



Building a Face Database to Study Racial Bias in Pain Perception

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INTRODUCTION

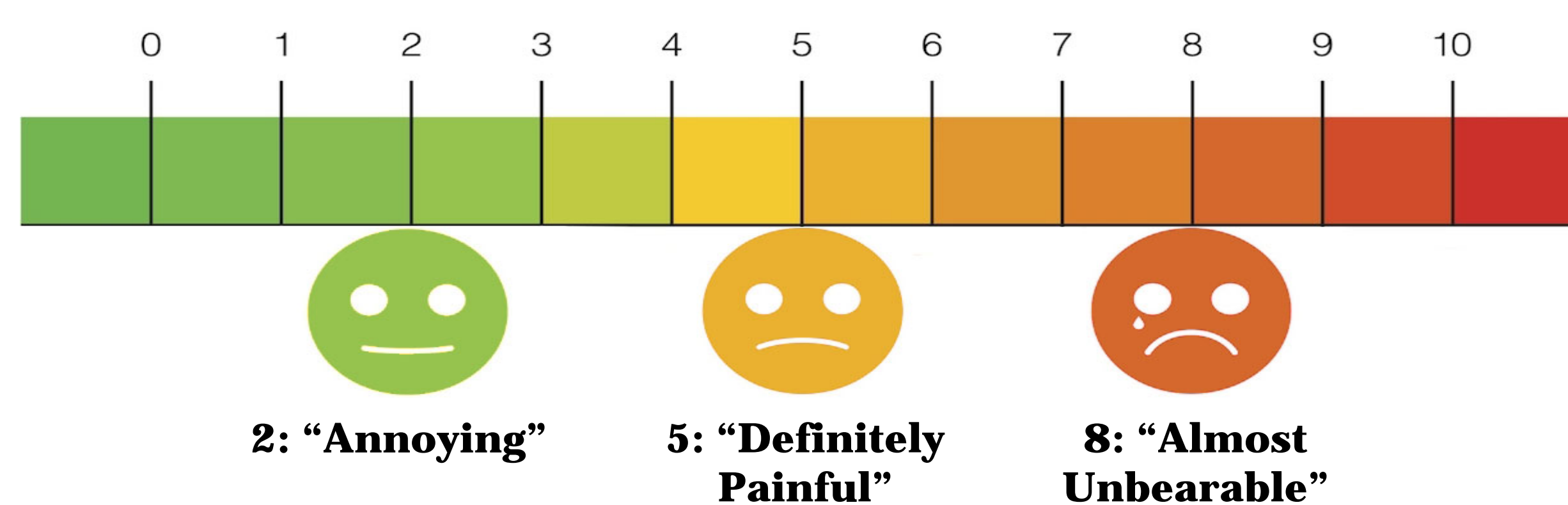
- Racial disparities in pain care and treatment in the US (e.g., Anderson et al., 2009) may stem, at least in part, from a perceptual source (Mende-Siedlecki et al., under revision)
- To test this hypothesis, we sought out a database of facial expressions of physical pain — however, existing stimuli sets lack diversity, in terms of race, gender, and expression variability (e.g., Simon et al., 2008).
- Thus, our lab built a large, high-quality, diverse database of faces expressing pain that would be useful to researchers across the fields of psychology, health, and neuroscience.

OBTAINING THE STIMULI

- Participants (265 total at NYU and UD, demographics below) received either course credit or \$5 for their time.

Procedure:

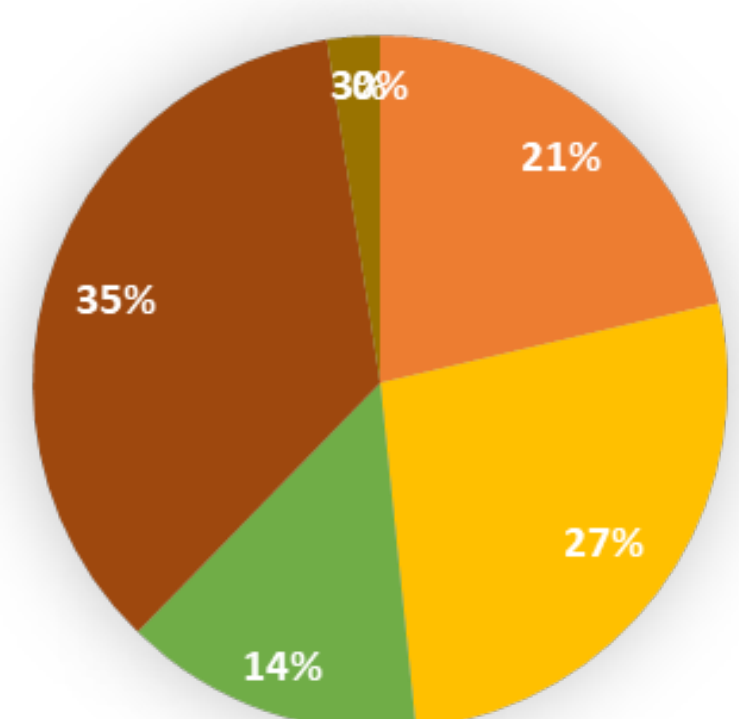
- After obtaining informed consent, actors completed a basic demographic survey.
- Participants then posed neutral expressions, as well as various experiences of pain (e.g., heat pain, electric shock, etc.) corresponding to a standardized series of prompts at three levels of pain — a 2, 5, and 8 on a scale from 1 to 10.



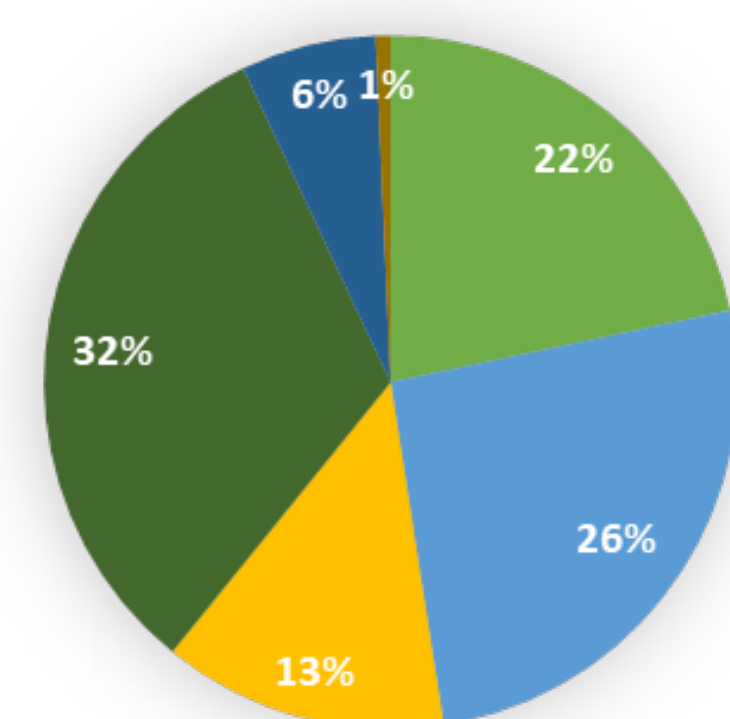
- Photos taken 4 feet away in response to prompts; researchers took multiple images for each prompt using an iPhone 5S for the NYU set and a Nikon Coolpix l330 for the UD set.

DATABASE DEMOGRAPHICS

Male Participants (N = 122)



Female Participants (N = 143)



Legend: Asian (green), Black (orange), Hispanic/Latino (yellow), White (red), Multiracial (blue)

References: Anderson, K. O., Green, C. R., & Payne, R. (2009). Racial and ethnic disparities in pain: causes and consequences of unequal care. *The Journal of Pain*, 10, 1187-1204.; Mende-Siedlecki, P., Qu-Lee, J., Backer, R., & Van Bavel, J. (under revision). Perceptual contributions to racial bias in pain recognition.; Simon, D., Craig, K. D., Gosselin, F., Belin, P., & Rainville, P. (2008). Recognition and discrimination of prototypical dynamic expressions of pain and emotions. *PAIN*, 135, 55-64.

CLEANING THE STIMULI



- Both neutral and painful stimuli were cropped to the head and backgrounds were removed using Adobe Photoshop CC 2017. The image was cropped from chin to top of hair across all stimuli.
- Resolution and image size were equated across stimuli at 300 pixels/inch and 4 inches x 4 inches. Each face was centered and straightened on a 4 inch x 4 inch canvas.

NORMING THE STIMULI

- To be able to equate stimuli across race and gender on dimensions relevant to pain tolerance (strength, status, etc.) or to select expressions based on specific criteria, two groups of MTurkers rated neutral and painful faces.

Neutral Faces:

- 525 participants ($M_{age} = 35.06$, $SD_{age} = 10.98$; 262F) rated a randomized subset of 25 neutral faces (~40 ratings per face) on the following dimensions:
 - Demographic features (perceived age, gender, race/ethnicity, racial prototypicality)
 - Social evaluations (attractiveness, dominance, masculinity, femininity, intelligence, status, unusualness, strength, babyfacedness, competence, trustworthiness; e.g., "How strong does this face look?")
 - Emotional content (sadness, disgust, surprise, threat, happiness, anger, fear, and physical pain; e.g., "How angry does this face look?")
- The sequences of demographic and non-demographic blocks and of all questions inside of each block were counterbalanced.

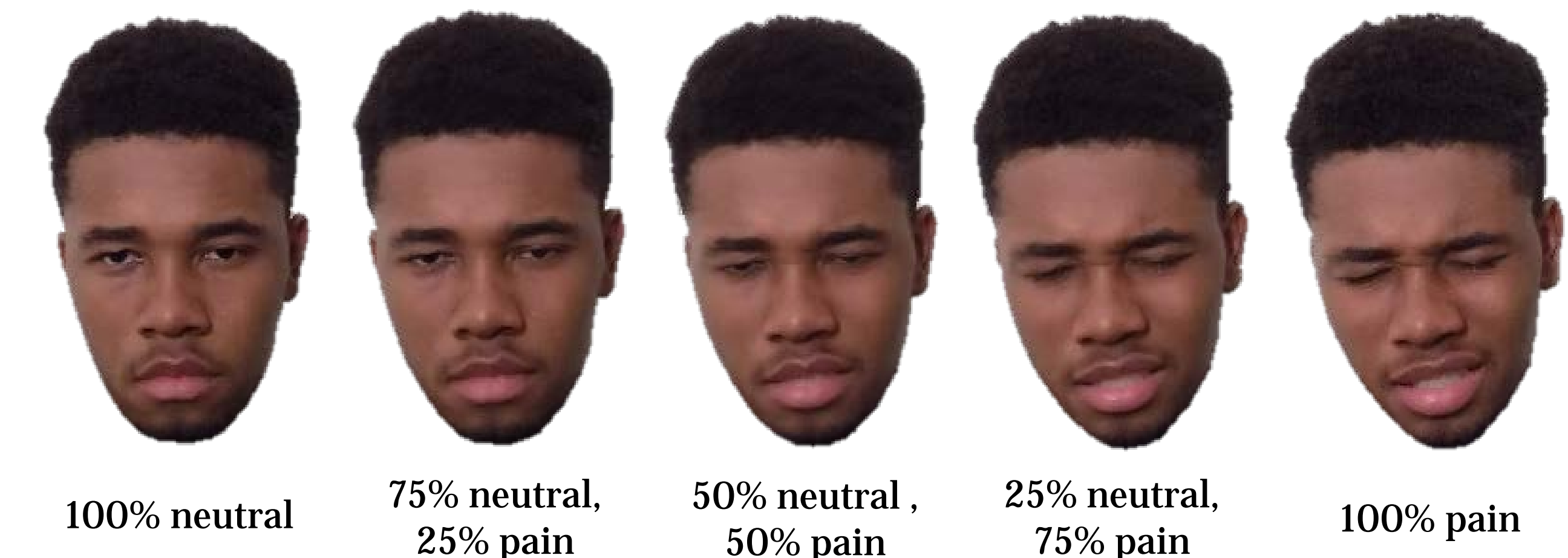
Pain Expressions:

- 701 participants ($M_{age} = 36.25$, $SD_{age} = 11.05$; 384F) rated a randomized subset of 30 emotional faces (~27 ratings per face) on the following dimensions:
 - Emotional content (sadness, disgust, surprise, threat, happiness, anger, fear, and physical pain)
 - Believability of expressions
- Rating order was randomized within each expression.
- 82 decoy expressions of other emotions (happiness, sadness, fear, surprise) were intermixed with pain faces (~5 decoys per subject).

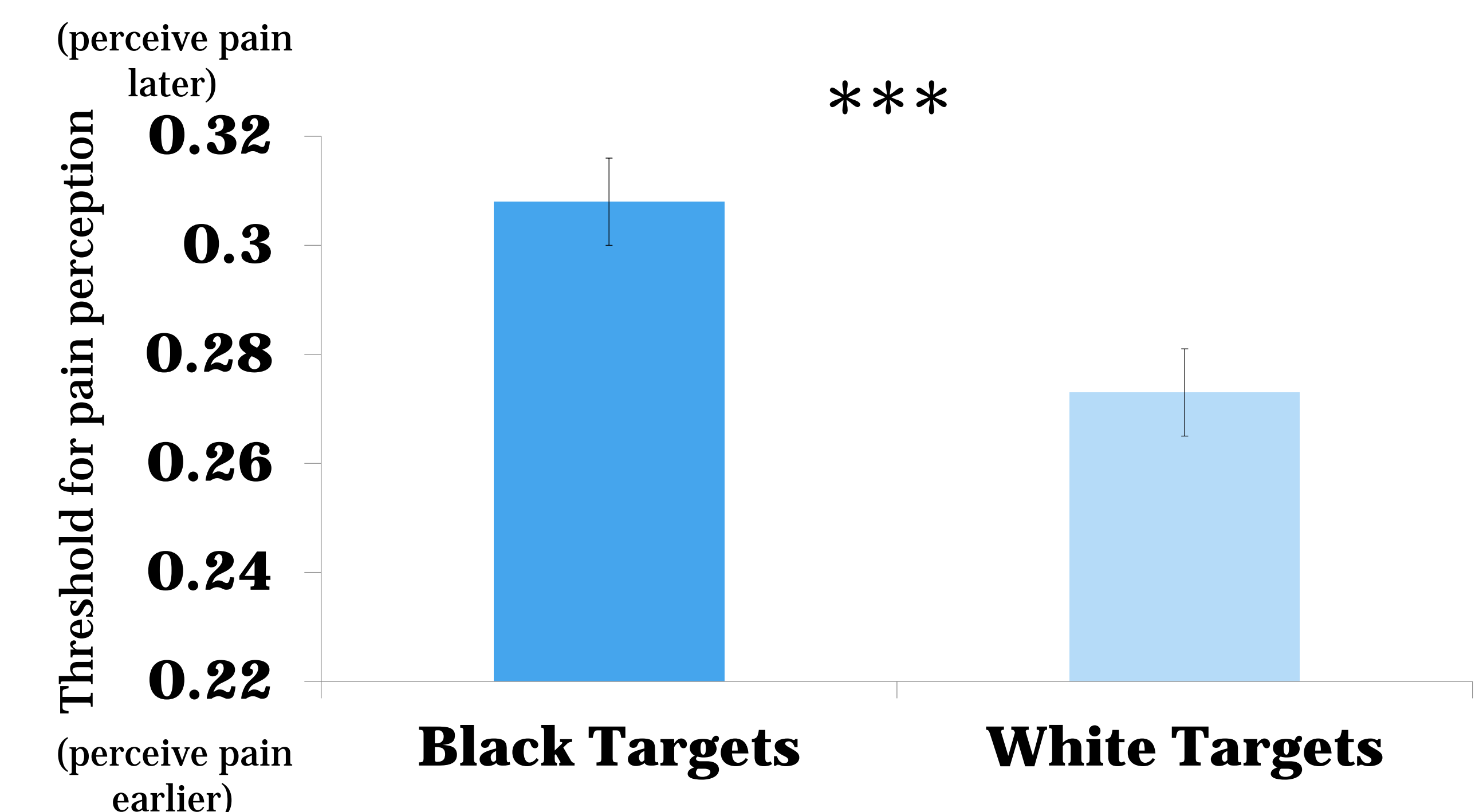
Acknowledgments: We acknowledge the support of Jay Van Bavel and the NYU Social Perception and Evaluation Lab, as well as the contributions of following members in the Mende-Siedlecki Lab: L. Davis, D. DiMeola, A. Desieghardt, E. Frezza, C. Gibbons, G. Gleason, M. Halkowski, A. Jaffl, A. Juliano, K. Kays, A. Klysa, N. Kozak, R. Lawrence, S. Marek, K. Mariani, C. Martin, L. Owens, E. Pittman, D. Prusisz, P. Y. Salvador, A. Schmidt, D. Schwartz, O. Stibolt, S. Tomatsu, & A. Wilford. This work was partially funded by a grant from the National Science Foundation (#1349089, PI: Van Bavel).

CURRENT & FUTURE DIRECTIONS

- Using the neutral and painful stimuli, we created morphs (Morpheus PhotoMorpher) to be used in subsequent tasks designed to examine racial bias in pain perception and treatment.



- For example, 246 White MTurk participants ($M_{age} = 36.54$, $SD_{age} = 10.96$; 132F) viewed sets of Black & White morphs (8 sets each; 11 morphs per set) and rated the pain intensity of each morph on a 1 ("definitely not in pain") to 7 ("definitely in pain") scale.
 - Black and White stimuli were balanced in terms of expression intensity, social evaluations (e.g., strength, dominance, status, etc.), and expression believability
- White perceivers showed more conservative thresholds for pain on Black faces, compared to White faces ($F(1,245) = 99.06$, $p < .001$, $\eta_p^2 = 0.28$), and further, bias in thresholds for pain perception were positively associated with bias in treatment recommendations ($B = 12.00$, $SE = 1.73$, $t = 6.96$, $p < .001$).



- Our lab is continuing to pursue new interventions aimed at reducing group-based disparities in health outcomes, and to investigate the perceptual roots of biases in pain care.
 - For example, we're currently examining how racial prototypicality, status, gender, and individuation motivation moderate racial bias in pain perception and treatment

Sample stimuli available for download at osf.io/dmy9/ & mendesiedleckilab.com/stimuli/. Full database and norming materials available online in mid-June at [osf.io/2x8r5!](https://osf.io/2x8r5/)