

Gender and Racial Bias in Representations of Scientists

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Introduction

- Underrepresentation within the scientific community based on gender and race
- A roughly equal number of female and male students enroll in programs related to science, technology, engineering, and mathematics (STEM) fields **However**,
- Twice the number of males receive doctoral degrees
- Males are more likely to hold longer contracts and leadership positions compared to females (NSF, 2020; Palermo et al., 2008)
- Females are less likely to stay in science due to a lack of female role models (Blickenstaff, 2005)

This may be due to:

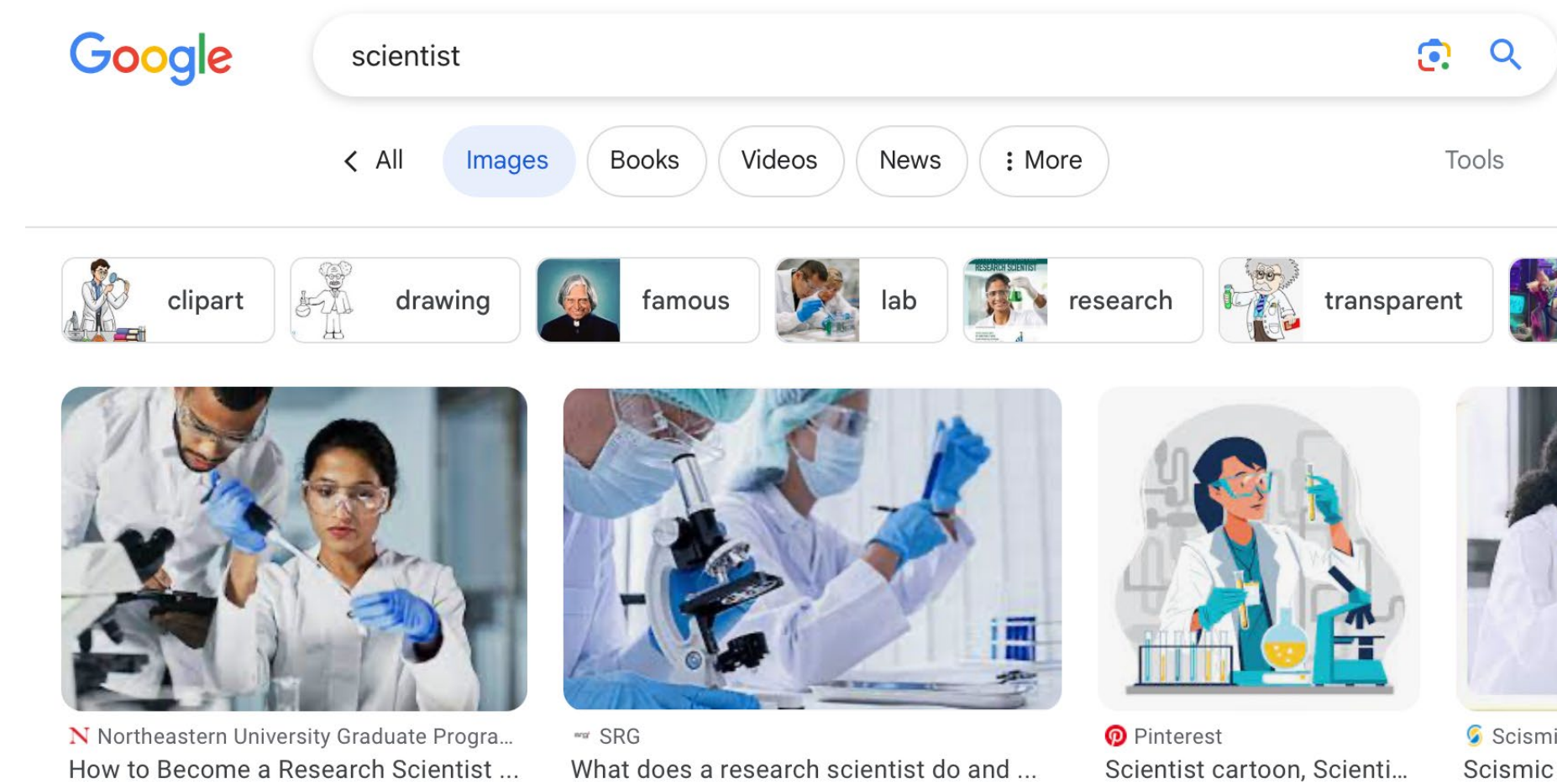
- The negative perceptions surrounding females in science
- Scientists being seen as a stereotypical male role (Miller et al., 2018)
- Although research on **racial bias** in science is limited, underrepresentation of minorities exists (NSF, 2021)
- We conducted three studies to examine whether there is gender or racial bias in media representations of scientists or in people's perceptions of scientists

References

- Blickenstaff, J. C. (2005). Women and science careers: Leaky pipeline or gender filter? *Gender and Education*, 17, 369 – 386.
- Miller, D.I., Nolla, K.M., Eagly, A.H., & Uttal, D.H. (2018). The development of children's gender-science stereotypes: a meta-analysis of 5 decades of U.S. draw-a-scientist studies. *Child Development*, 89(6), 1943-1955. <https://doi.org/10.1111/cdev.1303>
- National Science Foundation (2020). National Center for Science and Engineering Statistics, Survey of Doctorate Recipients. <https://ncesdata.nsf.gov/home>
- National Science Foundation (2021). Women, Minorities, and Persons with Disabilities in Science and Engineering. <https://nces.nsf.gov/pubs/nsf21321>
- Palermo, S., Giuffra, E., Arzenton, V. and Bucchi, M. (2008), Gender and science. *EMBO Reports*, 9, 494-495. <https://doi.org/10.1038/embo.2008.82>

Study 1: Scientist Image Search

- **Method:** Utilizing Google's Image search, we collected the first 100 image results when searching for "scientist"
- The images were classified by gender and race of the individual(s) in the image and the content of its associated webpage
- Content classification include STEM, gender, race, health, and education



Study 2: Imagine a Scientist

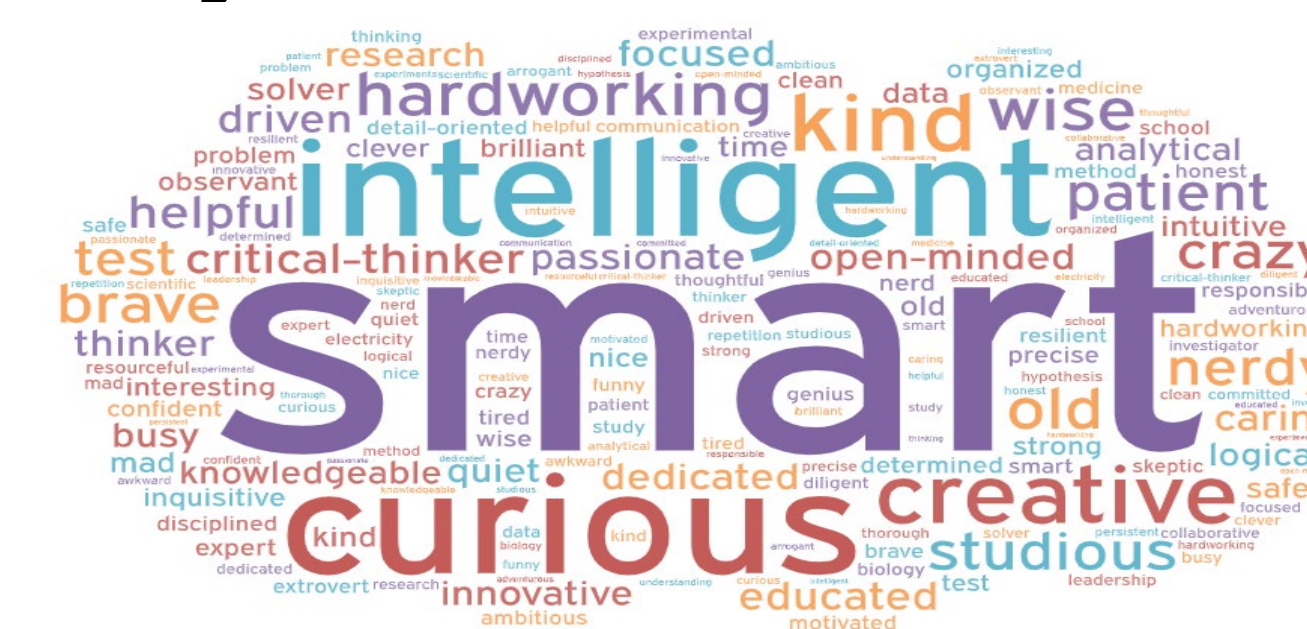
- **Method:** Using an online survey, participants were instructed to visualize a "scientist" and select from two set of images the image that best fit their visualization
- Individuals in images varied in gender and race
 - Black, East Asian, Latino, South Asian, and White faces
- One set of images included individuals in a laboratory setting, and one included headshots
- Participants also listed 10 adjectives related to scientists



Sample images from the lab-setting set and headshot set from survey.

Study 3: Scientist Adjectives

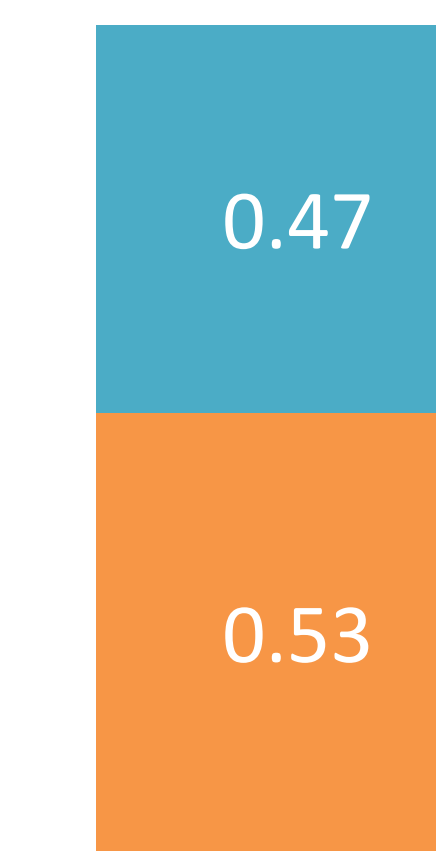
- **Method:** Using an online survey, participants rated 77 adjectives about scientists (collected from Study 2) as feminine or masculine



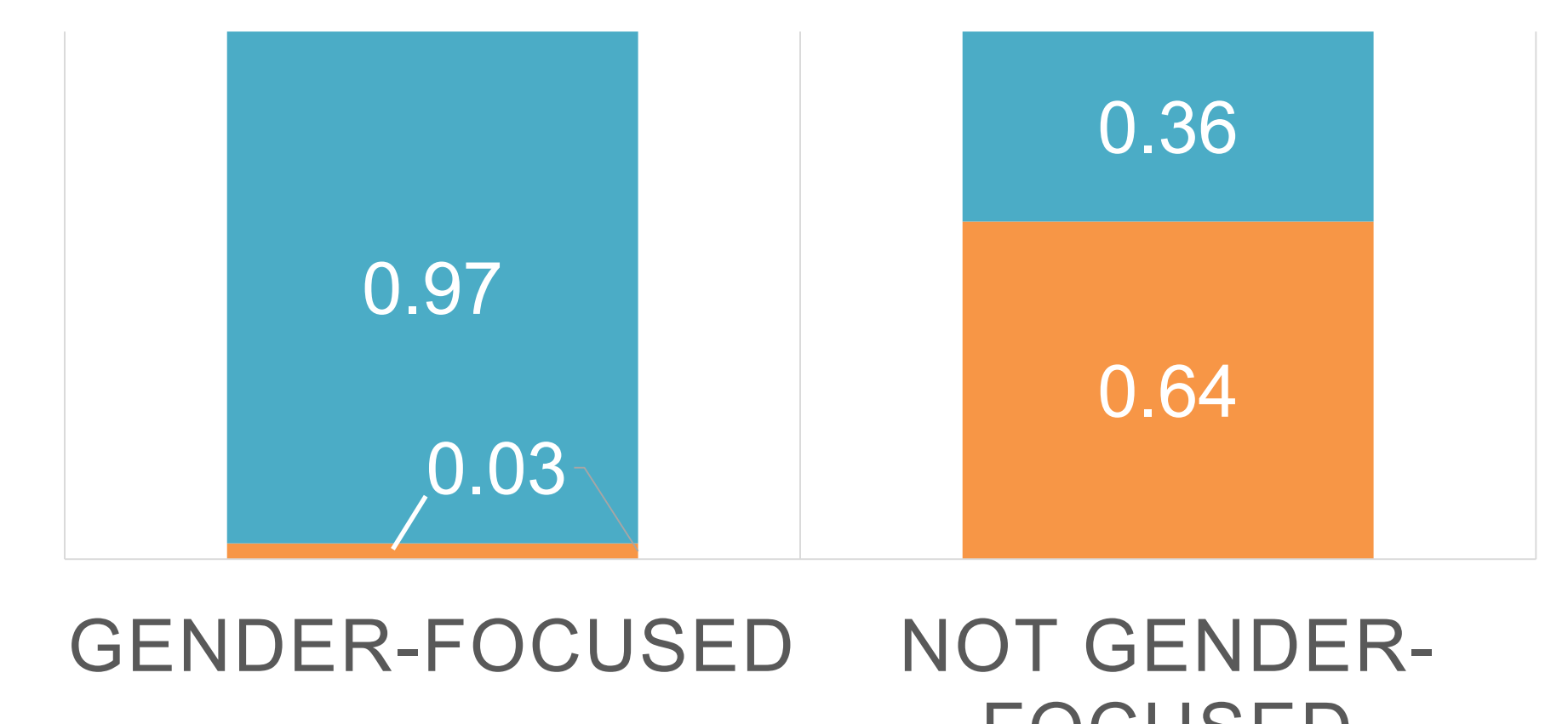
Results

OVERALL

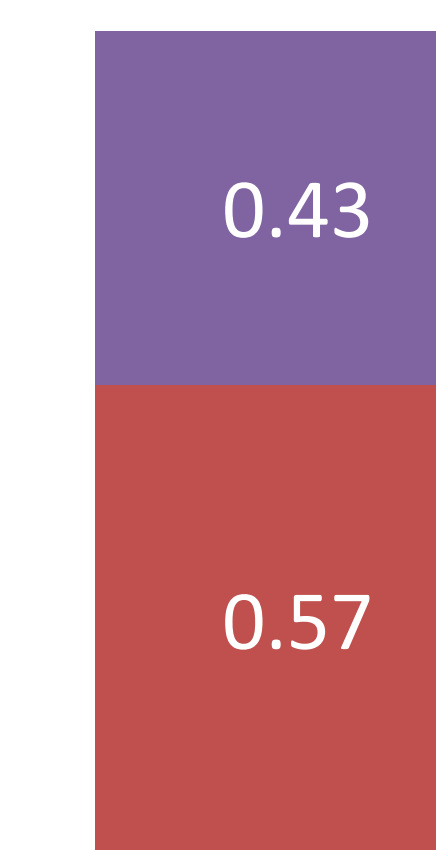
Male Female



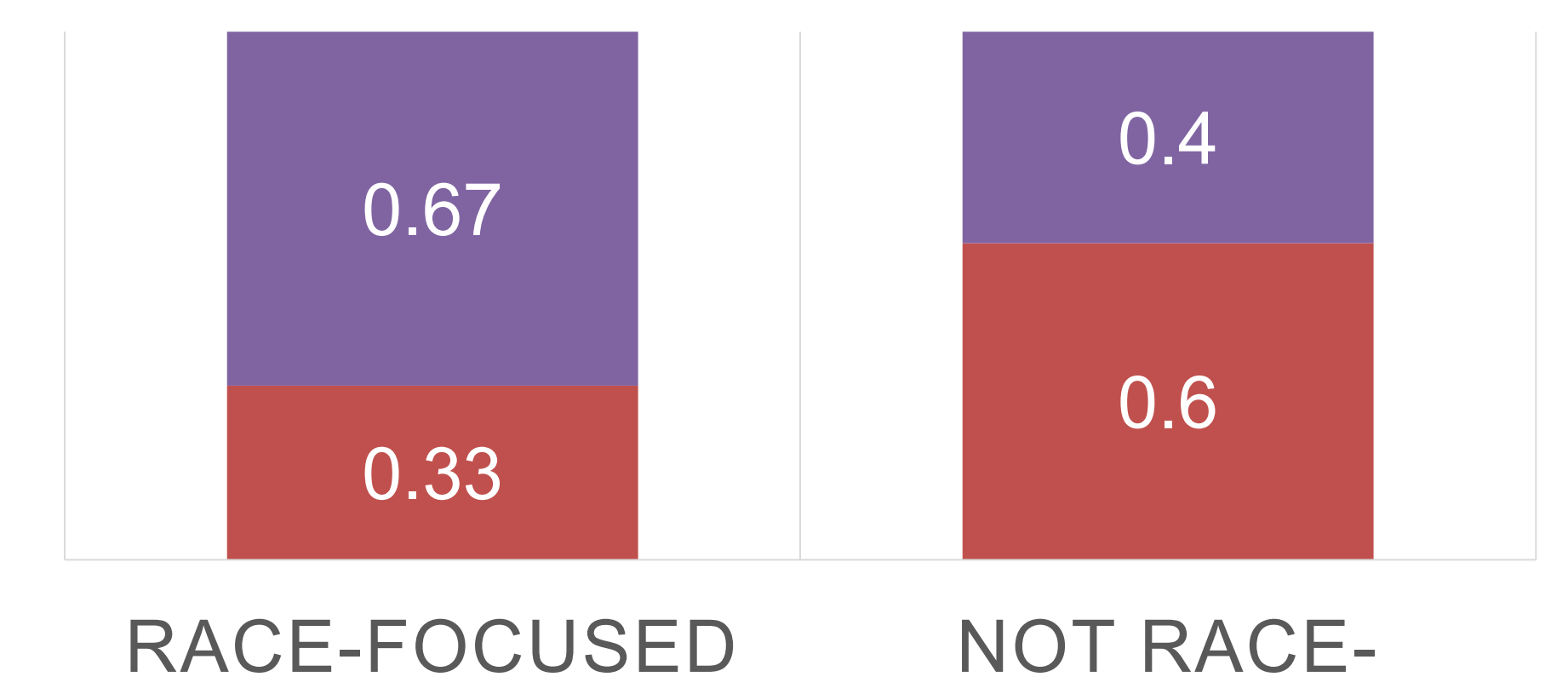
Male Female



White Not White



White Not White



- Articles focused on STEM, health and education also showed racial and gender differences
 - Education: more non-white faces
 - STEM and health: more female faces

Results

- Female faces were selected more frequently (60%)
- Latino faces were selected most frequently in the headshot images set (30%)
- Black faces were selected least frequently in both sets

Results

- Ratings did not significantly differ from neutral (i.e. no bias towards masculine or feminine)

Most masculine words:

- strong
- arrogant
- expert
- mad
- brave

Most feminine words:

- thoughtful
- kind
- detailed
- caring
- passionate