $p < .001$, $r_{\text{effect size}} = .82$, 95% CI [.76, .87].

Procedure. We randomly assigned 150 MTurk Workers (82 female, 65 male, 3 other; $M_{\text{age}} = 37.46$ years, $SD = 12.44$; 109 Caucasian, 13 African, 9 Hispanic, 7 East Asian, 5 mixed-race, 3 Native American, 2 Southeast Asian, 2 unspecified ethnicity) to categorize the social class of either the 80 rich ($N = 76$) or 80 poor targets ($N = 74$) as *rich* or *poor* at their own pace. Participants viewed targets from only one of the two social class groups because previous research found that the neutral rich faces looked significantly more positive than the neutral poor faces (Bjornsdottir & Rule, 2017b). Participants viewed 40 sad and 40 neutral faces in random order, counterbalancing which expression they saw for each target (thus, over 30 participants rated each individual stimulus—a sample size resulting in good interrater reliability in previous work; e.g., Tskhay & Rule, 2015). Participants ended the study by providing demographic information and indicating whether they had trouble viewing any of the stimuli and whether they waited for all stimuli to load before providing their answers.

Results. We excluded data from 14 participants who reported trouble viewing the images or indicated having provided answers without waiting for stimuli to load (final $n = 136$; 74 female, 60 male, 2 other; $M_{\text{age}} = 37.21$ years, $SD = 12.51$; 101 Caucasian, 9 African, 8 Hispanic, 7 East Asian, 4 mixed race, 3 Native American, 2 Southeast Asian, 2 unspecified ethnicity). The remaining participants showed good interrater reliability (Cronbach's $\alpha = .84$). We calculated the

proportion of participants that categorized each photo as *poor* and submitted these values to a 2 (Expression: sad, neutral) \times 2 (Social Class: rich, poor) target-level ANOVA with repeated measures on the first factor. This revealed the hypothesized main effect of Expression, $F(1, 158) = 381.71, p < .001, r_{\text{effect size}} = .84, 95\% \text{ CI } [.80, .87]$, such that targets were more often categorized as *poor* when displaying sad ($M = .67, SD = .16$) versus neutral expressions ($M = .49, SD = .16$). Neither the main effect of Social Class nor the interaction between Expression and Social Class reached significance, $F_s \leq 2.19, p_s \geq .14, r_s_{\text{effect size}} \leq .12$.³

Discussion. Targets looked poorer when enacting sad facial expressions than when neutral, regardless of their true social class. These results complement other research showing that the poor experience more depression than the rich (e.g., Adler et al., 2008), provide further support for the idea that people stereotypically associate sadness with the poor (as observed in the Pilot Study), and demonstrate that perceivers indeed use this stereotypical association to judge others' social class. We next expanded our investigation to test whether this pattern applies to anger, another emotion associated with lower social class standing.

Study 1B

The results of Study 1A indicate that perceivers use sadness as a cue to judge social class, with sad targets perceived as poorer than neutral targets. Sadness is not the only negative emotion associated with low social class, however. Research has also linked lower social class to greater actual (Marmot et al., 1991) and perceived (the Pilot Study) hostility or anger. To clarify

³ Adding target gender and ethnicity to the ANOVA furthermore did not reveal any interactions, all $F_s \leq 2.98, p_s \geq .09, r_s_{\text{effect size}} \leq .14$.

whether perceivers use angry expressions to judge social class, we manipulated targets' expressed anger and measured perceptions of their social class analogous to Study 1A.

Method.

Stimuli. We manipulated the same 160 neutral targets from Study 1A to create an angry version of each using FaceFilter3 (Reallusion Inc., 2013). We tightened the eyelids by 25%, narrowed the eyes by 35%, wrinkled the nose by 60%, drooped the lower lip by 30%, drooped the mouth edges by 20%, pressed the lips by 100%, sucked the lips by 15%, raised the outer brow by 70%, and moved the brow down, basing these adjustments on the facial action units associated with expressions of anger (Figure 2C; Ekman & Friesen, 1978; Jack et al., 2016). We verified the success of our manipulations by recruiting 31 participants (11 female, 20 male; $M_{\text{age}} = 38.94$ years, $SD = 10.76$; 19 Caucasian, 6 African, 3 Hispanic, 1 mixed race, 1 Native American, 1 South Asian) to categorize the morphed angry faces' emotion (choosing from *anger*, *contempt*, *disgust*, *fear*, *happiness*, *sadness*, and *surprise*) as in Study 1A, and 60 participants (19 female, 41 male; $M_{\text{age}} = 34.37$ years, $SD = 11.33$; 38 Caucasian, 13 African, 5 Native American, 2 South Asian, 1 Southeast Asian, 1 unspecified ethnicity) to rate either the neutral or morphed targets' anger from 1 (*not at all angry*) to 7 (*very angry*), again averaging participants' ratings for each target (Cronbach's $\alpha = .81-.87$).⁴ The angry faces ($M = 4.22$, $SD =$

⁴ We excluded the data of seven participants who reported trouble viewing the images in each sample, resulting in 24 participants (11 female, 13 male; $M_{\text{age}} = 40.50$ years, $SD = 11.55$; 18 Caucasian, 2 African, 1 Hispanic, 1 mixed race, 1 Native American, 1 South Asian) categorizing targets' emotion and 53 participants rating anger (18 female, 35 male; $M_{\text{age}} = 34.74$ years, $SD =$

0.52) looked significantly angrier than the neutral faces ($M = 3.23$, $SD = 0.57$), $t(159) = 33.05$, $p < .001$, $r_{\text{effect size}} = .93$, 95% CI [.91, .95], and the proportion of participants who correctly categorized the angry morphs' emotion ($M = .29$, $SD = .15$) significantly exceeded chance among the five negative emotions (20%), $t(159) = 7.70$, $p < .001$, $r_{\text{effect size}} = .52$, 95% CI [.40, .63]. We therefore proceeded to use these targets in our study.

Procedure. The procedure followed that of Study 1A exactly, albeit with angry morphs replacing the sad morphs. We randomly assigned 150 MTurk Workers (68 female, 82 male; $M_{\text{age}} = 36.07$ years, $SD = 12.09$; 108 Caucasian, 11 African, 10 East Asian, 10 Hispanic, 5 Native American, 2 mixed race, 1 Middle Eastern, 1 South Asian, 1 Southeast Asian, 1 unspecified ethnicity) to categorize the social class of either the 80 rich ($N = 72$) or 80 poor targets ($N = 78$) as *rich* or *poor* in random order. Participants viewed 40 angry and 40 neutral faces, counterbalancing which expression they saw for each target. Participants then provided demographic information and reported whether all images loaded and if they provided answers without waiting for images to load.

Results. We excluded the data of 10 participants who reported trouble viewing some of the images or provided some answers without waiting for the stimuli to load (final $n = 140$; 63 female, 77 male; $M_{\text{age}} = 36.31$ years, $SD = 12.18$; 101 Caucasian, 11 African, 10 East Asian, 9 Hispanic, 4 Native American, 2 mixed race, 1 Middle Eastern, 1 South Asian, 1 Southeast Asian). Interrater reliability was good among the remaining participants (Cronbach's $\alpha = .80$). As in Study 1A, we calculated the proportion of participants categorizing each photo as *poor*,

11.86; 35 Caucasian, 10 African, 4 Native American, 2 South Asian, 1 Southeast Asian, 1 unspecified ethnicity).

submitting these scores to a 2 (Expression: angry, neutral) \times 2 (Social Class: rich, poor) target-level ANOVA with repeated measures on the first factor. Paralleling the results of Study 1A, this revealed a significant main effect of Expression, $F(1, 158) = 262.69, p < .001, r_{\text{effect size}} = .79$, 95% CI [.73, .83], such that targets were more often categorized as *poor* when angry ($M = .69, SD = .13$) than when neutral ($M = .52, SD = .16$). No Social Class main effect or interaction emerged, $F_s \leq 1.60, p_s \geq .21, r_{\text{effect size}} \leq .10$.⁵

Discussion. Parallel to the findings for sadness in Study 1A, targets were categorized as *poor* more often when expressing anger than when neutral. This suggests that perceivers may employ either sadness or anger to judge social class, echoing both the perceived and actual associations between social class and each emotion in the Pilot Study and in previous research, respectively (e.g., Marmot et al., 1991; Singh-Manoux et al., 2003). However, it remains possible that perceivers may broadly associate negative valence with lower social class and employ any negative emotional expression when judging low social class standing. Yet, it remains unclear whether perceivers would do so when the specific negative emotion bears no particular association with low class standing. We tested this possibility in Study 2.

Study 2

Together, the results of the Pilot Study and Study 1 suggest that people associate specific negative emotions with lower social class standing and furthermore employ these emotions when judging social class from faces. Thus, perhaps only the precise negative emotions actually and stereotypically associated with low social class relate to perceptions of social class.

⁵ As above, including target gender and ethnicity revealed no significant interactions, all $F_s \leq 2.25, p_s \geq .14, r_{\text{effect size}} \leq .12$.

Alternatively, perceivers might generalize their negative associations with low social class, categorizing targets expressing *any* negative emotion as *poor*. We directly tested these two possibilities here by comparing targets' perceived social class when expressing neutral, sad, angry, and disgusted expressions. We included disgust in our investigation, as it does not appear to relate to either the experience or perception of low class standing (rather, people of low social class tend to *elicit* disgust from perceivers; see Lawler, 2005; Tyler, 2008). We preregistered this study on the Open Science Framework (<https://osf.io/hb4vk/register/5730e99a9ad5a102c5745a8a>).

Method

Stimuli. Due to the difficulty of manipulating neutral faces to appear disgusted (expressions of disgust often involve an open mouth, which we were unable to create from closed-mouth neutral faces), we collected a new set of stimuli. Furthermore, people can misperceive expressions of disgust as anger because of their shared action units (e.g., Jack, Garrod, & Schyns, 2014), necessitating unambiguous disgust expressions. We therefore collected target photos from the Amsterdam Dynamic Facial Expression Set (Van der Schalk et al., 2011), FACES (Ebner, Riediger & Lindenberger, 2010), Karolinska Directed Emotional Faces (Lundqvist, Flykt, & Öhman, 1998), and Radboud Faces Database (Langner et al, 2010). We only selected photos of Caucasian individuals who did not have any facial hair, appeared 35 years old or younger, were not wearing glasses or other accessories, and (most important) had complete sets of neutral, angry, disgusted, and sad expressions. We cropped the photographs at the top of the head, bottom of chin, and outer edge of each ear, standardizing their color (grayscale) and height. We collected 40 male and 40 female targets for a total of 320 stimuli, affording over 99% power to detect a main effect of target expression in a one-way ANOVA

(anticipating an effect size of $r = .79-.84$, as in Study 1) and over 85% power in simple effects paired t -tests comparing the individual expressions to one another, anticipating the average effect size in social psychology ($r = .21$; Richard et al., 2003) and Bonferroni correcting for multiple comparisons ($\alpha = .05/6 = .008$).

Similar to Study 1, we ensured the legibility of the targets' expressions by asking 150 participants (67 female, 81 male, 1 other, 1 unreported gender; $M_{\text{age}} = 36.20$ years, $SD = 10.71$; 123 Caucasian, 10 African, 5 Hispanic, 2 mixed race, 2 Native American, 1 East Asian, 1 Middle Eastern, 1 Pacific Islander, 1 South Asian, 1 Southeast Asian, 3 unspecified ethnicity) to categorize the emotions of a subset of the angry, disgusted, and sad faces (choosing from *anger*, *contempt*, *disgust*, *fear*, *happiness*, *sadness*, and *surprise*). We then calculated the proportion of participants who chose the correct response for each stimulus.⁶ We selected our 80 targets from a larger sample of 95, choosing targets whose three expressions were all categorized above chance among the negative emotions (20%). Overall, our final set of 80 targets effectively displayed anger ($M = .64$, $SD = .18$), $t(79) = 21.41$, $p < .001$, $r_{\text{effect size}} = .92$, 95% CI [.88, .95], disgust ($M = .61$, $SD = .14$), $t(79) = 26.01$, $p < .001$, $r_{\text{effect size}} = .95$, 95% CI [.92, .97], and sadness ($M = .65$, $SD = .16$), $t(79) = 24.96$, $p < .001$, $r_{\text{effect size}} = .94$, 95% CI [.91, .96].

⁶ We excluded the data of 25 participants who either provided incomplete data, reported trouble viewing the photos, provided answers without waiting for photos to load, or had GPS coordinates matching those of known data farms (Bai, 2018; resulting $n = 125$; 57 female, 67 male, 1 other; $M_{\text{age}} = 36.90$ years, $SD = 11.07$; 101 Caucasian, 10 African, 4 Hispanic, 2 mixed race, 2 Native American, 1 East Asian, 1 Pacific Islander, 1 South Asian, 1 Southeast Asian, 2 unspecified ethnicity).

Procedure. We recruited 150 MTurk Workers (50 female, 100 male; $M_{\text{age}} = 35.04$ years, $SD = 11.22$; 93 Caucasian, 35 African, 7 Hispanic, 4 East Asian, 4 mixed race, 3 Native American, 2 Southeast Asian, 1 South Asian, 1 unspecified ethnicity) to categorize the targets as *rich* or *poor*. They viewed all 80 targets in random order, counterbalancing which 20 targets displayed each expression (neutral, angry, disgusted, sad).⁷ Thus, over 30 participants categorized each version of each target, as above, allowing for good interrater reliability (e.g., Tskhay & Rule, 2015). After categorizing the targets, participants provided demographic information, reported any issues with images loading, and indicated whether they rated any targets before waiting for them to load.

Results

We began by excluding the data of 30 participants who either reported trouble viewing the images, indicated that they rated some targets without viewing them, or whose GPS coordinates matched those of known data farms (Bai, 2018; remaining $n = 120$; 44 female, 76 male; $M_{\text{age}} = 36.23$ years, $SD = 12.15$; 77 Caucasian, 22 African, 6 Hispanic, 4 East Asian, 4 mixed race, 3 Native American, 2 Southeast Asian, 1 South Asian, 1 unspecified ethnicity). The remaining participants showed good interrater reliability (Cronbach's $\alpha = .81$). We then calculated the proportion of participants categorizing each version (neutral, angry, disgusted, sad) of each target as *poor*, entering these scores into a one-way repeated-measures target-level

⁷ Due to a programming error, 15 targets appeared twice (i.e., with two different expressions) in one of the four counterbalanced conditions. Excluding these targets from our analyses does not change the results.

ANOVA. This revealed the expected main effect that perceived social class differed by target expression, $F(3, 237) = 46.44, p < .001, r_{\text{effect size}} = .61, 95\% \text{ CI } [.52, .67]$.

We decomposed this result by comparing each of the negative emotions to neutral and to one another (Figure 3). Replicating and extending the results of Study 1, targets were more often categorized as *poor* when posing sad ($M = .60, SD = .16, t(79) = 7.51, p < .001, r_{\text{effect size}} = .65, 95\% \text{ CI } [.50, .76]$), angry ($M = .60, SD = .18, t(79) = 7.52, p < .001, r_{\text{effect size}} = .65, 95\% \text{ CI } [.50, .76]$), and disgusted expressions ($M = .65, SD = .18, t(79) = 11.08, p < .001, r_{\text{effect size}} = .78, 95\% \text{ CI } [.68, .86]$), than when neutral ($M = .49, SD = .20$). Moreover, the proportion of participants categorizing targets as *poor* was greater when targets appeared disgusted than when sad, $t(79) = 4.13, p < .001, r_{\text{effect size}} = .42, 95\% \text{ CI } [.22, .59]$, or angry, $t(79) = 3.71, p < .001, r_{\text{effect size}} = .39, 95\% \text{ CI } [.18, .56]$, which did not differ, $t(79) = 0.26, p = .80, r_{\text{effect size}} = .03, 95\% \text{ CI } [-.20, .25]$.

Discussion

Despite the specific emotion stereotypes that people may have (Pilot Study) and the correlates between social class and particular negative emotions (e.g., Marmot et al., 1991), these results suggest that perceivers appear to use negative emotions generally to judge social class from faces. Targets were more often categorized as *poor* when expressing anger, sadness, or disgust than when neutral. Furthermore, disgusted targets were perceived as *poor* more often than the angry and sad targets. One possible explanation is that the disgusted targets looked more intensely negative than the sad and angry targets did (e.g., Amir, Najmi, Bomyea, & Burns, 2010). We tested this possibility by recruiting 91 MTurk participants (40 female, 51 male; $M_{\text{age}} = 36.14$ years, $SD = 11.04$; 64 Caucasian, 8 African, 6 Hispanic, 4 East Asian, 4 Native American,

2 South Asian, 2 Southeast Asian, 1 unreported ethnicity)⁸ to rate the angry, disgusted, and sad faces on how negative they looked (viewing only one version of each target) from 1 (*not at all*) to 7 (*very*). This revealed that the targets appeared more negative when posing disgusted ($M = 5.45$, $SD = .44$) versus angry expressions ($M = 5.13$, $SD = .58$), $t(79) = 4.65$, $p < .001$, $r_{\text{effect size}} = .46$, 95% CI [.27, .62], which in turn were more negative than sad expressions ($M = 4.63$, $SD = .55$), $t(79) = 6.63$, $p < .001$, $r_{\text{effect size}} = .60$, 95% CI [.44, .73]. Thus, the most negative expression led to greater perceptions of being poor. Together, this indicates that perceivers may generalize their negative associations with low social class standing and judge people displaying any negative emotion as *poor*, rather than employing specific emotion stereotypes when inferring social class.

The results of this study and Study 1 thus indicate that perceivers associate negative emotional expressions with low social class standing and (relatively) positive expressions with high class standing. These data do not clarify, however, whether these patterns would generalize to other relatively low-ranking and high-ranking social class groups (e.g., working class or upper-middle class, respectively), or whether perceivers may associate specific emotional expressions with particular social class groups. We tested this question in Study 3.

Study 3

⁸ We excluded the data of 17 participants who reported trouble viewing the photos, indicated answering before the photos loaded, or whose GPS coordinates matched those of known data farms (Bai, 2018), resulting in $n = 74$ (31 female, 43 male; $M_{\text{age}} = 37.01$ years, $SD = 11.65$; 51 Caucasian, 8 African, 4 East Asian, 3 Hispanic, 3 Native American, 2 South Asian, 2 Southeast Asian, 1 unreported ethnicity).

Although Studies 1 and 2 helped illustrate the strong association between negative emotion and low social class standing, social class group membership is more nuanced than just *rich* versus *poor*—these describe only the extremes of the social class spectrum. People often think of social class categorically, using terms such as *poor*, *working class*, *middle class*, *upper-middle class*, and *upper class* (Jackman & Jackman, 1983). It therefore remains unknown whether people use emotional expressions to make more specific social class judgments, rather than just to evaluate low versus high class standing. Given our results above, we hypothesized that targets' emotional expression would lead to different social class categorizations, with negative (vs. neutral) emotional expressions leading to lower class categorizations (*poor*, *working class*) and positive (vs. neutral) expressions leading to higher class categorizations (*upper-middle class*, *upper class*). Testing which emotional expressions might most strongly relate to each class category (*poor*, *working class*, *middle class*, *upper-middle class*, *upper class*) remained exploratory. We preregistered this study on the Open Science Framework (<https://osf.io/ft2kz/register/5730e99a9ad5a102c5745a8a>).

Method

Stimuli. We used the same 80 targets (40 female, 40 male; all Caucasian) as in Study 2, but also collected fearful and happy expressions for each target to encompass the four universal categories of emotion expression (anger/disgust, fear/surprise, happiness, sadness; Jack et al., 2016) and to include an additional negative emotion not mentioned by participants in our Pilot Study (i.e., fear). We therefore had six expressions for each target (neutral, angry, disgusted, fearful, happy, sad), for a total of 480 stimuli. This sample size afforded over 99% power to detect main effects of the size observed in Study 2 ($r = .61$) in one-way ANOVAs and 79% power in follow-up paired *t*-tests, anticipating the average effect size in social psychology ($r =$

.21; Richard et al., 2003) and Bonferroni correcting multiple comparisons within each social class group ($\alpha = .05/15 = .003$).

To validate the added fear and happiness expressions, we recruited 61 MTurk workers (24 female, 36 male, 1 other; $M_{\text{age}} = 36.80$ years, $SD = 11.26$; 43 Caucasian, 8 African, 3 East Asian, 3 Hispanic, 2 Native American, 1 mixed race, 1 Southeast Asian) to categorize the faces' emotions (choosing from *anger*, *contempt*, *disgust*, *fear*, *happiness*, *sadness*, and *surprise*, as in the previous studies), calculating the proportion of participants who chose the correct response for each stimulus.⁹ This set of 80 targets clearly expressed both happiness ($M = .97$, $SD = .07$), $t(79) = 99.70$, $p < .001$, $r_{\text{effect size}} > .99$, 95% CI [.99, 1.00], and fear ($M = .35$, $SD = .20$), $t(79) = 9.42$, $p < .001$, $r_{\text{effect size}} = .73$, 95% CI [.61, .82], significantly better than chance (14.3% among the seven options). Importantly, participants chose *fear* significantly more often than *surprise* ($M = .25$, $SD = .18$), for the fearful faces, $t(79) = 3.24$, $p = .002$, $r_{\text{effect size}} = .34$, 95% CI [.13, .53], though the two expressions can be confused (e.g., Matsumoto & Ekman, 1989).

Procedure. We recruited 225 participants via MTurk (108 female, 116 male, 1 unspecified; $M_{\text{age}} = 37.13$ years, $SD = 11.66$; 157 Caucasian, 21 African, 15 Hispanic, 12 East Asian, 6 Native American, 5 South Asian, 5 Southeast Asian, 1 Middle Eastern, 1 mixed race, 1 Pacific Islander, 1 unreported ethnicity) to categorize the faces by social class. We asked participants to categorize each face as either *poor*, *working class*, *middle class*, *upper-middle class*, or *upper class*. We chose these particular class labels because they are intuitive and

⁹ We excluded the data of one participant who reported trouble viewing some of the stimuli (remaining $n = 60$; 24 female, 35 male, 1 other; $M_{\text{age}} = 36.72$ years, $SD = 11.34$; 42 Caucasian, 8 African, 3 East Asian, 3 Hispanic, 2 Native American, 1 mixed race, 1 Southeast Asian).

understandable to North Americans (see Jackman & Jackman, 1983) and because recent research has used them effectively (e.g., Dietze & Knowles, 2016). Participants viewed all 80 targets in random order, counterbalancing which targets displayed each of the six expressions (neutral, angry, disgusted, fearful, happy, sad). Over 30 participants therefore categorized each version of each target, allowing for similarly good interrater reliability as above. Finally, participants provided demographic information and reported whether they experienced any issues with viewing the stimuli or whether they provided any ratings before waiting for the stimuli to load.

Results

We removed the data of one participant who provided incomplete data and of 14 participants who either reported trouble viewing some stimuli or indicated having provided their responses without waiting for stimuli to load (remaining $n = 210$; 102 female, 108 male; $M_{\text{age}} = 37.28$ years, $SD = 11.76$; 149 Caucasian, 19 African, 13 Hispanic, 12 East Asian, 5 Native American, 5 South Asian, 4 Southeast Asian, 1 Middle Eastern, 1 mixed race, 1 Pacific Islander). The remaining participants showed high interrater reliability (Cronbach's $\alpha = .88$).

We first calculated the proportion of participants who categorized each version of each target into each social class group. Across emotional expressions, frequencies of categorizations aligned with base rates—most targets were categorized as *middle class*, and the fewest as *poor* or *upper class* (Figure 4). Next, using these values, we then performed a target-level MANOVA with target expression (neutral, angry, disgusted, fearful, happy, sad) predicting the proportion of participants categorizing each target into a social class group (poor, working class, middle class, upper-middle class, upper class). The results of the MANOVA revealed that target expression significantly predicted perceived social class overall, $F(5, 474) = 5.75, p < .001$. Follow-up univariate analyses showed that target expression significantly predicted perceptions as *poor*,

$F(5, 474) = 12.70, p < .001$, *working class*, $F(5, 474) = 26.89, p < .001$, *upper-middle class*, $F(5, 474) = 30.14, p < .001$, and *upper class*, $F(5, 474) = 35.27, p < .001$, but only marginally predicted perceptions as *middle class*, $F(5, 474) = 2.24, p = .05$.

Next, we conducted paired comparisons of the emotional expressions within each social class group (see Table 1 for all comparisons; see also Figure 4). Among targets categorized as *poor*, a greater proportion of targets expressed disgust or sadness than neutral expressions. The proportions of neutral, angry, and fearful targets did not differ, however, and more targets were disgusted or sad than fearful. Finally, the proportion of neutral targets was greater than that of happy targets. For targets perceived as *working class*, more targets expressed anger, disgust, fear, and sadness than neutral. Furthermore, more targets were disgusted than fearful or sad, and a greater proportion of targets was neutral compared to happy.

For targets appearing *middle class*, marginally more targets expressed fear than neutral expressions, with no other expressions differing from neutral. Moreover, a greater number of targets was fearful, compared to sad, disgusted, or (marginally) angry. In contrast, among targets perceived as *upper-middle class*, a greater proportion of targets were happy compared to neutral. Furthermore, there were more neutral than angry, disgusted, fearful, or sad targets. The same pattern emerged among targets categorized as *upper class*, such that more targets expressed happiness, compared to a neutral expression, and a greater proportion of targets was neutral compared to the four negative expressions.

Discussion

These results show that perceivers broadly associate negative emotional expressions with lower social class standing (*poor, working class*) and associate positive emotional expressions with higher social class standing (*upper-middle class, upper class*). Not only do these data thus

demonstrate that perceptions of targets' social class group membership expand beyond the extreme ends of the social class spectrum used in Study 2 (i.e., *rich* vs. *poor*), they also expand those findings to an additional negative emotional expression: fear. We furthermore replicated the pattern of results found in previous research, such that happy targets appeared higher class than neutral targets (Bjornsdottir & Rule, 2017b), again expanding this beyond just *rich* versus *poor*. The accumulated findings therefore suggest a robust association between perceptions of negative emotional expressions and lower social class.

Perception of someone as *middle class*, however, appears to be fairly neutral ground. Roughly equal numbers of targets perceived as *middle class* displayed negative, neutral, and positive emotions. Interestingly, the most common expression among targets perceived as *middle class* was fear. This association between fear and middle class standing could have something to do with impressions of the middle class feeling threatened (e.g., due to the shrinking size of the American middle class; e.g., Pressman, 2007), but this possibility requires much additional testing, and our finding is qualified by the only marginal omnibus relation between target expression and categorization as *middle class*. Overall, the results of Study 3 indicate that various negative-looking and positive-looking faces appear lower and higher in social class standing, respectively, across the social class spectrum.

General Discussion

These data suggest that perceptions of social class relate to general valence, rather than specific emotions. Previous research found that accurate social class judgments depend on perceptions of subtle cues to emotion present in resting (neutral) faces and that expressions of happiness lead to impressions of higher social class, compared to neutral expressions, regardless of the target's true social class standing (Bjornsdottir & Rule, 2017b). The present research

aligns with this by affirming emotion's role in perceptions of social class and expanding its scope.

Complementing previous findings showing that happy expressions promote perceptions of higher social class (Bjornsdottir & Rule, 2017b), the current findings replicate this pattern and furthermore indicate that anger, disgust, fear, and sadness all relate to perceptions of lower social class. Thus, not only do people perceive someone smiling as higher in class standing, they also perceive someone expressing a range of negative emotions as lower in class standing. Although lay stereotypes reflect actual associations between lower social class and specific negative emotions (e.g., Adler et al., 2008; Marmot et al., 1991; Singh-Manoux et al., 2003), these particular stereotypes may not necessarily affect first impressions of someone's class—or at least not exclusively. Rather, perceivers appear to rely on more general associations between affective valence and class, such that expressions of positivity lead to impressions of higher class standing and expressions of negativity lead to impressions of lower class standing.

Indeed, perceivers judged targets as *poor* or *working class* particularly often when expressing disgust—an emotion associated with how others react towards the poor, rather than how people of lower class actually feel (Lawler, 2005; Tyler, 2008). This applied not only when the targets otherwise presented neutral expressions but also in the context of targets expressing sadness and anger, emotions stereotypically and realistically associated with lower class standing. Indeed, disgust expressions appeared the most negatively valenced. Furthermore, fearful targets appeared lower class than neutral targets, despite no documented link between fear expressions and lower class standing, and despite participants in the Pilot Study not mentioning fear as an emotion stereotypically associated with the poor (though fear could possibly align with the lesser control felt by lower class individuals; Kraus, Piff, & Keltner, 2009). These findings

point to the strength of the association between general negativity and low social class, suggesting that this broader association overshadows the absence of stereotypes relating fear and disgust to social class. Thus, it appears that the more pervasive association of low social class as a negative state (e.g., Aknin et al., 2009), rather than particular emotion stereotypes, may drive social class impressions.

Importantly, we found these associations between negative emotional expressions and low social class across two sets of targets (our own manipulated targets in Study 1 and face database targets in Studies 2 and 3) and two types of judgments of social class (*poor* vs. *rich* judgments and categorizations into five social class groups). Furthermore, we demonstrated this using a within-targets design, thereby controlling for possible confounding cues and demonstrating that the *same individual's* perceived social class differs by affect.

These design features and insights notwithstanding, future work may seek to address some limitations in our studies. For instance, we did not test whether expressions of negative emotions often associated with *higher* class standing (e.g., contempt) would lead to perceptions of low class standing. Although mentioned by only a few participants in our Pilot Study, contempt may nonetheless prove worthy of future investigation to round out how negative valence relates to impressions of low social class. Given perceivers' difficulty in correctly identifying expressions of contempt (e.g., Widen, Christy, Hewett, & Russel, 2011), however, it seems likely that perceivers would simply base their judgments on the expression's negative valence, leading to categorizations of targets as *poor*. Indeed, often regarded as a synonym or blend of anger and disgust (both emotions clearly associated with the perception of low social class here; e.g., Cottrell & Neuberg, 2005; Prinz, 2007), contempt expressions seem likely to lead to lower class categorizations—at least when presented alongside more positive-looking

expressions (neutral or happy). Results might, however, differ when presenting perceivers with only negative emotions (e.g., anger, contempt, disgust, fear, and sadness) or with only negative emotions that subtly differ from one another (e.g., anger, contempt, and disgust). Similarly, different class associations could emerge for different types of smiles (affiliative, dominant, rewarding; Rychlowska et al., 2017) which may be obscured when presented in the context of negative expressions. Indeed, studies presenting participants with only emotions of the same valence might reveal more nuances in the associations between specific emotions and social class, but this remains an empirical question.

Another avenue possibly worth exploring includes how the salience of class-emotion stereotypes might moderate the influence of valence versus specific emotions on class perceptions. For example, if one reminds perceivers that lower-class individuals experience more depression or hostility, might it trigger them to base their judgments on only sadness or anger (respectively), rather than on valence? Or would the salience of either emotion suffice in stimulating them to deploy negative valence as a diagnostic tool? Finally, as emotions influence perceptions of a variety of social group memberships (including gender, race, and sexual orientation; e.g., Hess, Adams, Grammer, & Kleck, 2009; Hugenberg & Bodenhausen, 2004; Tskhay & Rule, 2015; see Bjornsdottir & Rule, 2017a, for review), how might these identities intersect with social class to influence emotion-based impressions, and what role might context play in which identity most strongly relates to the expressed emotion? Answers to these questions might improve understanding of how emotional expressions explain social class inferences.

The findings from the current studies begin to provide a more complete picture of the association between emotion and perceived social class. It seems that expressing various

negative emotions increases the probability that one will appear lower class. This observation allows for a more nuanced understanding of how people form impressions of others' social class from their faces and highlights the strength of negative associations with lower social class standing. Given the rapidity with which perceivers form impressions of others' class from their faces (within 500ms; Bjornsdottir & Rule, 2017b), the strong influence of the face on first impressions (e.g., Perrett, 2010; Zebrowitz, 1997), and the impact of perceived class on outcomes such as employment (Bjornsdottir & Rule, 2017b; Ridgeway & Fisk, 2012; Rivera & Tilcsik, 2016), the insights provided by the current work hold value for clarifying the role that facial affect plays in this process.

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Table 1

Paired Comparisons of Target Expressions Categorized in Each Social Class Group in Study 3

	<i>M</i> (<i>SD</i>)	Neutral		Angry		Disgusted		Fearful		Happy	
		<i>t</i>	<i>r</i> [95% CI]	<i>t</i>	<i>r</i> [95% CI]	<i>t</i>	<i>r</i> [95% CI]	<i>t</i>	<i>r</i> [95% CI]	<i>t</i>	<i>r</i> [95% CI]
<i>Poor</i>											
Neutral	.07 (.07)	–	–								
Angry	.08 (.07)	2.59*	.28 [.06, .48]	–	–						
Disgusted	.11 (.10)	3.85***	.40 [.19, .57]	1.99	.22 [-.003, .42]	–	–				
Fearful	.07 (.05)	0.23	.03 [-.20, .25]	-1.91	-.21 [-.42, .01]	-3.35**	-.36 [-.54, -.14]	–	–		
Happy	.03 (.05)	-6.42***	-.59 [-.72, -.42]	-7.17***	-.63 [-.75, -.47]	-8.68***	-.70 [-.80, -.57]	-6.51***	-.59 [-.72, -.43]	–	–
Sad	.10 (.08)	4.30***	.44 [.24, .60]	1.91	.21 [-.01, .42]	-0.34	-.04 [-.26, .19]	3.67***	.38 [.18, .56]	8.78***	.71 [.57, .80]
<i>Working Class</i>											
Neutral	.28 (.13)	–	–								
Angry	.35 (.11)	5.86***	.55 [.38, .69]	–	–						
Disgusted	.37 (.11)	6.97***	.62 [.46, .74]	1.19	.13 [-.09, .35]	–	–				
Fearful	.32 (.11)	3.86***	.40 [.20, .57]	-2.79**	-.30 [-.49, -.08]	-4.10***	-.42 [-.59, -.22]	–	–		
Happy	.18 (.13)	-8.46***	-.69 [-.79, -.55]	-14.80***	-.88 [-.91, -.79]	-15.77***	-.87 [-.92, -.81]	-12.33***	-.81 [-.88, -.72]	–	–
Sad	.33	4.27***	.43	-2.38*	-.26	-3.54***	-.37	0.49	.06	11.07***	.78

Angry	(.05)	.03	-4.82***	-.48	–	–					
Disgusted	(.03)	.03	-6.65***	-.60	-1.87	-.21	–	–			
Fearful	(.03)	.03	-5.52***	-.53	-0.14	-.02	1.85	.21	–	–	
Happy	(.03)	.10	4.07***	.42	8.92***	.71	11.00***	.78	9.31***	.73	–
Sad	(.06)	.03	-5.14***	-.50	-0.82	-.09	1.03	.12	-0.71	-.08	-9.95***
	(.03)										

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; Bolded values are significant after Bonferroni correcting for multiple comparisons ($\alpha = .003$).

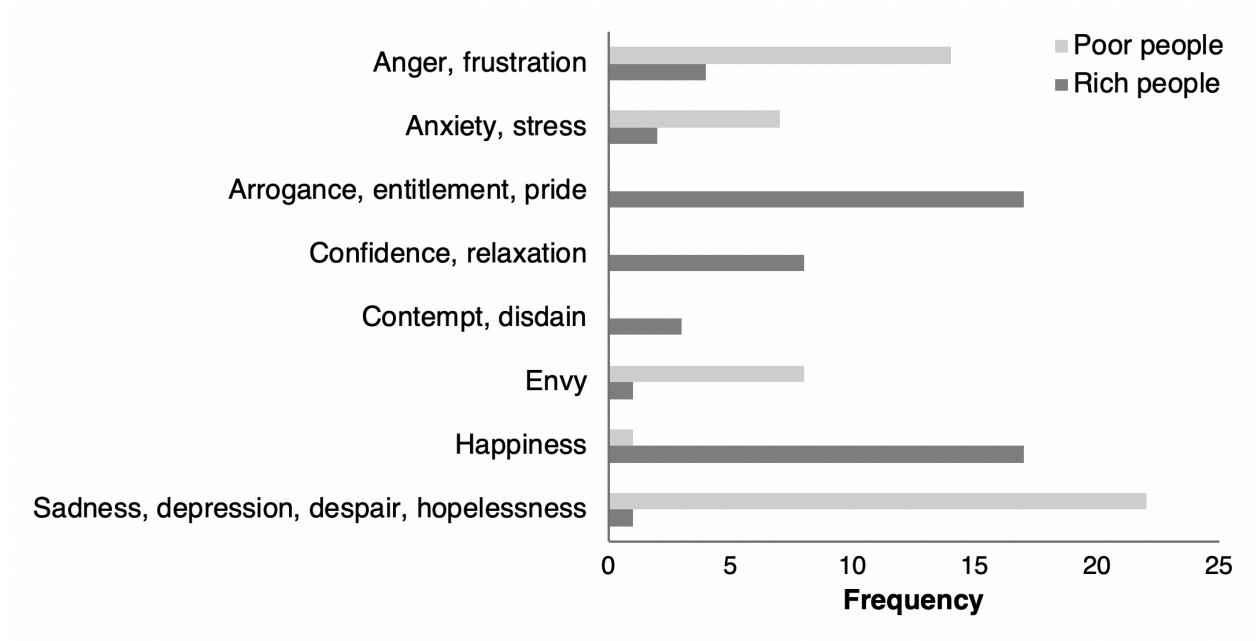


Figure 1. Frequency of stereotypical emotions listed by participants in the Pilot Study.



Figure 2. Sample (A) neutral stimulus used in Studies 1A and 1B, (B) sad morphed stimulus in Study 1A, and (C) angry morphed stimulus in Study 1B. Images reproduced with the consent of the pictured individual.

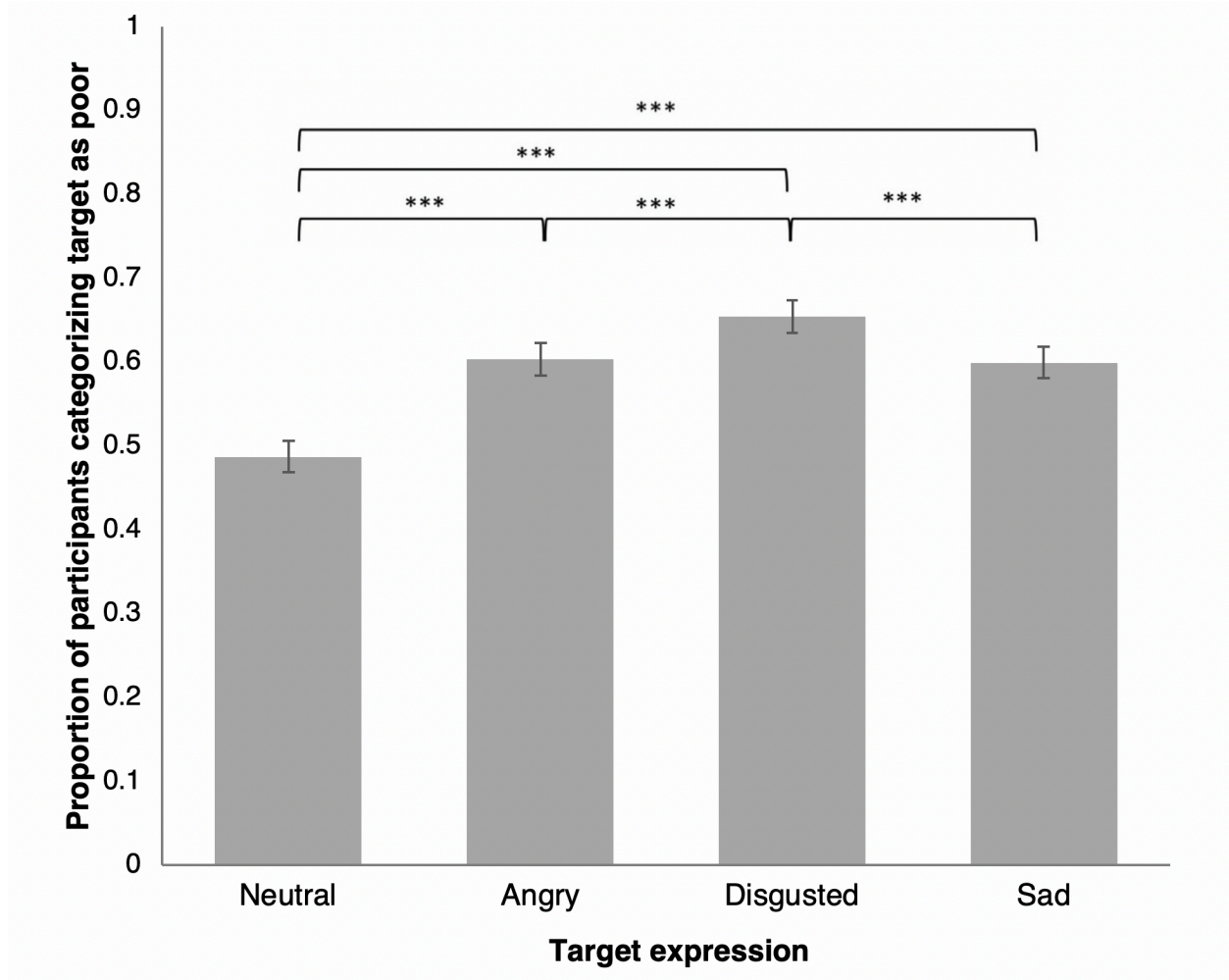


Figure 3. Proportion of participants categorizing neutral, angry, disgusted, and sad targets as *poor* in Study 2. Error bars represent standard error of the mean.

*** $p < .001$

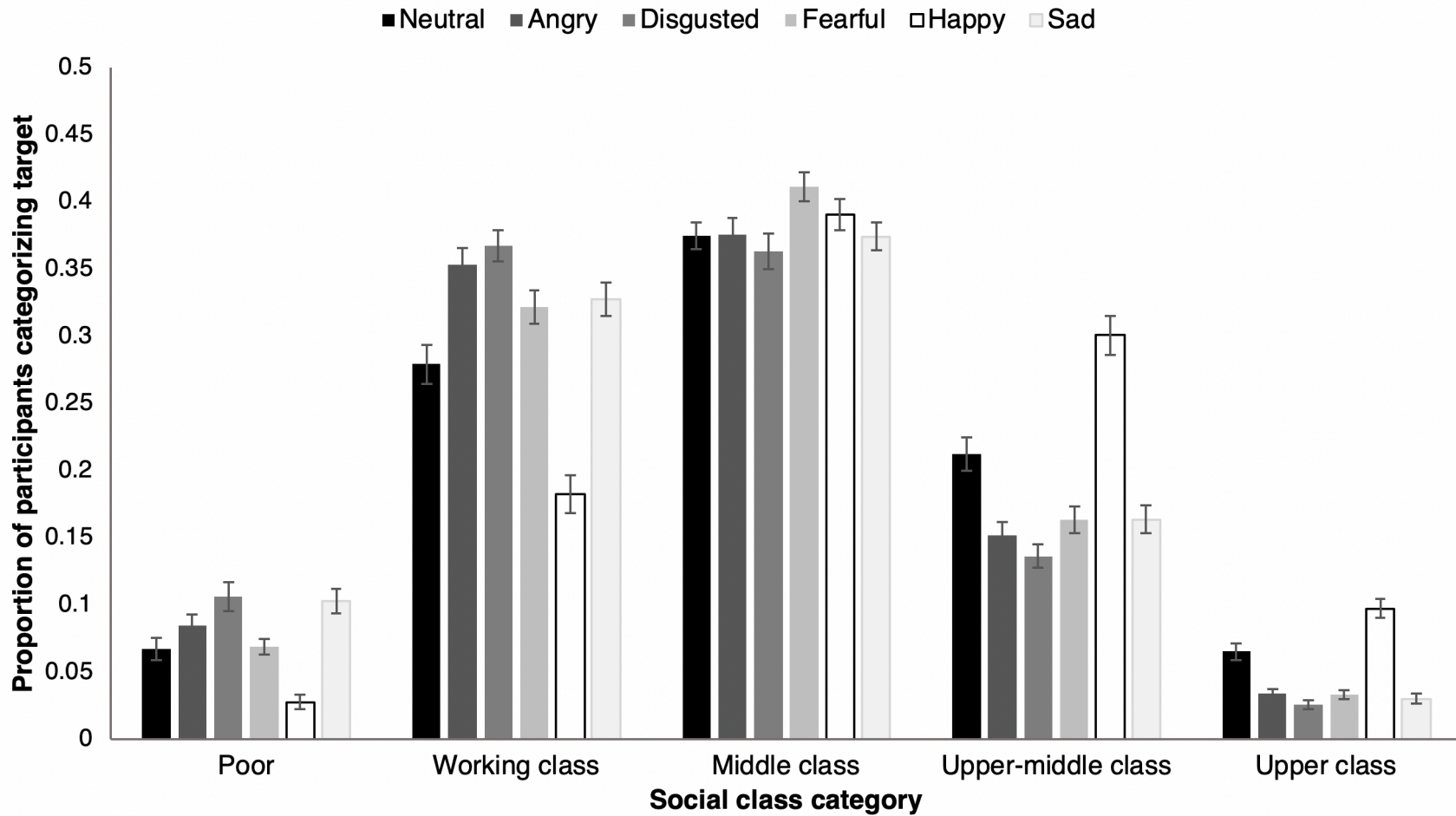


Figure 4. Proportion of participants categorizing neutral, angry, disgusted, fearful, happy, and sad targets as *poor*, *working class*, *middle class*, *upper-middle class*, and *upper class* in Study 3. Error bars represent standard error of the mean.