

The Effect of Self-Esteem on Ingroup Bias in Facial Impressions of Trustworthiness

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Introduction

First impressions of traits such as competence, attractiveness, and trustworthiness can form within milliseconds of seeing a face (Todorov, 2017). Moreover, implicit association tasks (IAT) reveal that people tend to exhibit ingroup bias, associating positive traits more closely with their own identity groups than other groups (Greenwald, McGhee & Schwartz, 1998). To more deeply understand the mechanisms of ingroup favoritism, this study investigates how self-esteem influences racial ingroup bias, specifically in facial impressions of trustworthiness.

A common explanation for ingroup favoritism is the social identity theory, which claims that identity and self-esteem are partly derived from group memberships (Gilovich et al, 2023). Ingroup favoritism boosts self-esteem because seeing similar group members favorably leads to seeing oneself more favorably. However, two conflicting explanations exist for how self-esteem, in turn, impacts ingroup bias (Aberson et al, 2000). People with high self-esteem may be inclined to favor ingroups in order to maintain their esteem. On the other hand, low self-esteem individuals may be even more incentivized to favor ingroups as a method of boosting their esteem. Although past studies indicate that high self-esteem tends to correspond to higher ingroup bias, the results vary depending on situational factors, and the role of esteem in forming facial impressions has not been extensively studied (Aberson et al, 2000).

Using an online survey that measures self-esteem and ingroup bias when judging trustworthiness of face images, this study will compare the ingroup favoritism of low-esteem and high-esteem individuals. If high-esteem individuals show more ingroup bias, this would suggest that maintaining self-esteem is a stronger drive for ingroup favoritism. If low-esteem individuals show more bias, this would suggest that boosting self-esteem is the stronger motivation. Additionally, half of the participants will be randomly assigned to a simple esteem-boosting

intervention, and regression will be used to quantify the effect of this treatment. A significant treatment effect would suggest that altering self-esteem can have a causal impact on ingroup bias.

Methods

Survey Design

An online survey created using Qualtrics was distributed to Harvard undergraduate mailing lists (see Appendix A for the full survey). Participants reported their race affiliation(s), gender, and age. Then, they reported their level of agreement on a scale from “strongly disagree” to “strongly agree” for eight baseline self-esteem statements adapted from the Rosenberg Self-Esteem Scale and the State Self-Esteem Scale (American Psychological Association, 2006; Heatherton & Polivy, 1991). Participants were randomly assigned to one of two groups. The treatment group was asked to “recall a time when you accomplished something that made you feel that others could depend on you,” a reminiscence-based esteem-boosting intervention inspired by previous research (Niveau et al, 2021). The control group did not complete this task.

All participants then viewed a series of paired images from the Chicago Face Database (CFD), a collection of standardized face images representing “self-identified Asian, Black, Latino, and White female and male models, recruited in the United States” (Ma et al, 2015). Each CFD image is accompanied by metadata including race, gender, and a trustworthiness rating averaged across 1,087 responses from a prior study. Participants were shown two images at a time and asked to choose the face they perceived as more trustworthy. Eight total pairs of images were shown, and images in a pair were always matched on gender, either both men or both women. Two pairs, one of each gender, were used to “benchmark” the CFD trustworthy ratings. In these benchmark pairs, both faces belonged to the participants’ ingroup, as determined

by their self-reported race, but one image had a low trustworthy rating and the other image had a high trustworthy rating. If the ratings are well-calibrated, the image with the higher rating should be chosen much more often. In the remaining pairs, trustworthy ratings were similar between the images, but one face belonged to the participants' racial ingroup and the other belonged to a racial outgroup (see appendix B for additional details of how pairings were created). Each of the three racial outgroups were represented once per gender, for a total of six non-benchmark pairs.

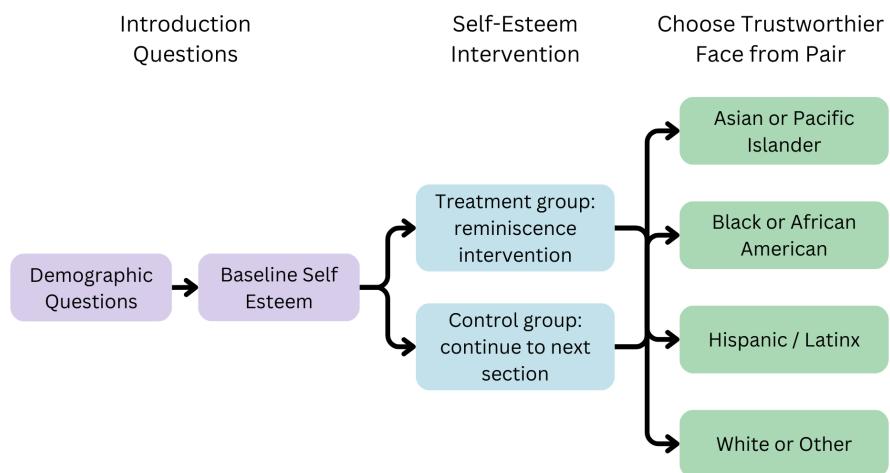


Figure 1: Survey Flow Diagram

Analysis Procedure

The baseline self-esteem questions were used to calculate a self-esteem score, with higher scores corresponding to higher esteem (see Appendix C for details). The self-esteem scores were symmetrically distributed (Figure 2a). Participants were categorized as “low” or “high” self-esteem individuals using the median esteem score of 32 as the cutoff. A participant’s “ingroup bias” was calculated as the proportion of the six non-benchmark questions where they chose the face from their ingroup as more trustworthy.

To analyze the effect of baseline self-esteem on ingroup bias, a t-test compared the ingroup bias of low and high self-esteem individuals in the control group, and a linear regression of the self-esteem score on the ingroup bias was conducted. To test the impact of the treatment,

another t-test compared the ingroup favoritism in the treatment vs. control group. A regression using both the self-esteem level and treatment status as predictors of ingroup bias was used to quantify the additional impact of the treatment holding baseline esteem fixed. The same regression was repeated using the self-esteem score instead of the self-esteem level.

It is possible that certain racial groups are generally perceived as more trustworthy, so ingroup favoritism might vary depending on which outgroup is being compared to. Therefore, how often images from a particular race are chosen over an ingroup image is also analyzed, a metric we will define as the “outgroup selection rate” (OSR).

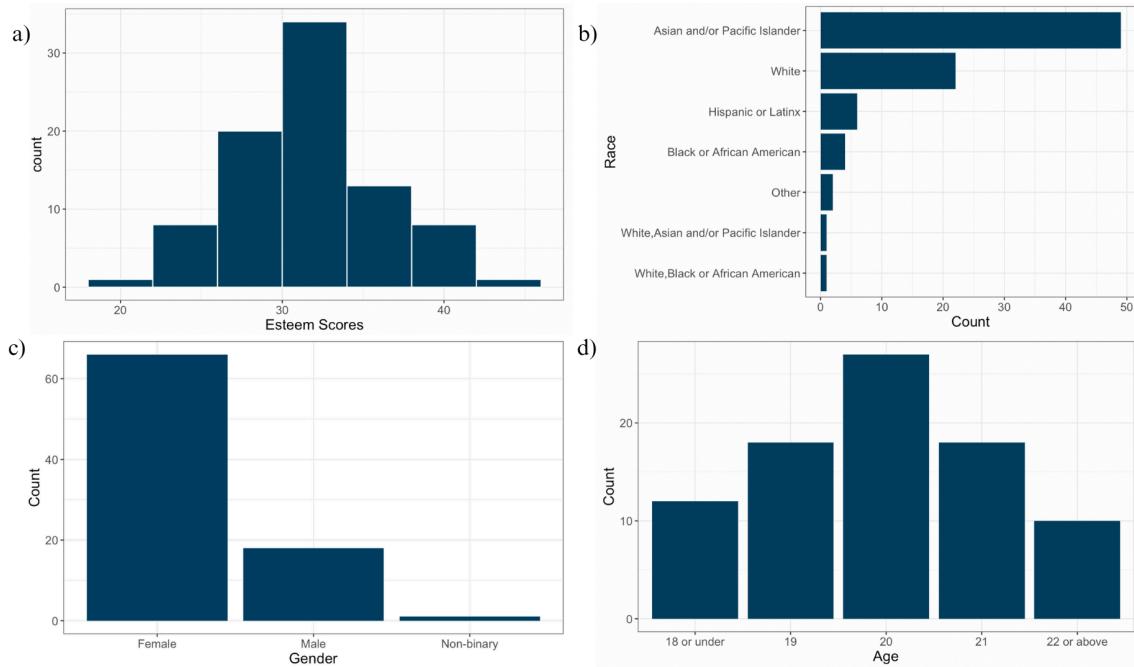


Figure 2: Distribution of self-esteem scores (a), racial/ethnic identities (b), gender (c), and age (d) among survey respondents

Compared to the overall population of Harvard undergraduates, Asians and females were overrepresented (Figure 2b-d). Two participants, who identified their race as “other,” were dropped from the analysis since their ingroup was not accurately determined. Mixed race individuals rated pairings based on all the racial identity groups they identified with, and their results counted toward every selected group.

Results

Survey Sample Characteristics

85 respondents finished the survey among 122 who started. Participants assigned to the treatment group disproportionately left the survey incomplete (Figure 3), but the set of complete survey responses were still balanced across control (N=43) and treatment (N=42). The treatment takeup was high, with 88% of the treatment group writing a response for the reminiscence task.

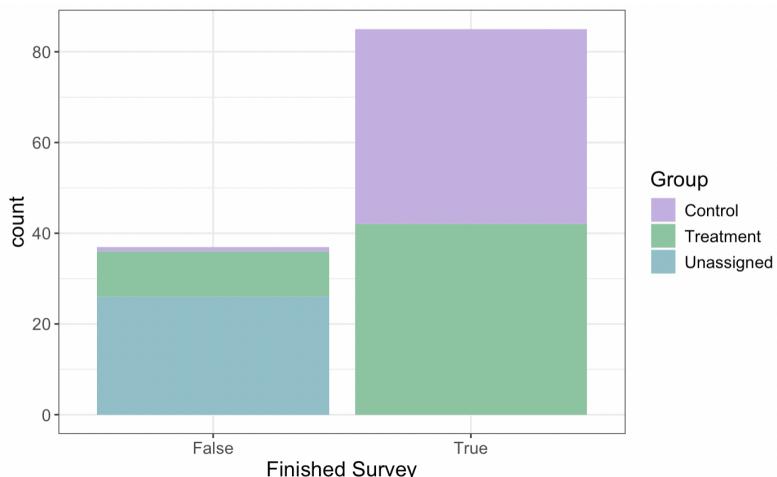


Figure 3: Treatment group assignment by survey completion status

Benchmark Analysis of the Trustworthiness Ratings

For every race and gender except the Asian female benchmark, the large majority of survey respondents chose the image corresponding to the higher trustworthy rating from the CFD metadata (Figure 4). This suggests that the CFD trustworthy ratings are well-calibrated to the attitudes of this sample but may not be perfect.

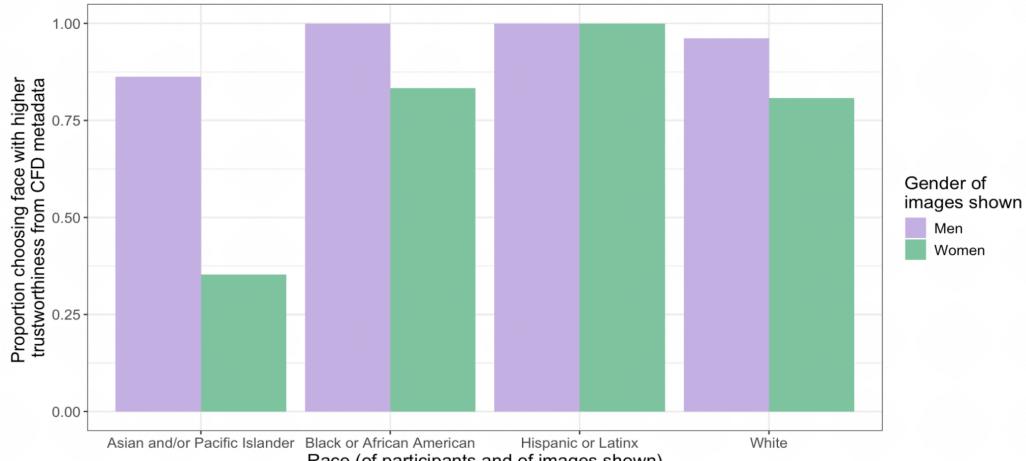


Figure 4: Benchmark question responses

Effect of Self-Esteem on Ingroup Bias

Among control group participants only, the mean ingroup bias was 0.6136 for low self-esteem individuals and 0.5417 for the high self-esteem individuals (Figure 5). The difference of -7.19% was not significant ($p=0.23$, $N=43$). The regression of ingroup bias on self-esteem score had a coefficient of -0.00968, indicating a 0.978% decrease in ingroup bias for every unit increase in self-esteem score (Figure 6). This relationship is moderate and significant at the 90% confidence level ($p=0.0586$, $r=-0.208$, $N=85$).

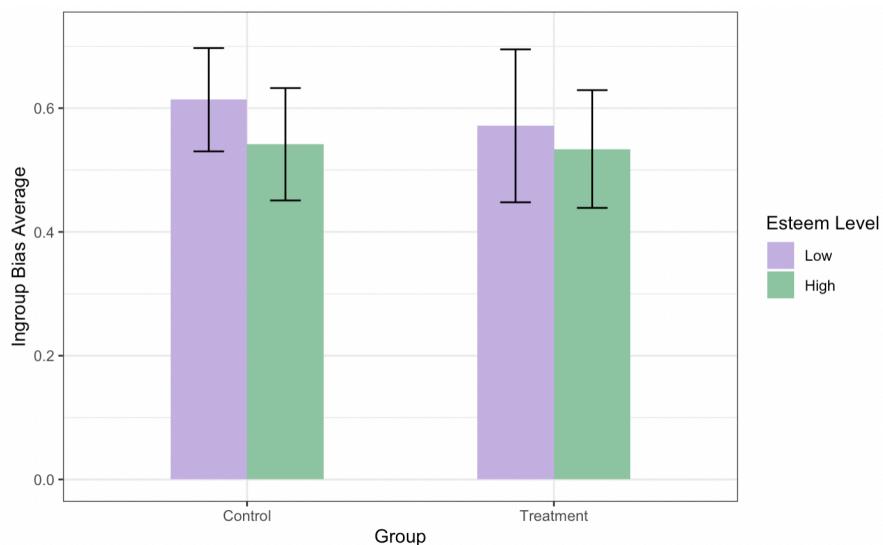


Figure 5: Ingroup bias by esteem level and treatment status

Effect of the Self-Esteem Boosting Intervention

	Model 1 Coefficients	Model 2 Coefficients
Esteem Level (reference group = “low”)	-0.05582 (p=0.244)	–
Esteem Score	–	-0.0009366 (p=0.0705)
Group (reference group = “control”)	-0.02244 (p=0.635)	-0.021745 (p=0.6389)

Table 1: Coefficients for regression models of predicting ingroup bias with esteem and treatment status

The mean ingroup bias for the control group was 0.5794 and the mean bias for the treatment group was 0.5467. The difference of -3.27% was not significant (p=0.485). Regression coefficients using self-esteem and treatment as predictors of ingroup bias are shown in Table 1. Controlling for self-esteem, receiving the treatment led to a small, insignificant decrease in ingroup bias of around 2.2%. Controlling for treatment status, higher self-esteem continues to be associated with decreased ingroup bias. “High” self-esteem had 5.58% lower ingroup bias compared to “low” self-esteem individuals, though the effect was insignificant. A unit increase in the esteem score corresponded to a 0.937% decrease in ingroup bias, which was a significant effect at the $\alpha=0.1$ level.

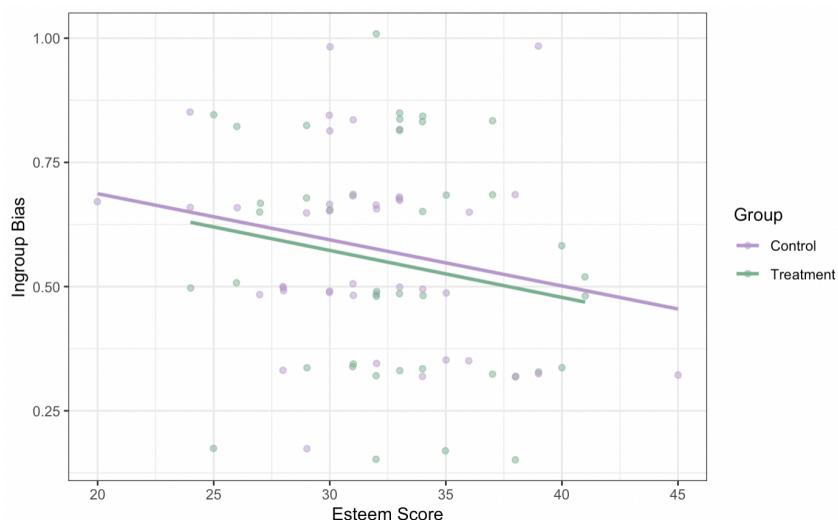


Figure 6: Esteem score vs. ingroup bias by treatment status. A slight random jitter has been added to the data points so that all points are visible.

Effect of Self-Esteem on Outgroup Selection

	Average Outgroup Selection Rate (OSR)	OSR for Low Esteem	OSR for High Esteem	Low and High Esteem OSR difference
Asian	0.6429	0.5833	0.6739	0.0906 (p=0.47)
Black	0.5063	0.3971	0.5870	0.1899 (p=0.017)
Latinx	0.3165	0.2969	0.3298	0.0329 (p=0.66)
White	0.3770	0.4500	0.3065	-0.1435 (p=0.10)

Table 2: Outgroup selection rate averages by race and t-test results comparing low and high self-esteem

Asian faces had the highest outgroup selection rate (OSR), while Latinx faces had the lowest OSR (Figure 7, Table 2). In other words, images of Asian faces were often perceived as more trustworthy by non-Asian participants over an image of their ingroup while Latinx faces were preferred less often among non-Latinx participants. Separating participants by self-esteem level, higher self-esteem was associated with an increase in OSR for Asian, Black, and Latinx faces and a decrease in OSR for white faces (Figure 8, Table 2). The OSR difference between esteem levels was only statistically significant for Black faces.

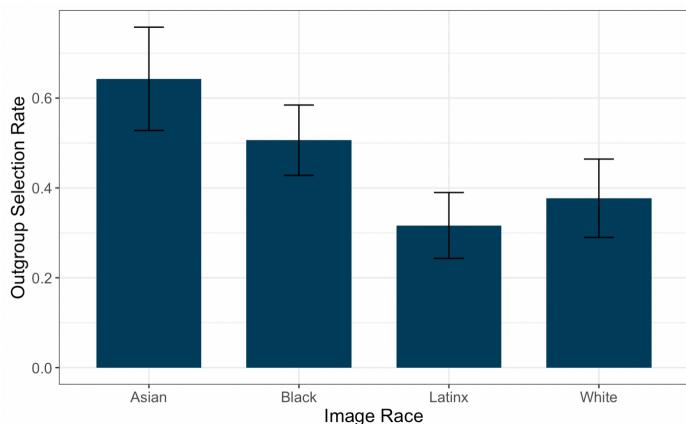


Figure 7: Proportion of times each race was chosen over the ingroup image (outgroup selection rate).

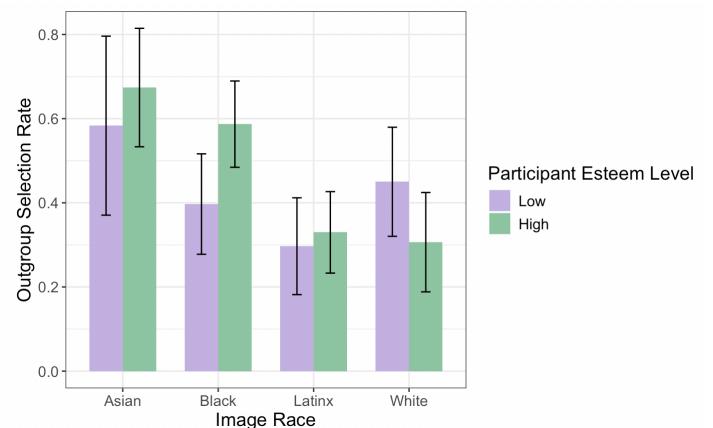


Figure 8: Outgroup selection rate by self esteem level.

Discussion

In this study, individuals with higher self-esteem, both on a binary scale of low vs. high and on a continuous scale of scores, had lower ingroup bias. While the results were not significant for the binary scale, the esteem score had a significant effect on ingroup bias at the 90% confidence level. The self-esteem boosting intervention also led to a slight decrease in ingroup bias, although the effect was not significant. Higher self-esteem led to higher rates of selecting Asian, Black, and Latinx faces as more trustworthy over an ingroup face. For Black faces in particular, high self-esteem individuals had an OSR 19% higher than low self-esteem individuals, a large, significant effect. Therefore, the impact of increased self-esteem on decreasing ingroup bias may be particularly beneficial for minority racial groups.

Overall, higher self-esteem corresponded to lower ingroup bias in this study, indicating that when it comes to facial impressions of trustworthiness, boosting self-esteem seems to be a greater drive of ingroup bias than maintaining self-esteem. This conclusion contradicts past studies on ingroup bias and self-esteem, suggesting that forming facial impressions might operate differently from other situations. One potential explanation might be the speed at which facial impressions form, which is much faster than other contexts where ingroup favoritism might arise. However, most of the correlations found in this study were not significant, so the true impact of self-esteem on ingroup bias in facial impressions is still inconclusive.

There are many limitations of this study that could be addressed by future research. The sample size was relatively small. A larger sample size would provide more statistical power and yield more conclusive results. Additionally, the sample was restricted to a very specific demographic, namely undergraduates from Harvard, primarily Asian or female. Thus, the results may not generalize well to a broader population. Furthermore, only a limited number of image

pairs were presented to the participants. Ideally, participants should rate many pairings for each combination of races rather than just one pair per gender. Although the ingroup-outgroup image pairings were theoretically matched on objective trustworthiness, based on responses to the benchmark questions, the CFD trustworthy ratings may not be perfectly calibrated. By presenting additional pairings, the results would be less impacted by potentially poorly matched image pairs.

This study could also be extended to look at impressions other than trustworthiness. Competence, attractiveness, and dominance, for instance, have frequently been studied in facial impression research (Todorov, 2017). Additionally, the intervention in this study was very minimal, merely requiring participants to briefly recall one situation. A more rigorous self-esteem boosting treatment could be tested to further determine whether altering self-esteem changes ingroup bias. Finally, because the survey questions measured explicit attitudes, participant bias likely impacted the results. Survey respondents may have realized that the study was measuring ingroup bias and intentionally adjusted their answers. Using implicit measures such as the IAT, ingroup bias could be measured more accurately.

Acknowledgements

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References

- Aberson, C.L., Healy, M., & Romero, V. (2000). Ingroup Bias and Self-Esteem: A Meta-Analysis. *Personality and Social Psychology Review*, 4(2), 157–173.
https://doi.org/10.1207/s15327957pspr0402_04.
- American Psychological Association. (2006). Rosenberg Self-Esteem Scale (RSE).
<https://www.apa.org/obesity-guideline/rosenberg-self-esteem.pdf>.
- Gilovich, T., Keltner, D., Chen, S., & Nisbett, R. E. (Year). Chapter 10: Stereotyping, Prejudice, and Discrimination. *Social Psychology* (6th ed., pp. 349-354). New York, NY: W.W. Norton & Company.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74(6), 1464–1480. <https://doi.org/10.1037/0022-3514.74.6.1464>.
- Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology*, 60(6), 895–910.
<https://doi.org/10.1037/0022-3514.60.6.895>.
- Ma, D.S., Correll, J. & Wittenbrink, B. (2015). The Chicago face database: A free stimulus set of faces and norming data. *Behav Res* 47, 1122–1135.
<https://doi.org/10.3758/s13428-014-0532-5>.
- Niveau, N., New, B., & Beaudoin, M. (2021). Self-esteem Interventions in Adults – A Systematic Review and Meta-analysis. *Journal of Research in Personality*, 94, 104131.
<https://doi.org/10.1016/j.jrp.2021.104131>.
- Todorov, A. (2017). *Face Value: The Irresistible Influence of First Impressions*. Princeton: Princeton University Press. <https://muse.jhu.edu/book/64584>.

Appendix

Appendix A: Full Survey

The full survey questionnaire is written below. Text in italics describe how the survey was formatted and were not included in the actual survey.

Page 1

Thank you for your interest in participating in this study! In this survey, you will be asked to answer questions about yourself and form first impressions based on images of people's faces. It should take less than 5 minutes to complete, and your answers will remain completely anonymous.

Do you consent to participate?

- Yes
- No

Page 2

1. How would you best describe your gender?
 - Male
 - Female
 - Non-binary
 - Other or Prefer not to say
2. How would you best describe your race/ethnicity? (*multiple choices are possible*)
 - White
 - Black or African American
 - Asian and/or Pacific Islander
 - Hispanic or Latinx
 - Other (with text entry)
3. What is your age?
 - 18 or under
 - 19
 - 20
 - 21
 - 22 or above

Page 3

Rate how strongly you agree with each of the following statements. Try to respond quickly without overthinking your answers.

For each of the statements below, participants have following options as answering:

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

Baseline Self-esteem Questions

1. I am worried about what other people think of me.
2. I feel that others trust me.
3. I believe that others can rely on me.
4. I feel self-conscious.
5. I wish I could have more respect for myself.
6. I feel that I am a trustworthy person.
7. I see myself as a dependable person.
8. On the whole, I am satisfied with myself.

Page 4

This section is displayed to the treatment group only

1. Briefly recall a time when you accomplished something that made you feel that others could depend on you.

Page 5 Version 1: “White” or “Other”

This version of the page is only displayed if the reported race is “White” or “Other” on page 1. Within this section, the question order and order of choices are randomized for each participant.

For each of the following questions, select the face that appears more trustworthy to you. There are no right or wrong answers. Try to answer each question quickly without overthinking your answers.

1. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



2. Which of these two faces looks more trustworthy to you?



3. Which of these two faces looks more trustworthy to you?



4. Which of these two faces looks more trustworthy to you?



5. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



6. Which of these two faces looks more trustworthy to you?



7. Which of these two faces looks more trustworthy to you?



8. Which of these two faces looks more trustworthy to you?



Page 5 Version 2: “Black or African American”

This version of the page is only displayed if the reported race is “Black or African American” on page 1. Within this section, the question order and order of choices are randomized for each participant.

For each of the following questions, select the face that appears more trustworthy to you. There are no right or wrong answers. Try to answer each question quickly without overthinking your answers.

1. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



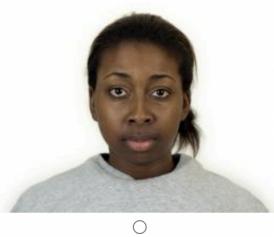
2. Which of these two faces looks more trustworthy to you?



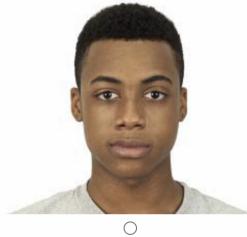
3. Which of these two faces looks more trustworthy to you?



4. Which of these two faces looks more trustworthy to you?



5. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



6. Which of these two faces looks more trustworthy to you?



7. Which of these two faces looks more trustworthy to you?



8. Which of these two faces looks more trustworthy to you?



Page 5 Version 3: “Asian and/or Pacific Islander”

This version of the page is only displayed if the reported race is “Asian and/or Pacific Islander” on page 1. Within this section, the question order and order of choices are randomized for each participant.

For each of the following questions, select the face that appears more trustworthy to you. There are no right or wrong answers. Try to answer each question quickly without overthinking your answers.

1. Which of these two faces looks more trustworthy to you? (Benchmark question)



2. Which of these two faces looks more trustworthy to you?



3. Which of these two faces looks more trustworthy to you?



4. Which of these two faces looks more trustworthy to you?



5. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



6. Which of these two faces looks more trustworthy to you?



7. Which of these two faces looks more trustworthy to you?



8. Which of these two faces looks more trustworthy to you?

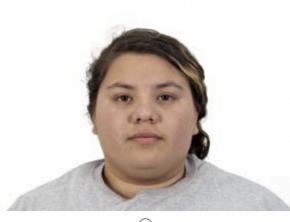


Page 5 Version 4: “Hispanic or Latinx”

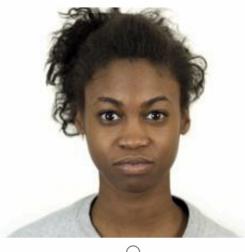
This version of the page is only displayed if the reported race is “Asian and/or Pacific Islander” on page 1. Within this section, the question order and order of choices are randomized for each participant.

For each of the following questions, select the face that appears more trustworthy to you. There are no right or wrong answers. Try to answer each question quickly without overthinking your answers.

1. Which of these two faces looks more trustworthy to you? (*Benchmark question*)



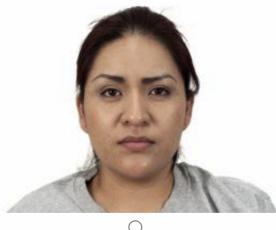
2. Which of these two faces looks more trustworthy to you?



3. Which of these two faces looks more trustworthy to you?



4. Which of these two faces looks more trustworthy to you?



5. Which of these two faces looks more trustworthy to you? *(Benchmark question)*



6. Which of these two faces looks more trustworthy to you?



7. Which of these two faces looks more trustworthy to you?



8. Which of these two faces looks more trustworthy to you?



Appendix B: Determining the Image Pairs

The CFD metadata included probabilities of someone being perceived to be either Asian, Black, Hispanic/Latino, multiracial, white, or another race based on the previous study's results. Any face that had 50% or lower probability of being perceived as their actual race were excluded from being selected so that faces included in this survey would be fairly recognizable as belonging to a particular racial group.

Among the remaining faces, the lowest and highest trustworthy ratings were chosen for each gender and racial group among Asian, Black, Hispanic/Latino, and white to create the benchmark pairings. The 3 faces closest in absolute difference to the average trustworthy rating across the dataset were selected for each race and gender. All three of these faces would be used for comparison in the ingroup image sets, and the one face with the rating closest to average would be used for comparison in the outgroup image sets. For example, the pairings for white participants are:

1. White woman (low trustworthy rating) vs. white woman (high trustworthy rating)
2. White woman vs. Asian woman (similar trustworthy ratings)
3. White woman vs. Black woman (similar trustworthy ratings)
4. White woman vs. Latina woman (similar trustworthy ratings)
5. White man (low trustworthy rating) vs. white man (high trustworthy rating)
6. White man vs. Asian man (similar trustworthy ratings)
7. White man vs. Black man (similar trustworthy ratings)
8. White man vs. Latino man (similar trustworthy ratings)

Appendix C: Calculating the Self-Esteem Score

Participants' responses to the baseline self-esteem questions were re-coded on a scale of 1-6. For questions 2, 3, 6, 7, and 8, "strongly disagree" corresponded to 1 and "strongly agree" corresponded to 6. For questions 1, 4, and 5, the values were reversed, with "strongly agree" corresponding to 1 and "strongly disagree" corresponding to 6. The participants' self-esteem score was the sum of the re-coded values for all 8 questions.