



# Sensitivity to Speech Distributional Information in Children with Autism: A MEG Study

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## Introduction

- The majority of individuals with ASD exhibit delay in language acquisition (Tager-Flusberg, 2006; Dawson et al., 2002)
- 25 – 30% of children with ASD fail to acquire language.
- Typical language learning requires sophisticated ability to capture the distributional information embedded in speech (Saffran et al., 1996; Newport & Aslin, 2004).
- Children with ASD: P(A|B)?
  - Impaired sequence learning (Gordon & Stark, 2007; Gidley-Larson & Mostofsky, 2008)
  - Reduced neural sensitivity to probabilistic cues (Scott-Van Zeeland et al., 2010; Jeste et al., 2014)

**Are children with ASD insensitive to information about frequency of occurrence (i.e., P(A)) in the first place? If so, how specific is such deficit?**

## Participants

	ASD	Typically Developing (TD)
Number	10	10
Age	10.9 (3.63)	9.8 (2.30)
IQ <sup>1</sup>	103.7 (17.06) *	121.8 (16.96)
Autism Severity <sup>2</sup>	7.0 (3.16) ***	1.13 (0.35)
Spoken Language <sup>3</sup>	88.5 (15.13) **	111.3 (7.39)
Written Language <sup>4</sup>	97.8 (12.31) ***	123.1 (9.54)
Phonological Awareness <sup>5</sup>	8.9 (3.38) **	12.9 (2.01)

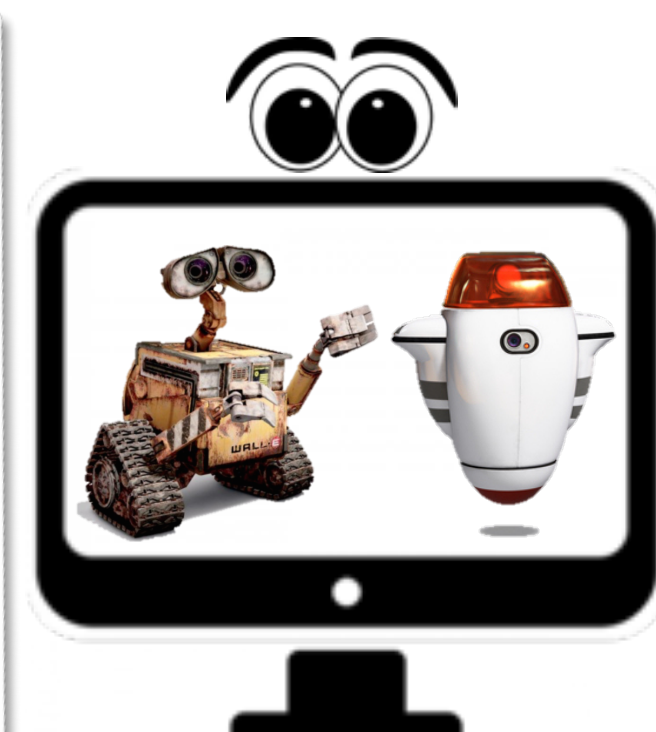
Standard deviation in parentheses.

Statistical significance compared with TD: \*\* P < 0.01; \*\*\* P < 0.001.

- Standard KBIT Non-verbal IQ
- Calibrated Severity Score (1-10) of ADOS (Gotham et al., 2009; Hus & Lord, 2014)
- Average of the standard score of TROG-2 and the core language score of CELF-4
- Average of the Z-normed standard scores of 4 word reading tests from TOWRE and WRMT and 1 sentence reading test from WJIII
- Standard score of CTOPP - Elision

## MEG Recording

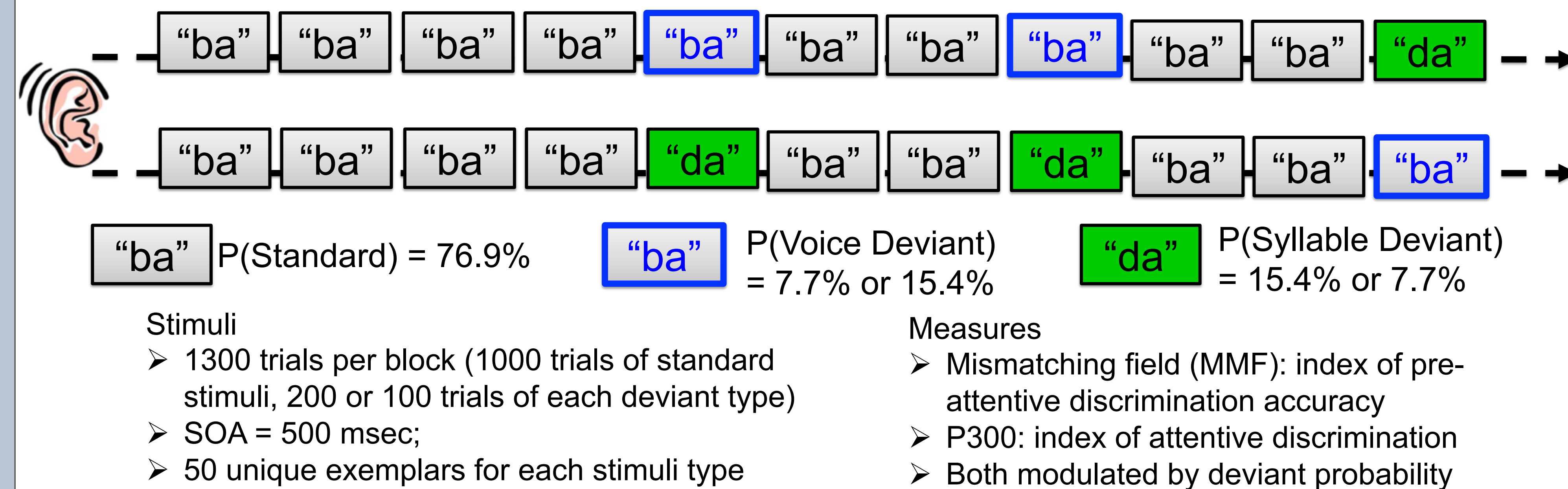
306 channels (204 planar gradiometers and 102 magnetometers, Elekta Neuromag TRIUX, Elekta, Stockholm)  
Task: Find These Robots!



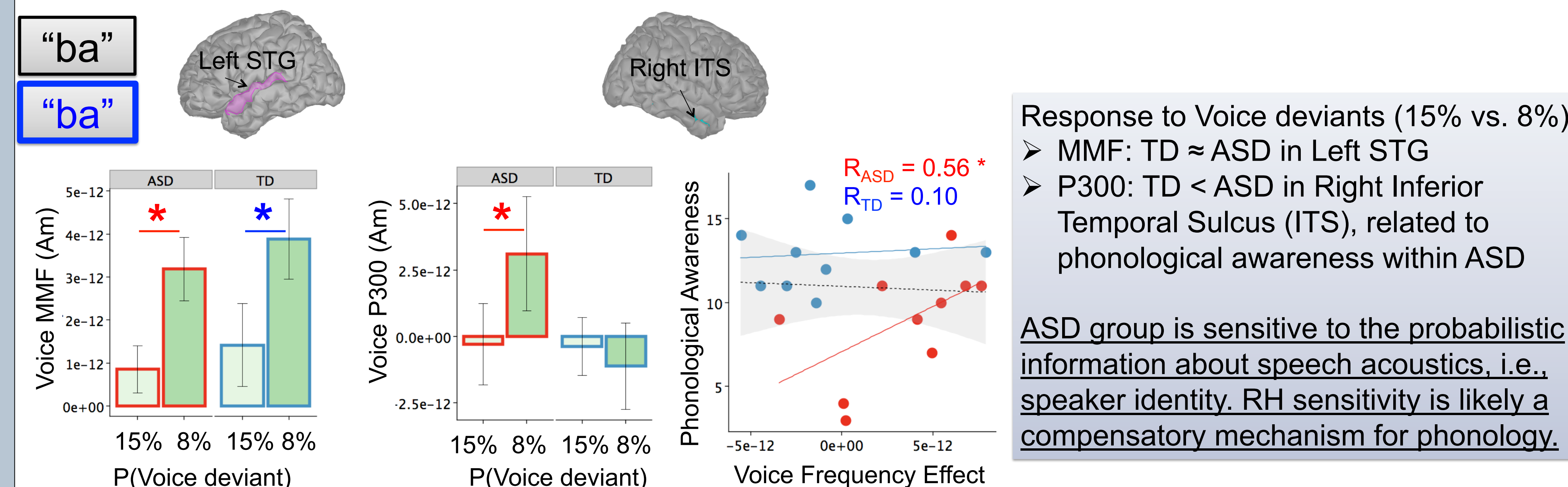
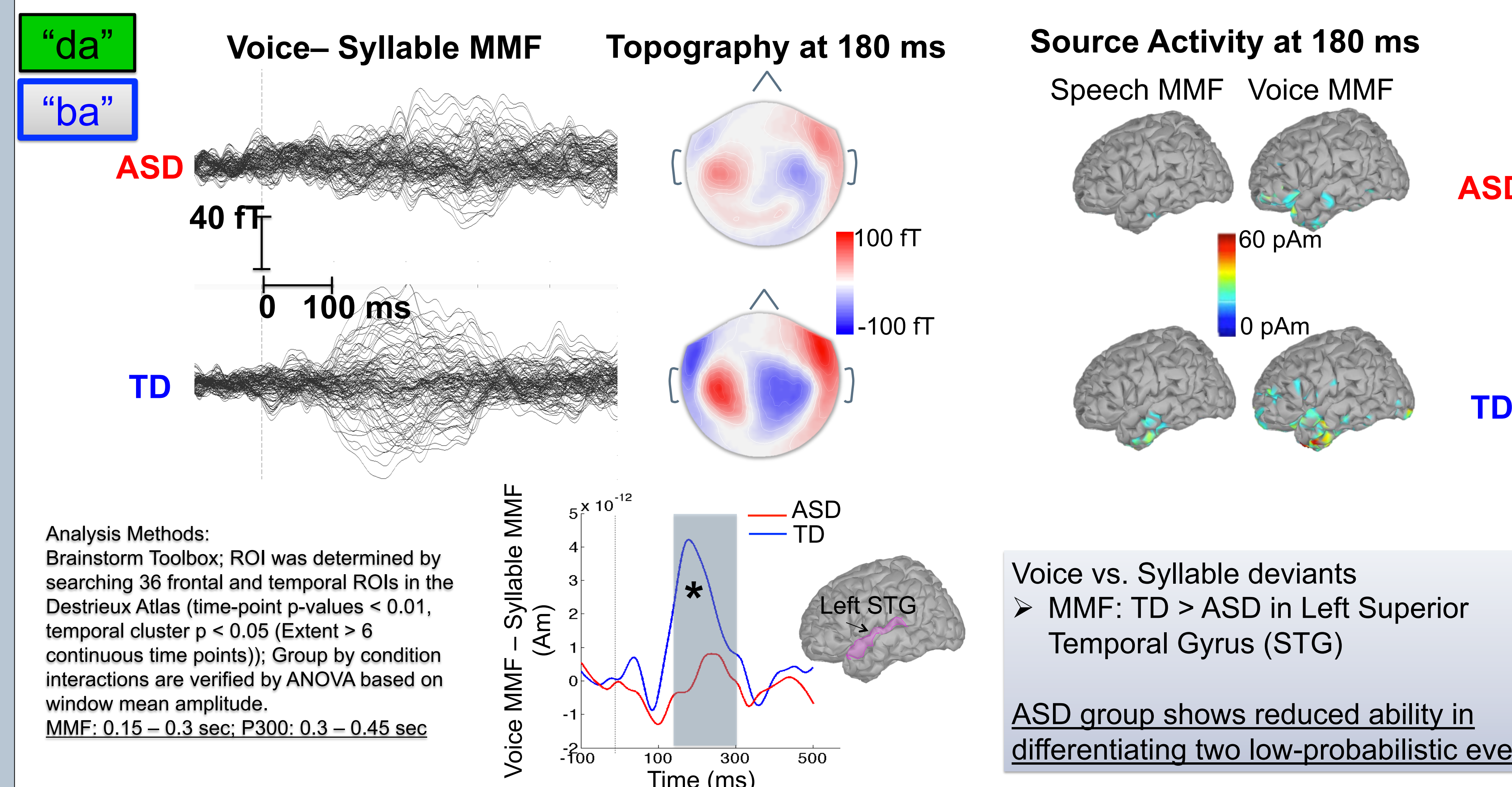
Number of targets detected during 20 minutes of movie:

ASD: 72; TD: 98  
No group difference

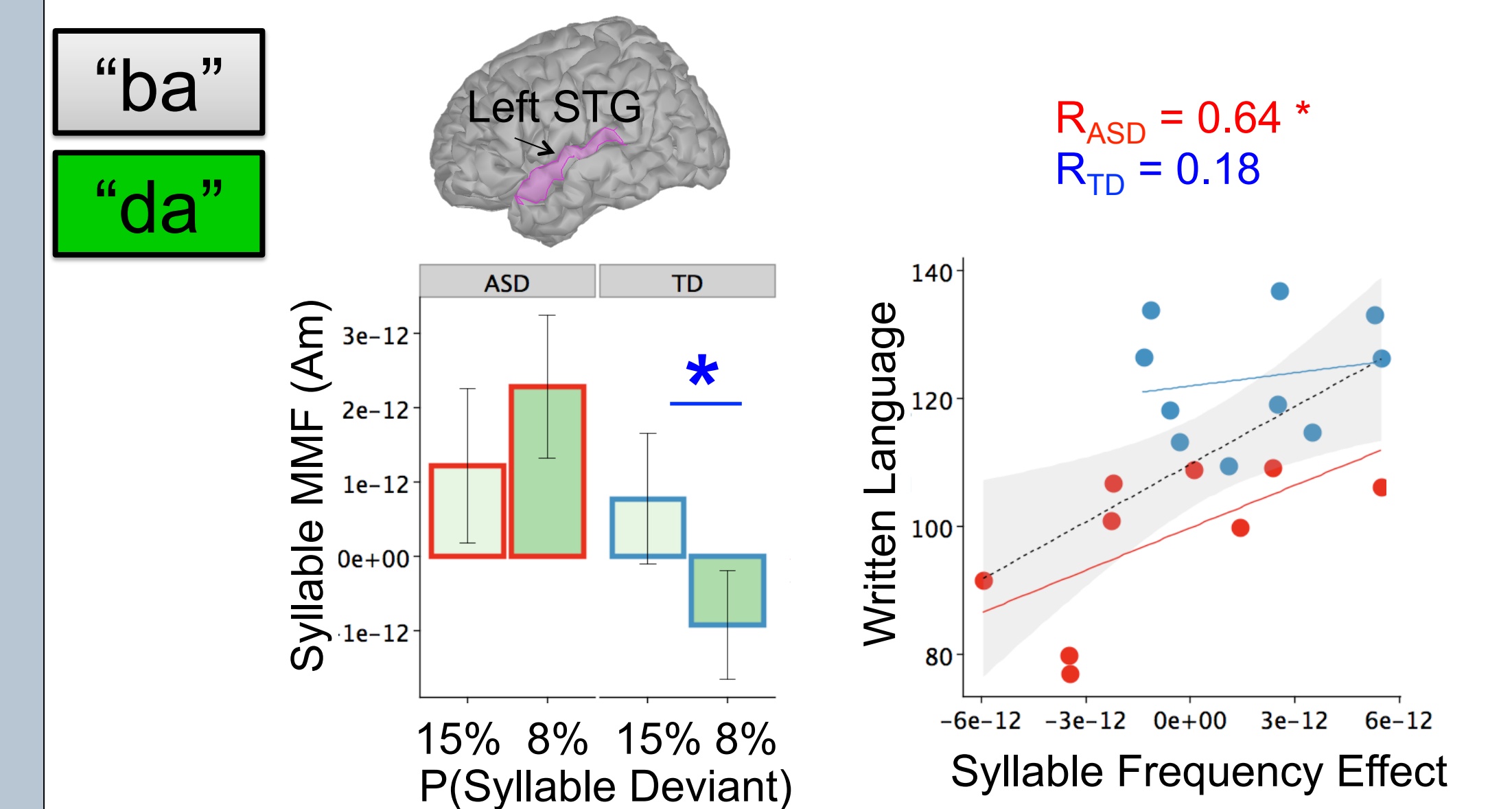
## Study Design



## Results

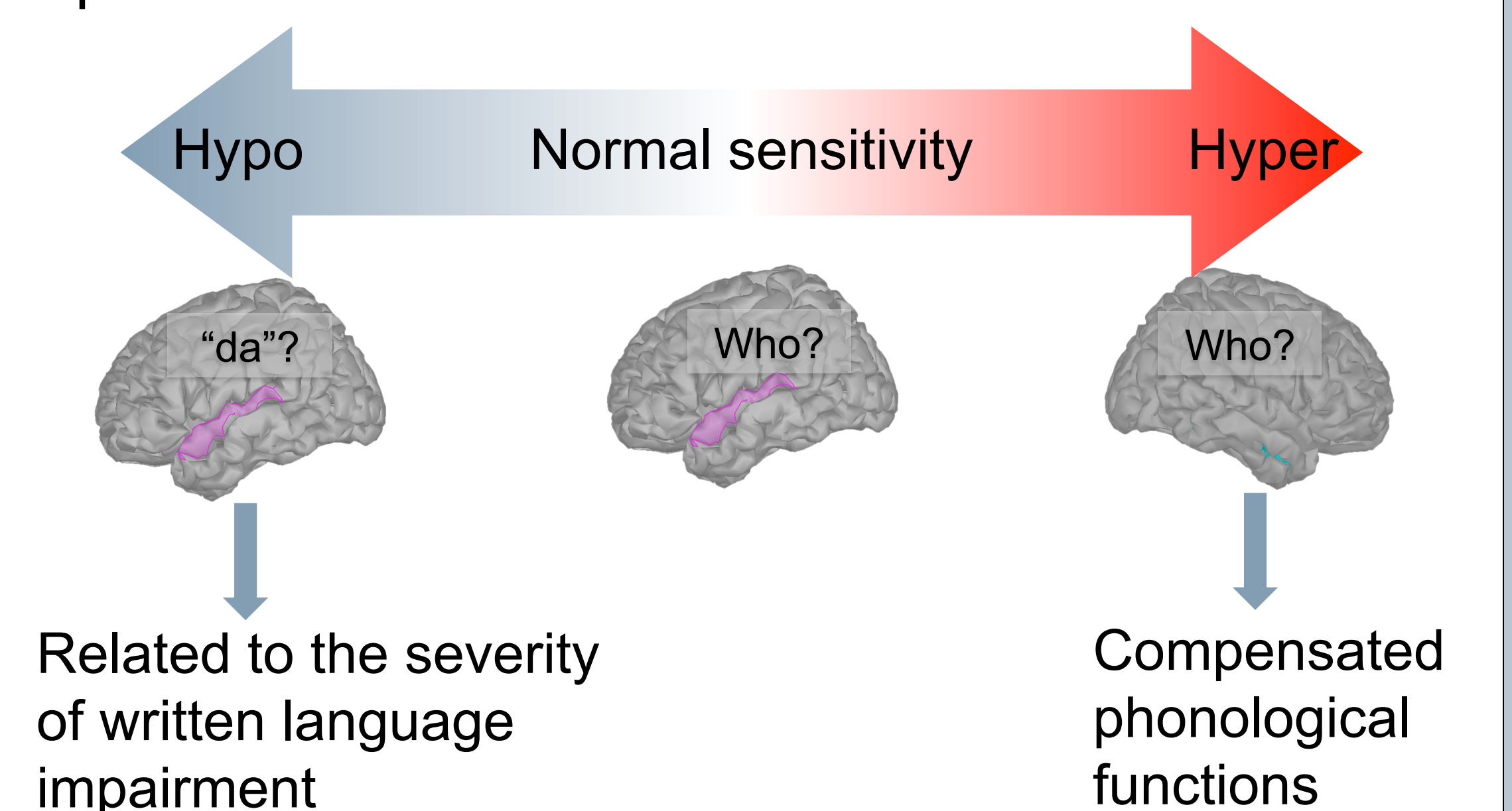


## Results



## Conclusion

- High-functioning school-age children with ASD are not generally indifferent to speech.
- However, they show specific strengths and deficits in their sensitivity to probabilistic information in speech.



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