

The Impact of Face Ethnicity on the Detection of Pain Facial Expressions

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Context.

Many studies have revealed that the pain expressed by Black people is underestimated. Moreover, a series of studies have shown that White perceivers have a more stringent threshold for detecting pain on Black than on White faces¹⁻⁵. However, those studies systematically relied on tasks that are sensitive to one's decisional criterion. **This research assessed whether those disparities remain when using a task controlling for decisional bias.**

Methods.

Experiment 1

Decisional bias possible

Design: Online (Lab Maestro Pack&Go⁶)

Participants: 50 White

Task: Yes/No pain detection (Fig 1a)

- 336 trials per participant

Stimuli: 336

- 8 ID x 2 ethnicities (White, Black; Fig2 a)

- Intensity between neutral and 100% (Fig2 b)

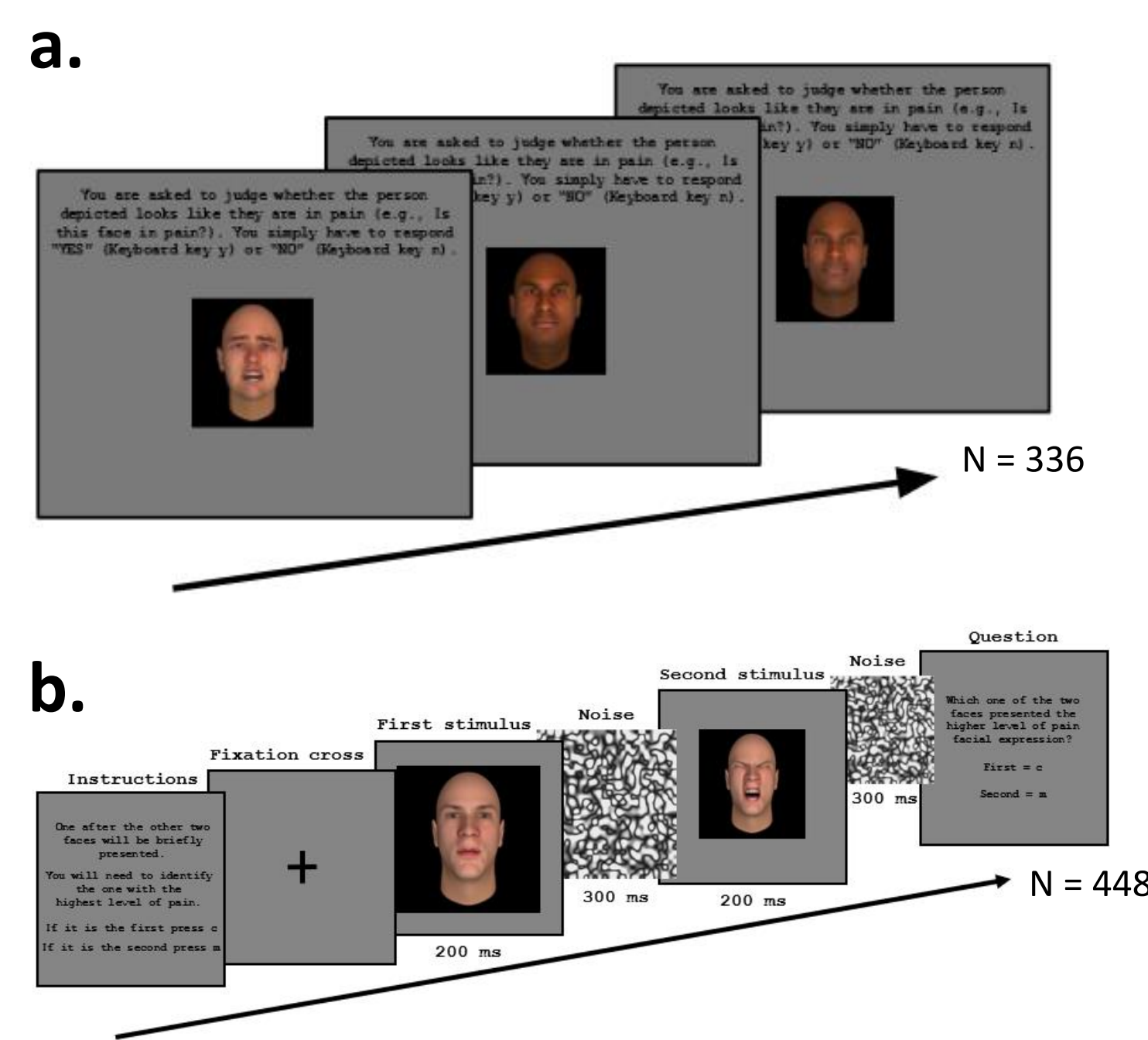


Figure 1 a) example of a trial in Exp. 1(a) and 2(b)

Experiment 2

Reduced decisional bias

Design: Online (Lab Maestro Pack&Go⁶)

Participants: 50 White

Task: 2-IFC pain detection (Fig 1b)

- 448 trials per participant

Stimuli: 224

- 8 ID x 2 ethnicities (White, Black; Fig2 a)

- Neutral expression compared to pain facial expressions ranging from 5% to 70% (Fig 2b)

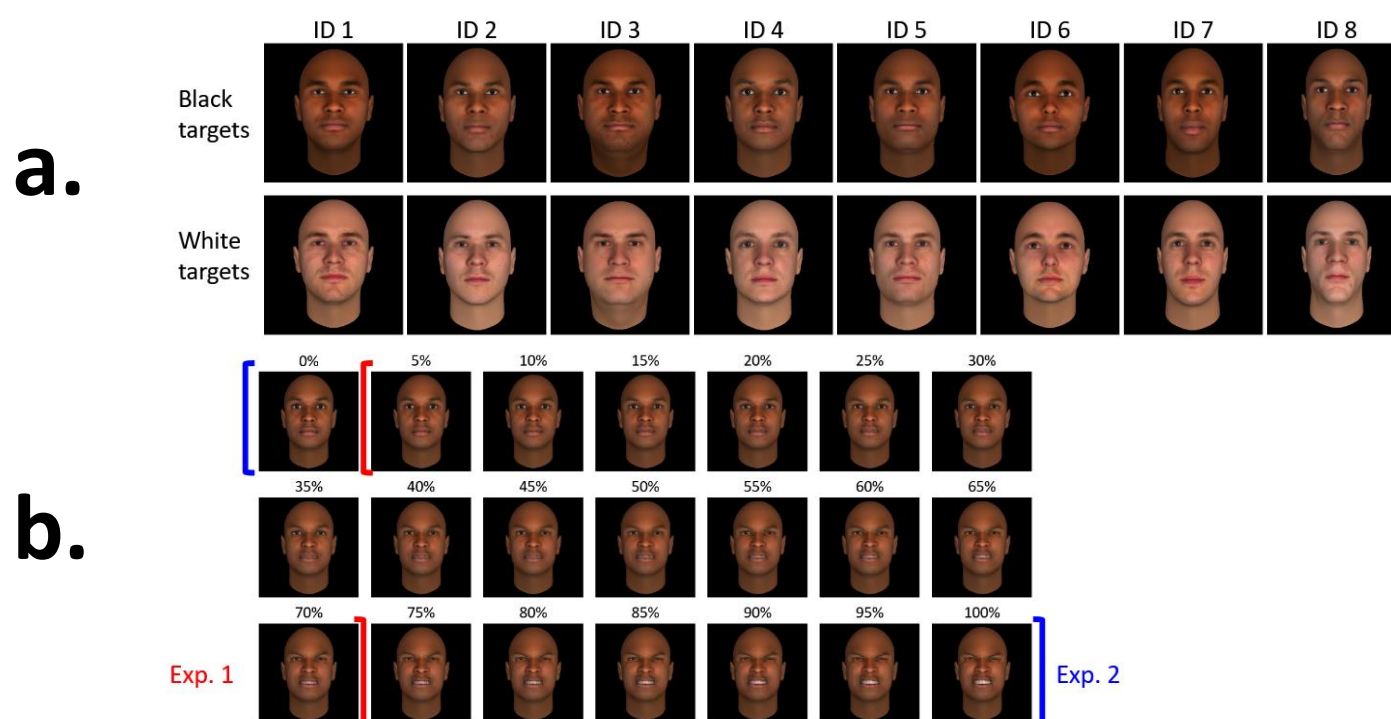


Figure 2 a) Identities of faces presented (Exp. 1 and Exp. 2). b) Example of stimuli with intensities of pain facial expression ranging from neutral to 100% (Exp. 1) and from 5% to 70% (Exp. 2)

References. 1) Drain, A., Goharзад, A., Qu-Lee, J., Lin, J., and Mende-Siedlecki, P. (2020) ; 2) Mende-Siedlecki, P., Backer, R., Qu-Lee, J., et Van B, J. J. (2019). *Journal of Experimental Psychology: General*, 148(5); 3) Mende-Siedlecki, P., Qu-Lee, J., Lin, J., Drain, A., et Goharзад, A. (2020). *Pain reports*, 5(6); 4) Mende-Siedlecki, P., Goharзад, A., Tuerxuntuoheti, A., Reyes, P. G. M., Lin, J., et Drain, A. (2021); 5) Mende-Siedlecki, P., Goharзад, A., Tuerxuntuoheti, A., Reyes, P. G. M., Lin, J., et Drain, A. (2022). *Journal of Experimental Social Psychology*, 101; 6) Lab Maestro Pack & Go, by VPIxx Technologies (<https://vpixx.com/products/labmaestro-packngo/>).

Results.

Experiment 1

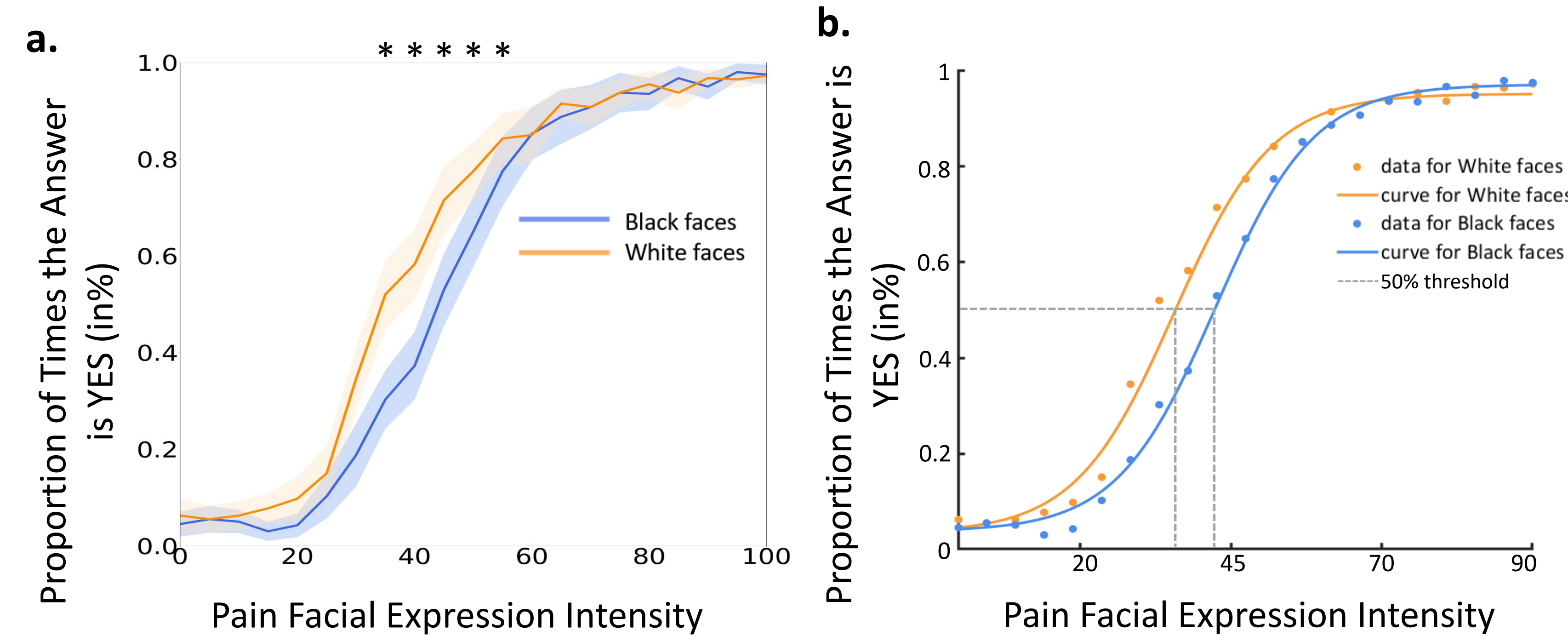


Figure 3 a) Proportion of pain detection across facial expression intensities. Detection of pain facial expression intensity of Black faces is depicted in blue and White faces in yellow. Shaded areas represent the 95% confidence intervals. b) Results of the curve fitting. * Intensity levels for which pain detection proportions were significantly different

Experiment 2

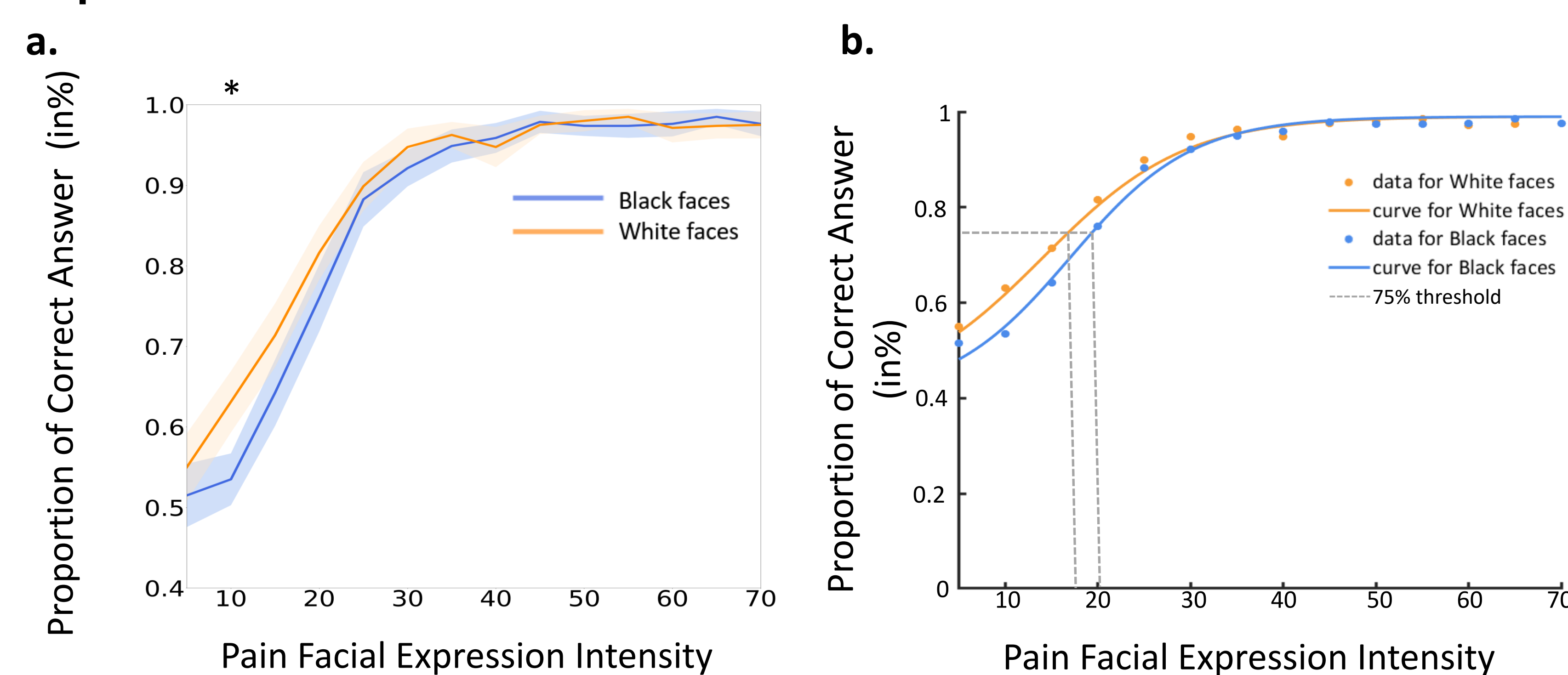


Figure 4 a) Proportion of pain detection across facial expression intensities. Detection of pain facial expression intensity of Black faces is depicted in blue and White faces in yellow. Shaded areas represent the 95% confidence intervals. b) Results of the curve fitting. * Intensity levels for which pain detection proportions were significantly different

Conclusion.

When controlling for decisional bias, effect of face ethnicity subsists, yet is constrained to a narrower range of pain intensities. Subsequent researches should simultaneously measure the respective contributions of sensitivity and decisional criteria in face ethnicity effect on pain detection.

Repeated measure ANOVA

- Effect of face ethnicity on participant's proportions of pain detection, $F(1, 49) = 58.50, p < .001, \eta^2p = .54$.
- Paired sample t test: Differences in proportion of detection for the intensities of pain ranging between 35% and 55%, $p < .001$.

Curve fitting

We used curve fitting analyses to find the threshold of each participant for detecting pain on Black and on White faces.

- A 10,000 iteration bootstrap analysis revealed a difference between thresholds for detecting pain facial expressions on White ($M = 38.30\%$, $SD = 1.50\%$) and on Black faces ($M = 44.60\%$, $SD = 1.55\%$), 95% CI $[-1.80, -1.00]$, $d = 4.13$.

Repeated measure ANOVA

- Effect of ethnicity on participant's proportions of pain detection, $F(1, 49) = 16.90, p < .001, \eta^2p = .26$.
- Paired sample t test: Differences in proportion of detection at a 10% pain intensity ($p < .001$).

Curve fitting

We used curve fitting analyses to find the threshold of each participant for detecting pain on Black and on White faces.

- A 10,000 iteration bootstrap analysis revealed a difference between thresholds for Whites faces ($M = 13.00\%$, $SD = .65\%$) and for Black faces ($M = 17.65\%$, $SD = .65\%$), 95% CI $[-1.43, -0.49]$, $d = 5.61$.