# Strategies for improving own-and other-race face recognition with learning context and multiple image training

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## Goals

Improve own- and other-race face recognition accuracy using:

- image variability (Murphy et al., 2015)
- learning context (Roark, 2007)

## Background

Image variability

- multiple variable > repeated exposures (Murphy et al.,2015)

Learning context

- distributed learning > contiguous learning (Roark, 2007)

Other-Race Effect (ORE)

- greater recognition accuracy for own-race faces than other-race faces (Meissner & Brigham, 2001)
- previous paradigms with own- and other-race faces and variable images (Hayward et al., 2016; Laurence et al., 2016; Matthews & Mondloch, 2017)

## Hypotheses

Face recognition accuracy:

- own-race > other-race
- distributed learning > contiguous learning
- multiple image learning > single image learning

## Approach

old/new recognition paradigm

| *Experiment 1* | *Experiment 2* |
|---|---|
| Multiple image training<br>Learning context<br>• *distributed vs contiguous* | Single image training<br>Learning context<br>• *distributed vs contiguous* |

## Experiment 1: Learning Context - Multiple Images

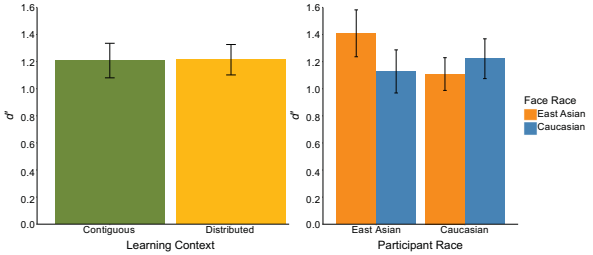
### Methods

**Training Phase:** 36 identities (18 East Asian/ 18 Caucasian)


**Testing Phase:** 72 identities (36 East Asian/ 36 Caucasian)


Participants: N =133, 59 East Asian, 85 Female

### Results

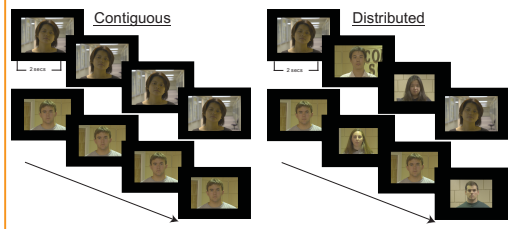



*Learning Context:* $F(1,129) = 0.14$, $MSE = 0.49$, $\mathbf{p = .71}$, $\eta_p^2 = .00001$

*ORE:* $F(1,129) = 9.74$, $MSE = 0.26$, $\mathbf{p = .002}$, $\eta_p^2 = .07$

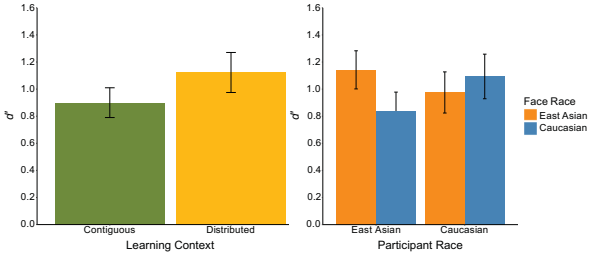
## Experiment 2: Learning Context - Single Images

**Training Phase:** 36 identities (18 East Asian/ 18 Caucasian)




Same Testing Phase

Participants: N =140, 65 East Asian, 110 Female




*Learning Context:* $F(1,136) = 5.63$, $MSE = 0.60$, $\mathbf{p = .019}$, $\eta_p^2 = .04$

*ORE:* $F(1,136) = 17.10$, $MSE = 0.18$, $\mathbf{p < .0001}$, $\eta_p^2 = .11$

## Cross-Experiment Analysis

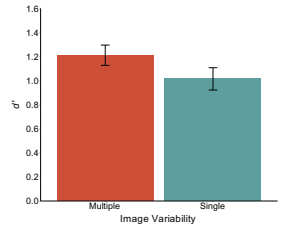



*Image Variability:* $F(1,265) = 10.71$, $MSE = 0.55$, $\mathbf{p = .001}$, $\eta_p^2 = .04$

## Conclusions

- Distributed learning is beneficial, but only when images are easily groupable by identity.
- Multiple image learning is beneficial for both own- and other-race faces.
- The other-race effect is **not eliminated** by multiple image training.

Limitations

- Effect of image variability derived from cross-experiment analysis.

Future Studies

- Can we help improve distributed, multiple image training by providing an identity cue (name)?

## References and Acknowledgement

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