HOW EXPOSURE TO DIVERSE FACES SHAPES THE COMPUTATIONAL MECHANISM OF FACE PERCEPTION

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INTRODUCTION

The Other-Race Effect (ORE) refers to the difficulty humans experience when recognizing faces from races less familiar to them. Prior research has linked the ORE to limited exposure to diverse faces (O'Toole et al.,1991; Walker et al., 2008). However, the precise nature of this relationship remains unclear. Here, we combine human behavioral data with deep convolutional neural networks (CNNs) to ask:

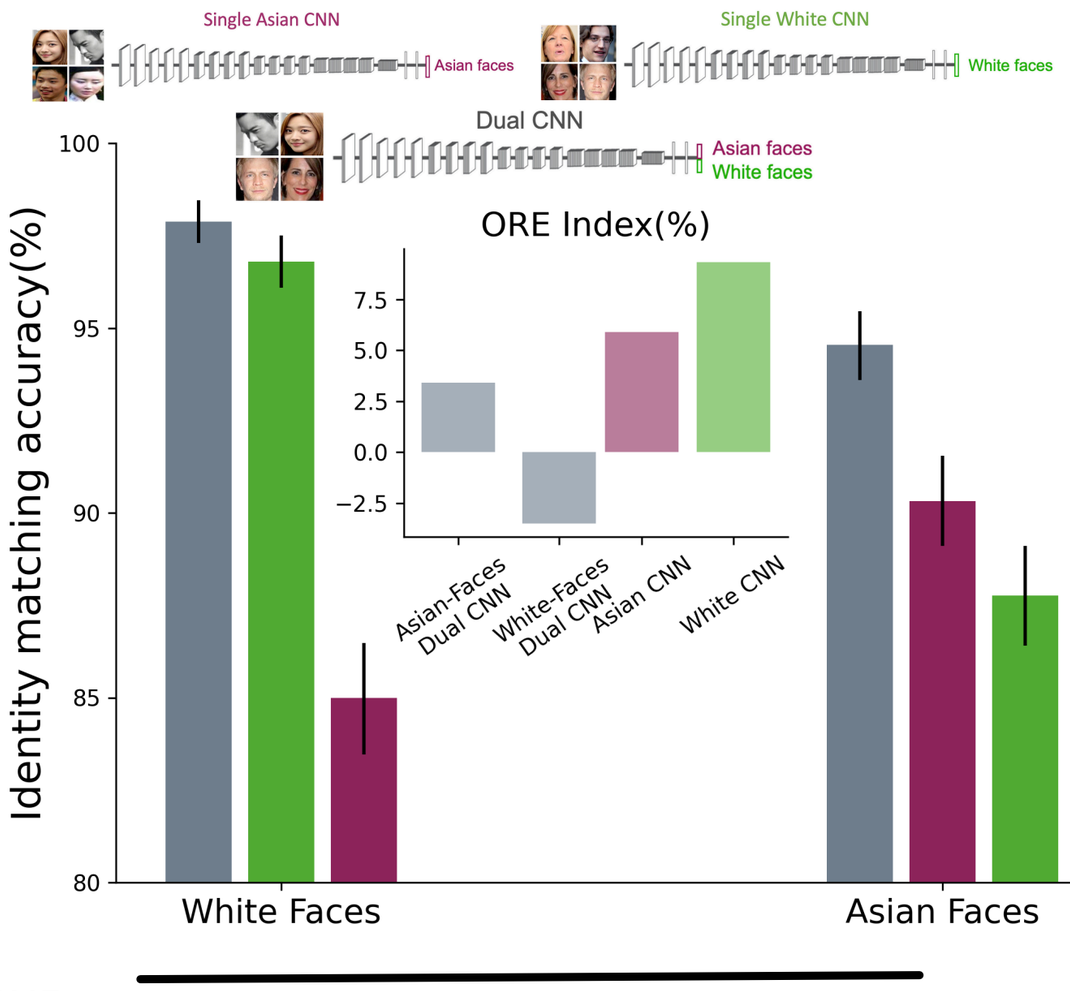
1. How does single- versus dual-race exposure affect the ORE in CNNs and their consistency with human face perception?
2. Does diverse exposure result in an integrated feature space or multiple race-specific feature spaces?
3. What are the computational advantages of diverse facial experience?

IMPORTANT!

While there are no distinct human races in terms of biology and genetics, the concept of "race" assigned to individuals does have an impact on psychological processes, including face memory and face perception (Stelter & Schweinberger, 2023). Thus, despite my likings, the term “race” will be used in this poster.

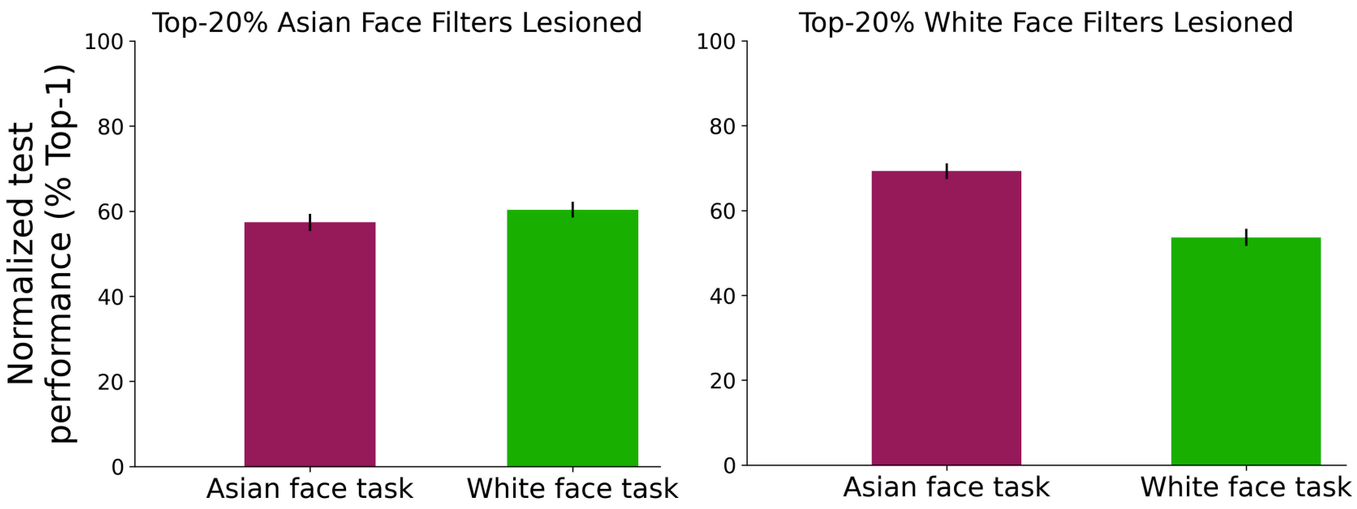
METHODS & RESULTS

Racial Biases in CNNs

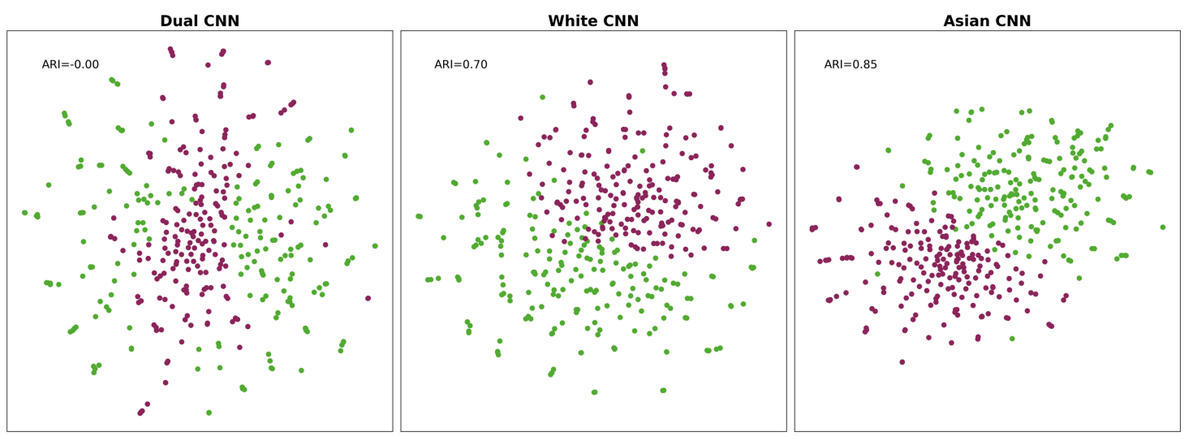


Properties of the Representational Feature Space

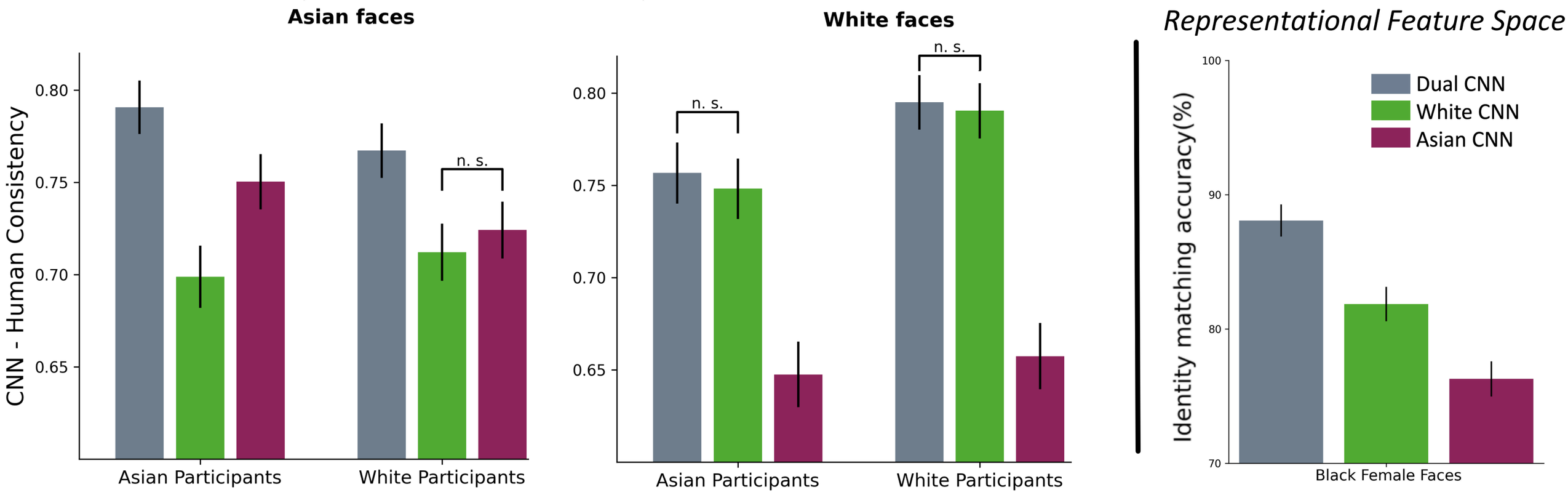
1. Lesioning



2. tSNE



Behavioral Consistency Between Human Participants and CNNs



Benefits of Integrated Representational Feature Space

CONCLUSION

- **Comparable Performance and Integrated Feature Space**: Matching the performance of single trained CNNs, "Dual network" does not merely combine the feature spaces of two separate single-race trained networks. Instead, it creates a new, integrated feature space where both Asian and white faces can be represented.
- **Enhanced Generalizability:** Dual network showed enhanced generalization when tested on faces of a new race.
- **Enhanced Alignment to Human Behavior:** Exposure to racially diverse faces not only reduces biases in CNNs but also enhances their generalizability and alignment with human perceptual behavior.

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