

# Investigation of Spatial Interference and Bias in the Visual Periphery in Autism

Riham Mostafa<sup>a</sup>, Zainab Naaran<sup>a,b</sup> & Amit Yashar<sup>a,b</sup>

<sup>a</sup> Department of Special Education, Faculty of Education, University of Haifa  
<sup>b</sup> The Edmond J. Safra Brain Research Center for the Study of Learning Disabilities, University of Haifa

Rihamomahir@gmail.com

## Introduction

- Autism involves differences in sensory and perceptual processing<sup>6,7</sup>.
- Visual periphery may be processed differently<sup>3,4</sup>.

### Crowding Effect

- Difficulty identifying peripheral objects due to nearby clutter<sup>1,2</sup>.
- Error types:
  - Substitution: flanker mistaken for target<sup>2</sup>.
  - Averaging: features blended<sup>2,3</sup>.
  - Inner-outer asymmetry: outer flankers disrupt more (non-autistic pattern)<sup>3,4</sup>.

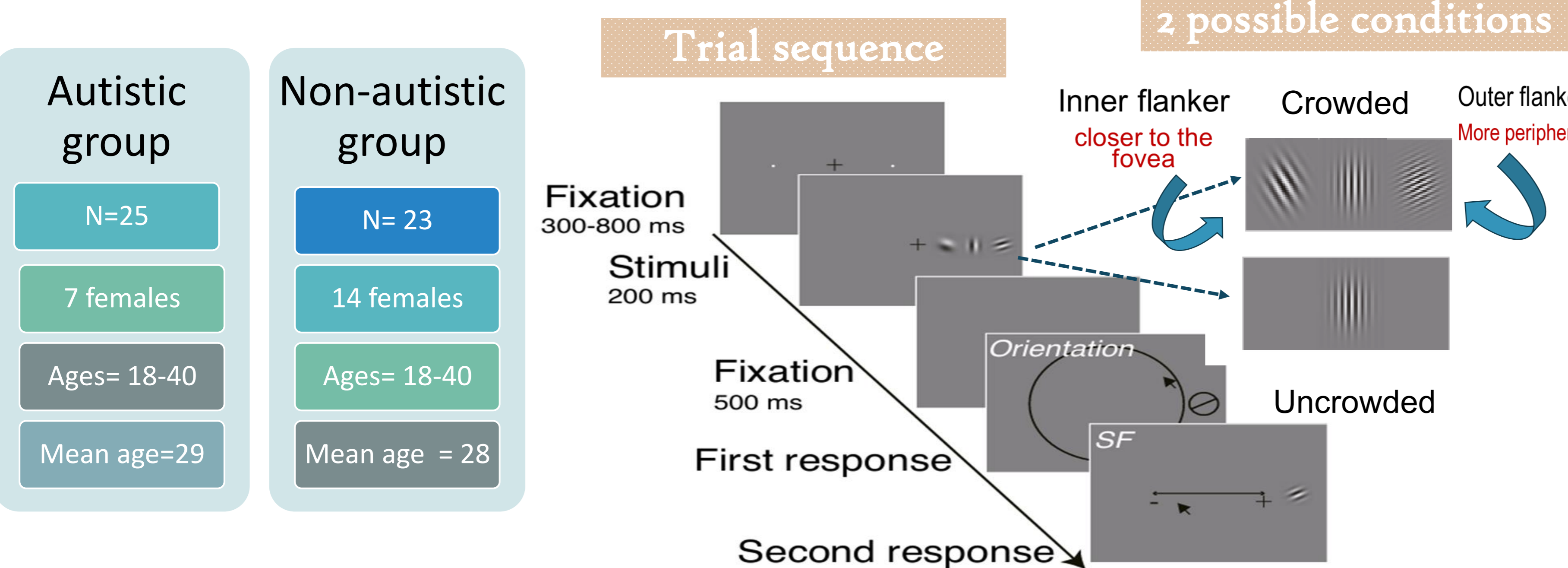
### Gap: Autism and crowding

- Previous studies measured accuracy, not specific error types or spatial biases<sup>5</sup>.

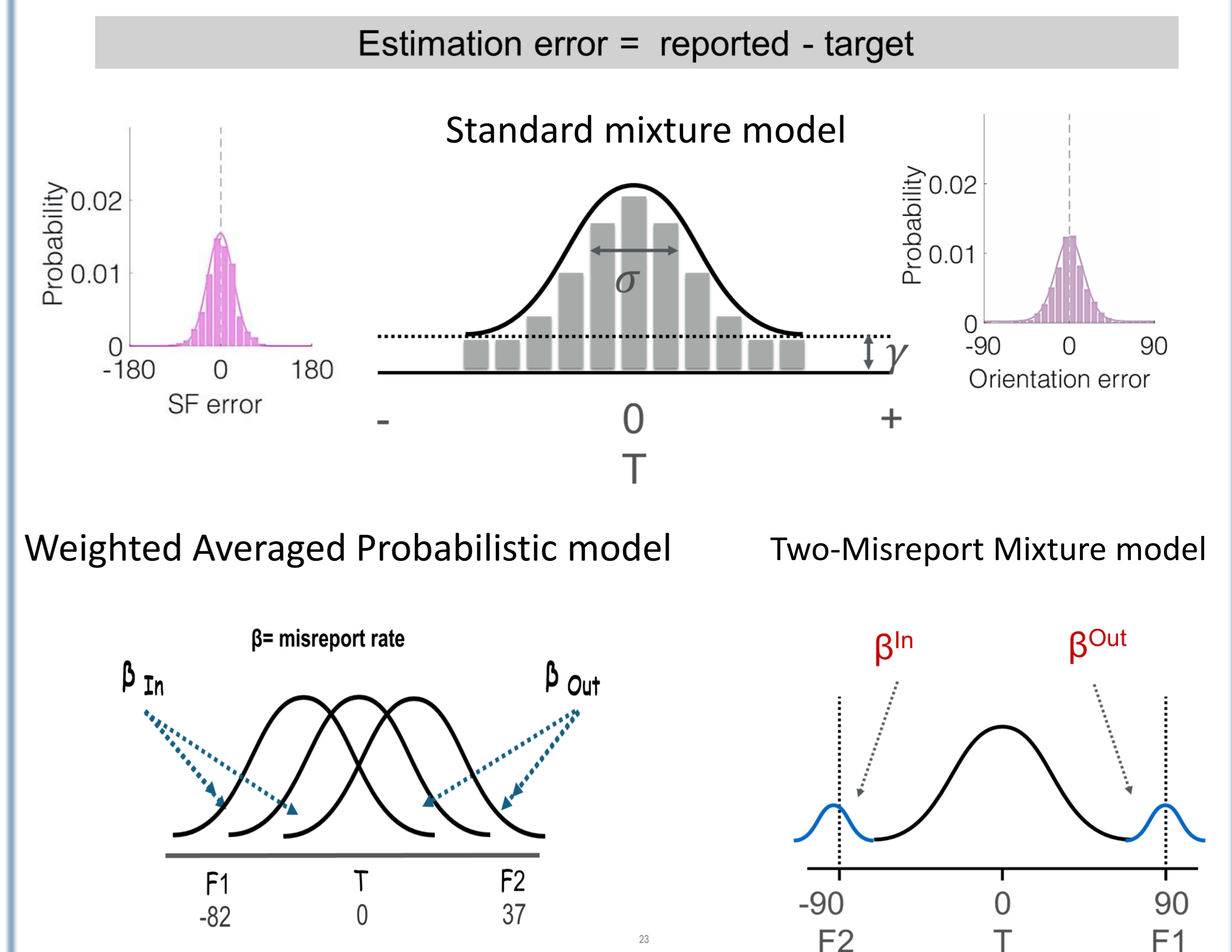
## Objectives

- Examine whether autistic individuals differ from non-autistic individuals in how they sample and process visual information under crowding.
- Analyze spatial biases and error types in orientation and spatial frequency tasks.
- Test whether responses reflect different sampling weights or model fits.

## Method



## Models

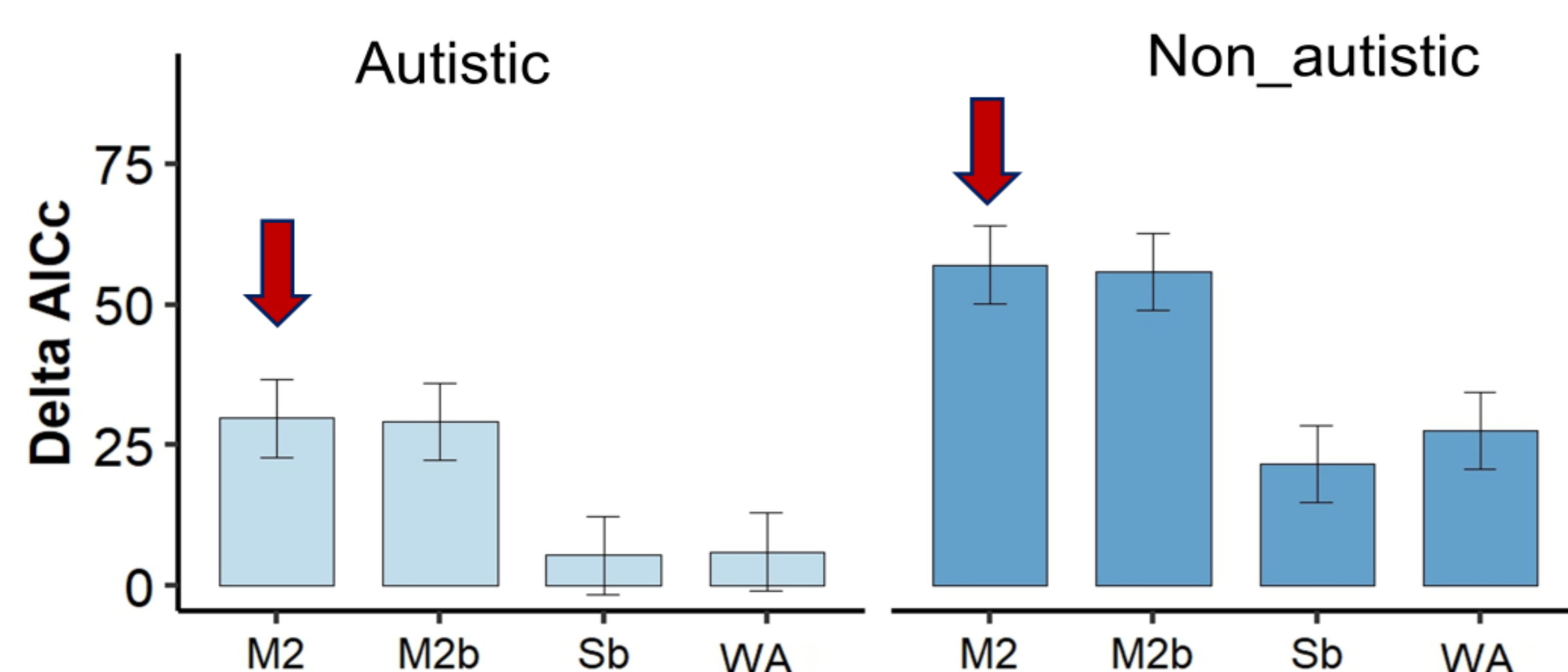


## Results

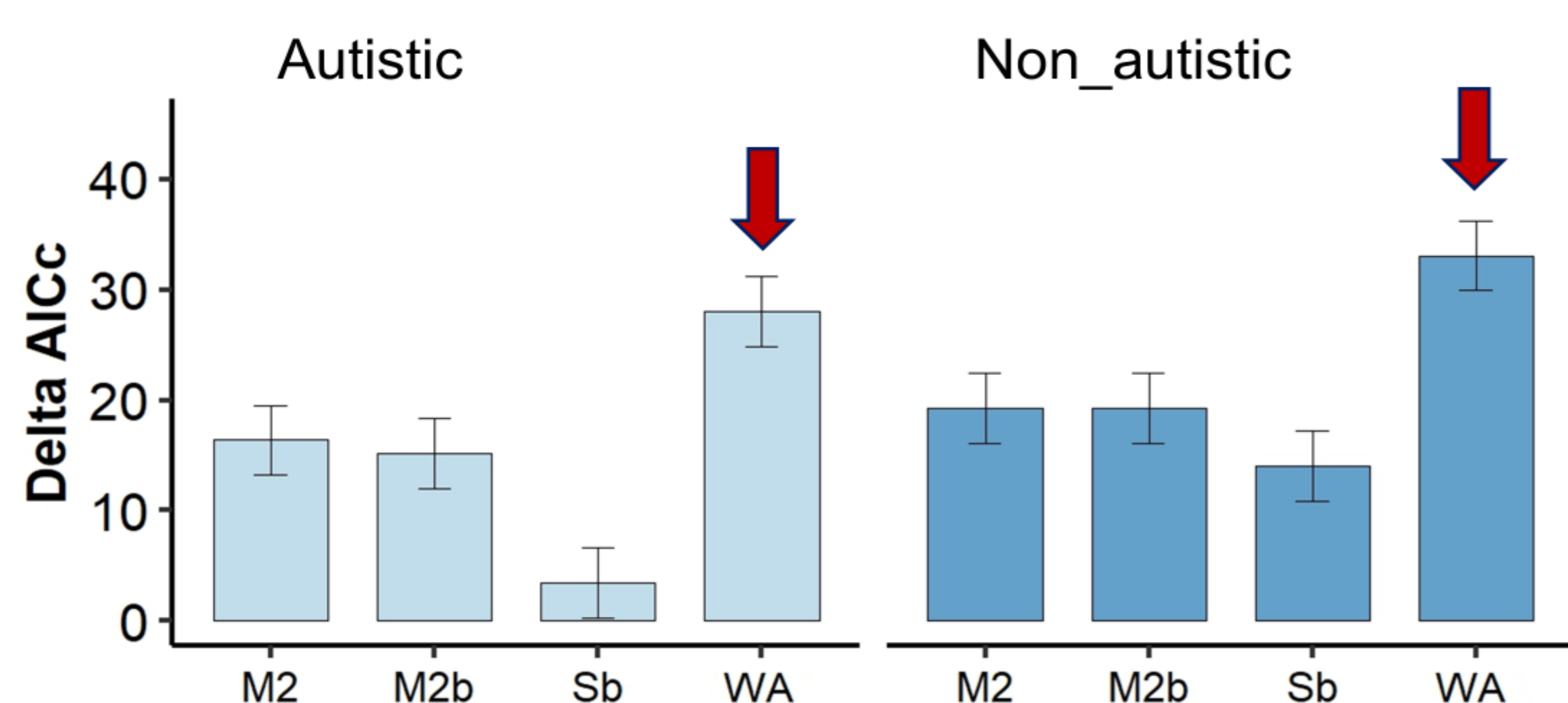
### Model comparison

$$\Delta AICc = AICc_{(Standard)} - AICc_{(model)}$$

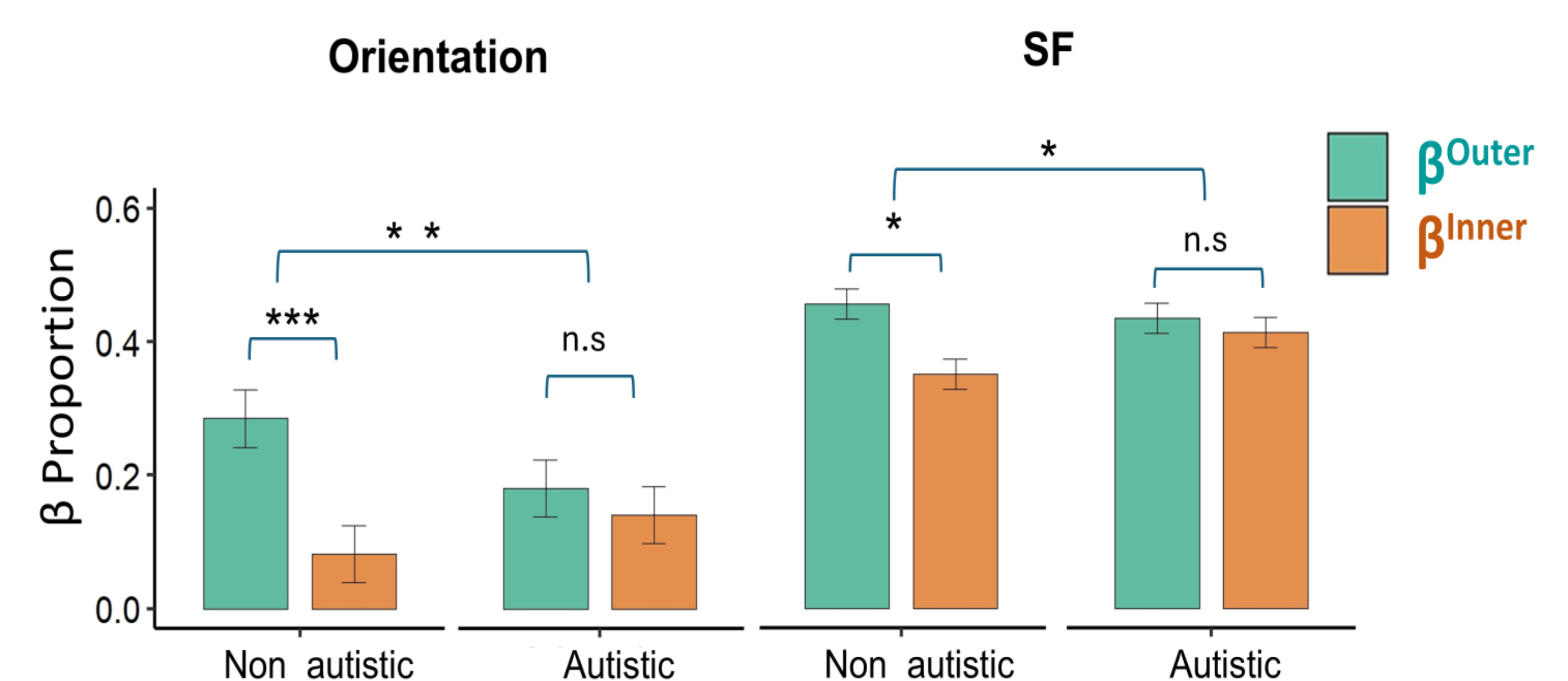
### Orientation



### SF



### Inner - Outer Asymmetry



## Conclusion

- Non-autism: stronger interference by peripheral flanker<sup>1,3,4</sup>
- Autism: more symmetrical sampling between central and peripheral flakers<sup>5</sup>
- Potential underlying processes:
- Speculation: Differences in How Receptive Field Size Scales with Eccentricity<sup>3,4,6</sup>
  - In autism, receptive field size may scale differently with distance from the center of vision, affecting how peripheral information is integrated<sup>6</sup>.

### References

- Whitney, D., & Levi, D. M. (2011). *Trends in Cognitive Sciences*.
- Yashar, A., et al., (2019). *Psychological Science*.
- Shechter, A., & Yashar, A. (2021). *Scientific Reports*.
- Yashar, A., & Carrasco, M. (2024). *Psychonomic Bulletin & Review*.
- Baldassi, S., Pei, F., Megna, N., et al. (2009). *Vision Research*.
- Robertson, C. E., & Baron-Cohen, S. (2017). *Nature Reviews Neuroscience*.
- Freeman & Simoncelli, (2012). *Nature Neuroscience*.

