

# Refinement of face representations by exposure and delay reveals dynamic shifts in face processing biases

Nofar Alfandary

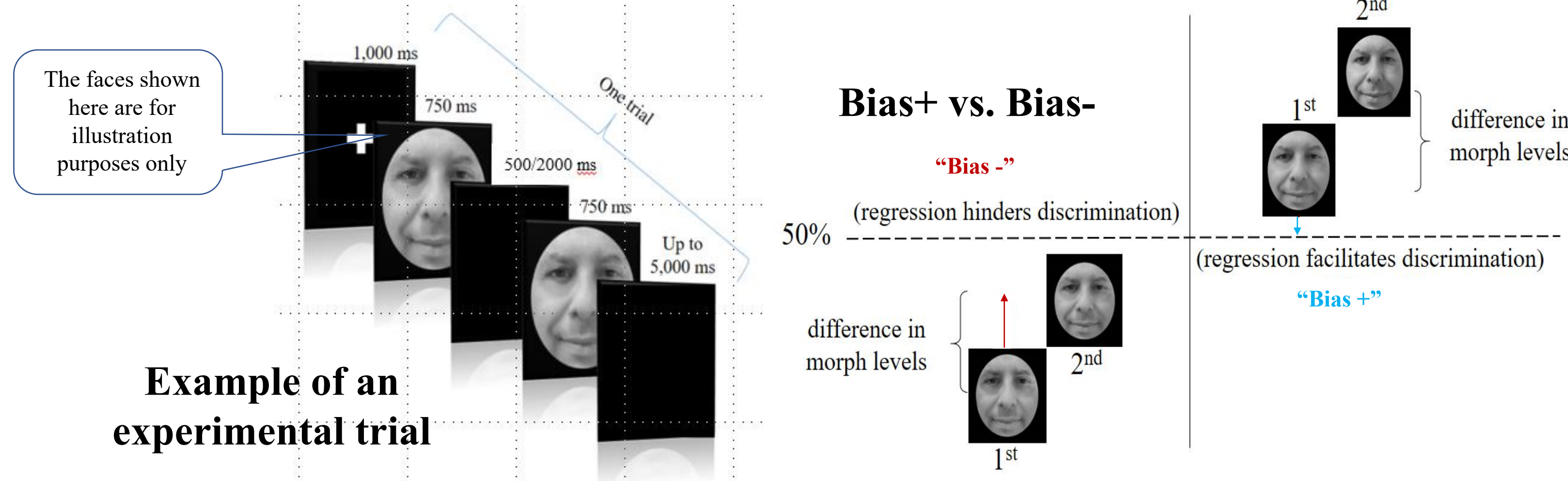
Instructors: Tal Lulav-Bash, Galia Avidan & Bat-Sheva Hadad

## introduction

- ❖ Perceptual representations are often subjected to significant biases optimizing outcomes by accounting for noise<sup>1</sup>. Biases such as gravitating magnitudes towards the mean of a range of values around which they are sampled (regression-to-the-mean - RTM), are shown to enhance perceptual resolutions.
- ❖ Experience modulates face discrimination abilities. Such modulations could be elicited by long term exposure (e.g., own-race advantage<sup>2</sup>) or short-term experiences<sup>1</sup>. RTM may underlie the experience-dependent modulation of face discrimination abilities<sup>3</sup>
- ❖ Introducing a delay between face stimuli is known to increase task difficulty<sup>4</sup>. **Will longer delay increase difficulty and lead to “nosier input” which would result in greater reliance on RTM? or alternatively will it impair the ability to form a stable average representation- thus reducing RTM?**

## Materials & Methods

- ❖ Participants' face processing abilities were tested online using the Cambridge Face Memory Test (CFMT), a valid and reliable measure of short-term memory for faces, and the Cambridge Car Memory Test (CCMT)<sup>5</sup>.
- ❖ Same/different task; two consecutive faces drawn from a sample of 100 morphed faces.
- ❖ Own race (Caucasian) vs. other race (Asian) faces.
- ❖ 500 ms delay trials vs. 2000 ms delay trials.
- ❖ Bias+ trials vs. Bias- different trials.



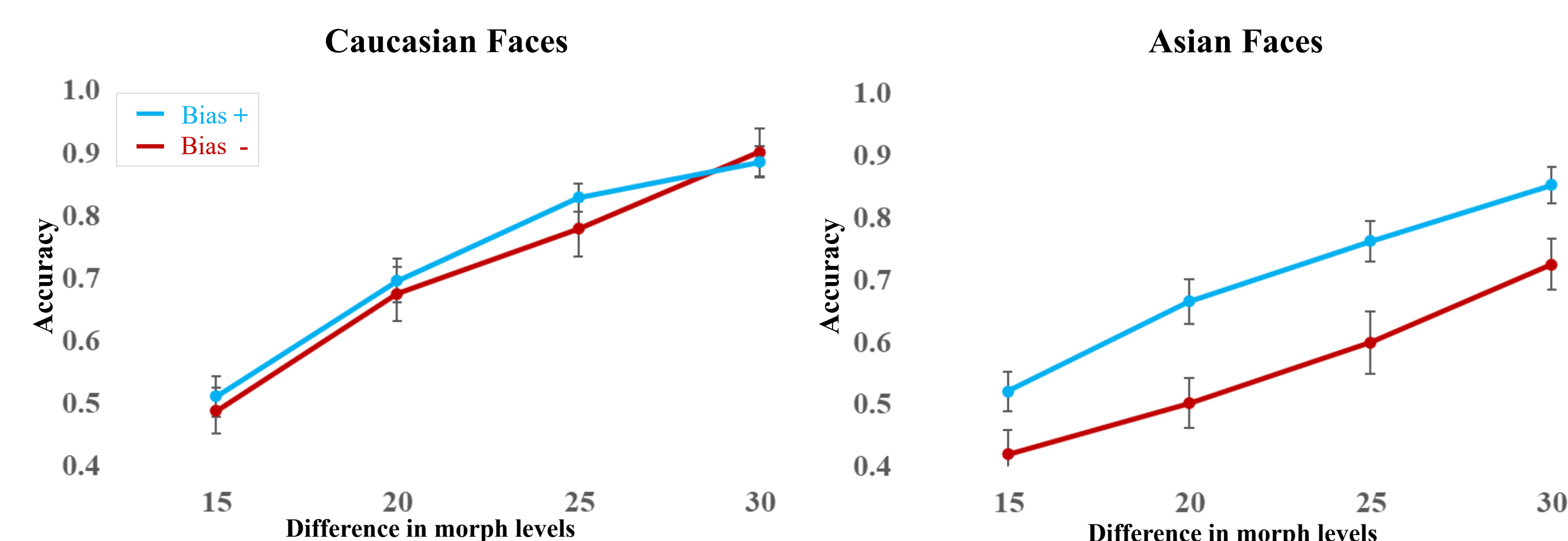
## Participants & Procedure

- ❖ Nineteen participants (19 to 25 y.o.), 2400 trials, four sessions.
- ❖ Each session began with a brief training phase that included feedback on response accuracy.
- ❖ Participants sat at a fixed distance from the screen using a chin rest and judged whether two sequentially presented faces were the same or different.
- ❖ Half “same” and half “different” trials (differing in 15%, 20%, 25% and 30% from each other).
- ❖ Faces were drawn from a Gaussian distribution.
- ❖ The stimuli were presented in blocks of 100 experimental trials, with the average face in each block being the “50”, i.e., 50% of parent A and 50% of parent B.

## Previous findings<sup>3</sup>

## Other race-effect

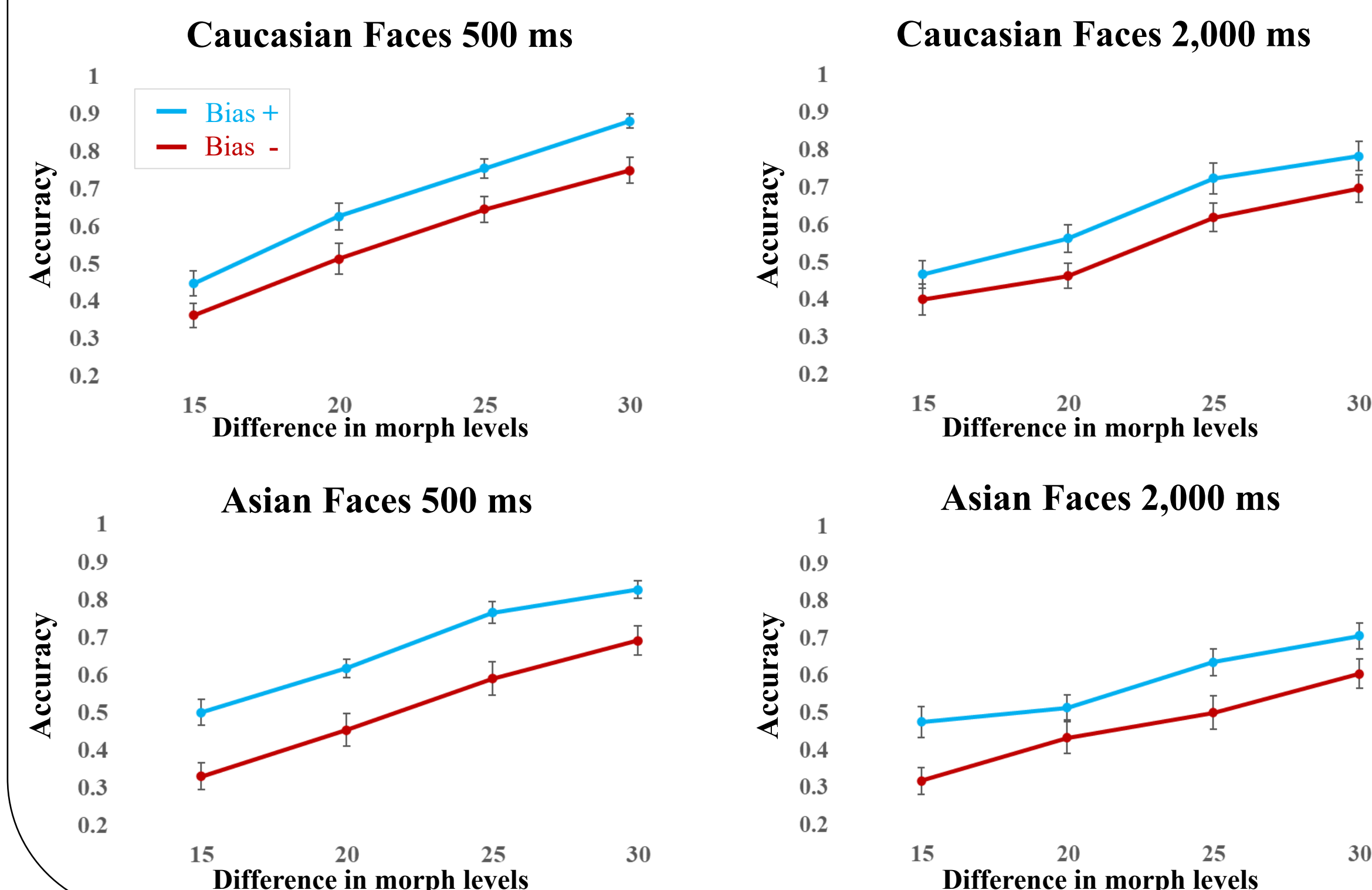
### Greater RTM for other-race faces



## Results

### Accuracy

#### Higher perceptual demands under delay lead to increased RTM



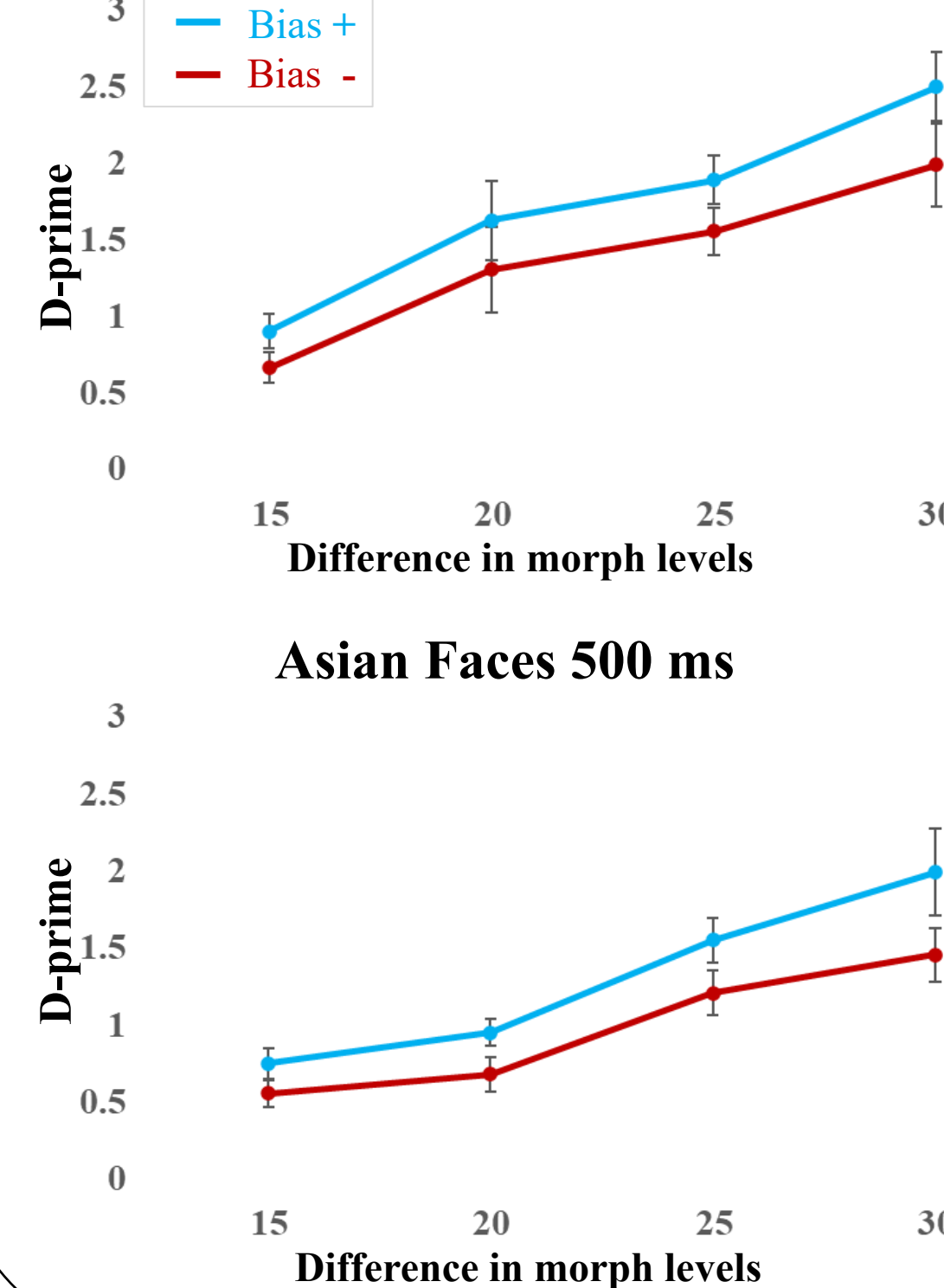
A significant interaction suggests stronger RTM for other race faces (Race X Regression X Range)  $F(3,57)=3.03$ ,  $p=.037$ ,  $\eta^2_p=.14$ , consistent with prior findings<sup>3</sup>.

Non-significant Delay X Regression interaction was found,  $F(1,18)=2.51$ ,  $p=.131$ ,  $\eta^2_p=.12$

✓ Significant main effect for race, regression, range and delay

### D-prime

#### Caucasian Faces 500 ms



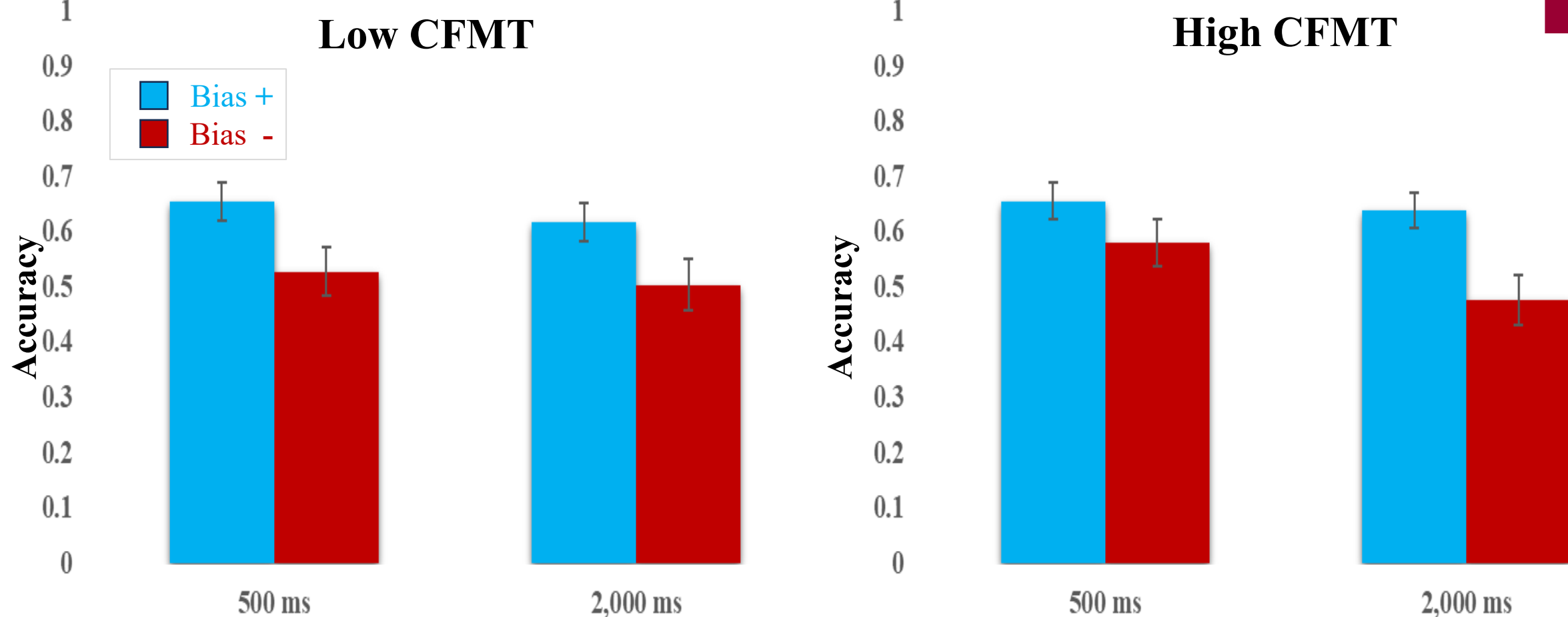
Non-significant trend Delay X Regression X Range interaction  $F(3,57)=2.65$ ,  $p=.058$ ,  $\eta^2_p=.13$ , supports greater reliance on RTM in longer delay.

A significant interaction between race, range and delay suggesting that delay increased task difficulty (Race X Range X Delay)  $F(3,57)=2.91$ ,  $p<.05$ ,  $\eta^2_p=.14$

✓ D-prime supported the findings by showing increased difficulty with delay as well as reliance on RTM

### CFMT

#### Division of subjects into high and low abilities



Non-significant trend interaction between delay and regression while the score of CFMT is considered (Delay X Regression X CFMT\_Group)  $F(1,18)=4.15$ ,  $p=.057$ ,  $\eta^2_p=.196$

A significant interaction Delay X Regression X Range  $F(3,54)=3.08$ ,  $p=.035$ ,  $\eta^2_p=.153$

## Conclusions

- ✓ The results reinforce the notion that face representations are biased by regression to the mean.
- ✓ Longer delay between face stimuli increased task difficulty and tended to amplify RTM in own-race faces, while the increase in difficulty may hinders the creation of the mean in other-race faces and therefore reduces the ability to use RTM.
- ✓ Weaker face processing abilities (low CFMT scores) was associated with increased reliance on regression to the mean in 500ms delay but not in 2000ms.

## References and Acknowledgment

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