

Multitalker speech perception in neurodiverse populations

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BACKGROUND

- Neurodiverse populations often report challenges listening in complex acoustic environments, despite clinically normal hearing levels [1-3].

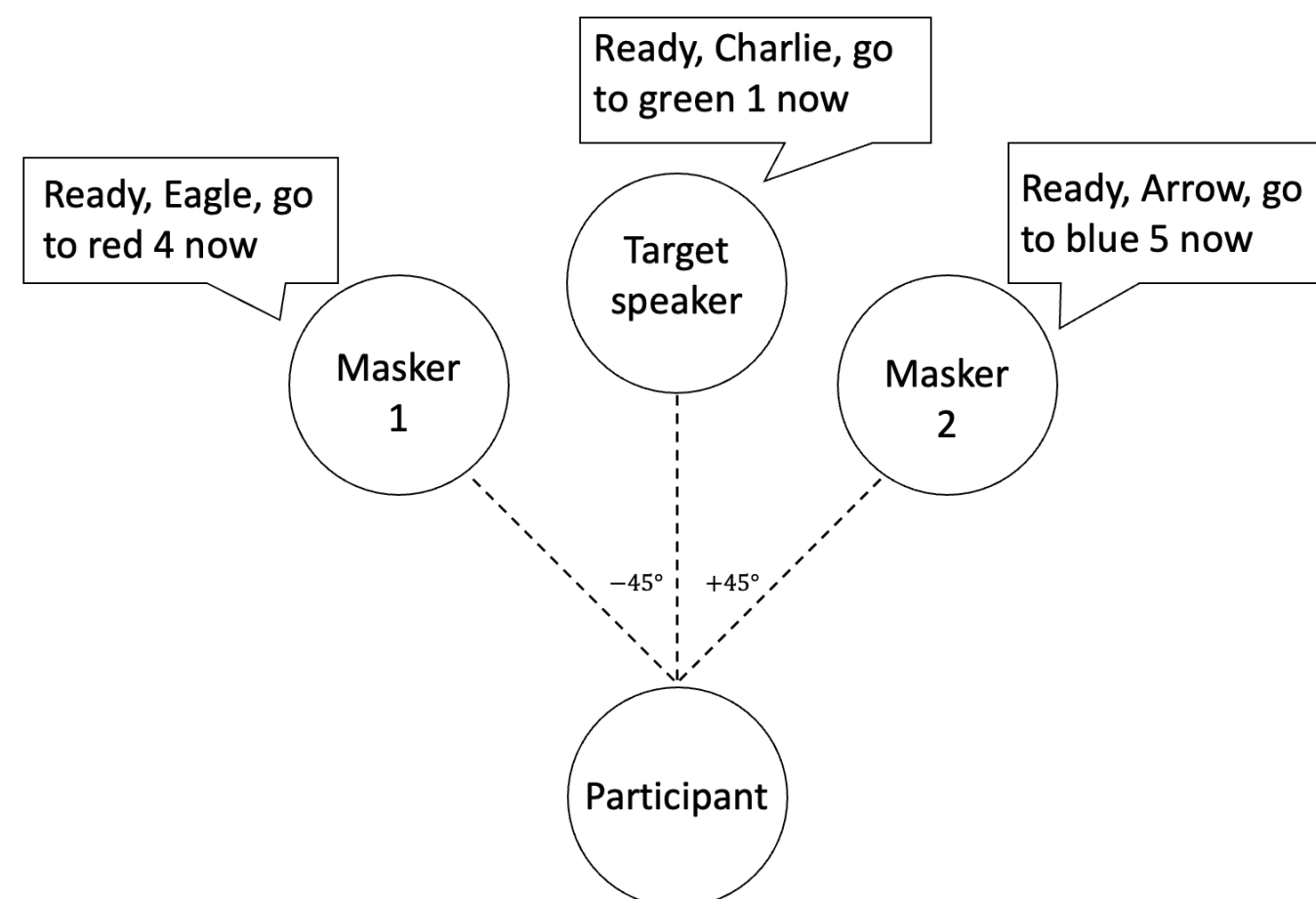
RESEARCH QUESTION: Can normal hearing adolescents and adults with autism spectrum disorder and fetal alcohol syndrome disorder use spatial cues to selectively attend to one of three simultaneous sentences?

PARTICIPANTS

- 49 participants (n=12 ASD; n=10 FASD; n=27 neurotypical age and sex-matched Comparison.)
- All subjects passed an audiometric screen (≤ 20 dB hearing level at octave frequencies between 250-8000 Hz) and otoacoustic emission screen for inclusion in the study.
- Mean Age (years):** ASD 21.7; FASD 20.4; Comparison 23.1.
- Mean WASI-II FSIQ:** ASD 100.5; FASD 97.0; Comparison 119.9.

TASK

- Goal:** listen for the person who says “Charlie” and report back the associated color and number.



- Participants listened to 3 simultaneous talkers: the target talker and two competing talkers (maskers).
- All speakers said a sentence from the Coordinate Response Measure Corpus [4].
- Speech perception thresholds, in terms of target-to-masker ratios (TMRs), were estimated using a one-up-one-down procedure to estimate 50% correct.

RESULTS

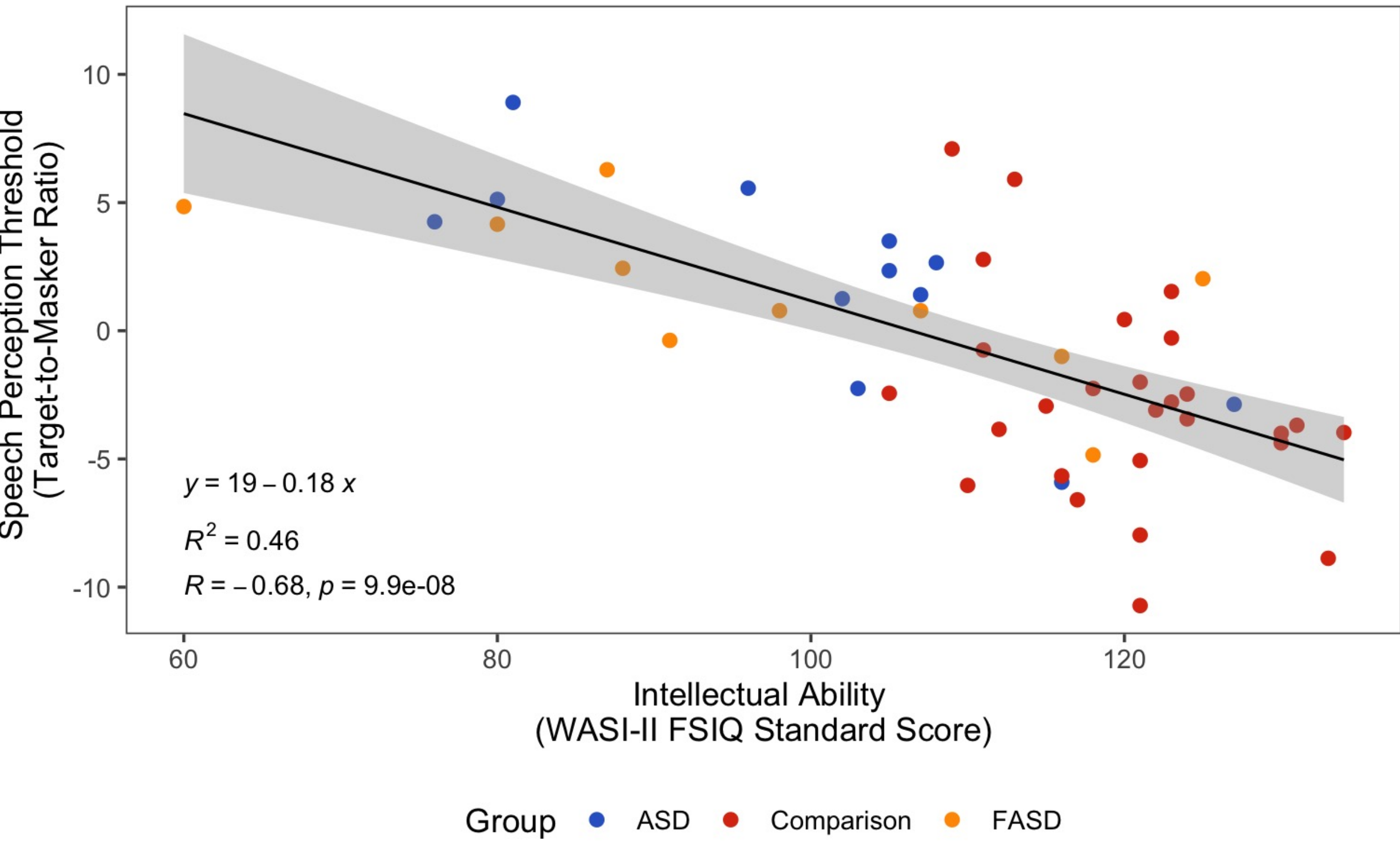


Fig 1. Speech perception thresholds as a function of intellectual ability. WASI-II FSIQ Standard Score was significantly correlated with TMR in the overall sample. The higher the IQ, the better the task performance.

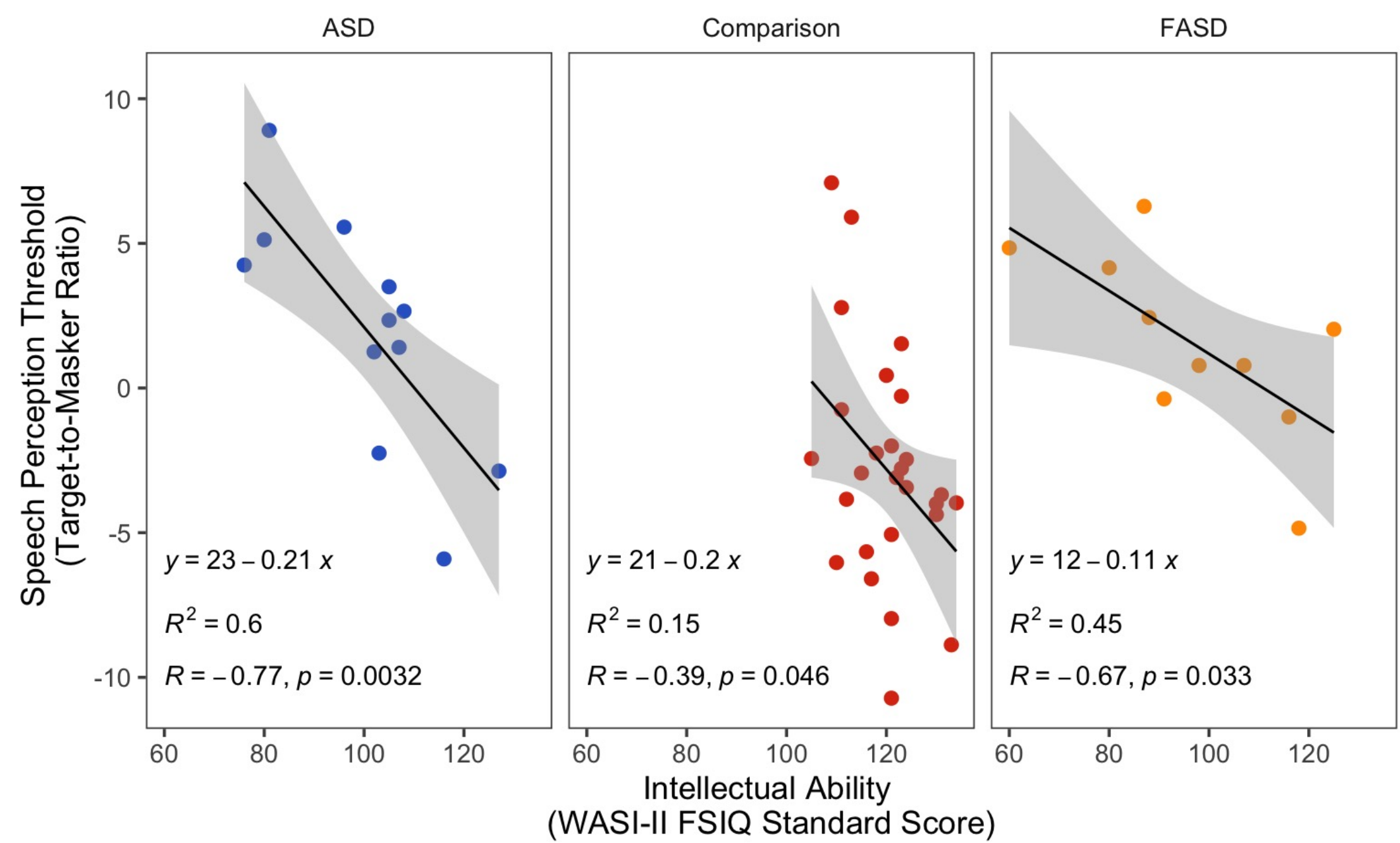


Fig 2. Speech perception thresholds as a function of intellectual ability by participant group. Individual data points show with solid dots. WASI-II FSIQ Standard Score was significantly correlated with TMR in all three groups.

RESULTS CONTINUED

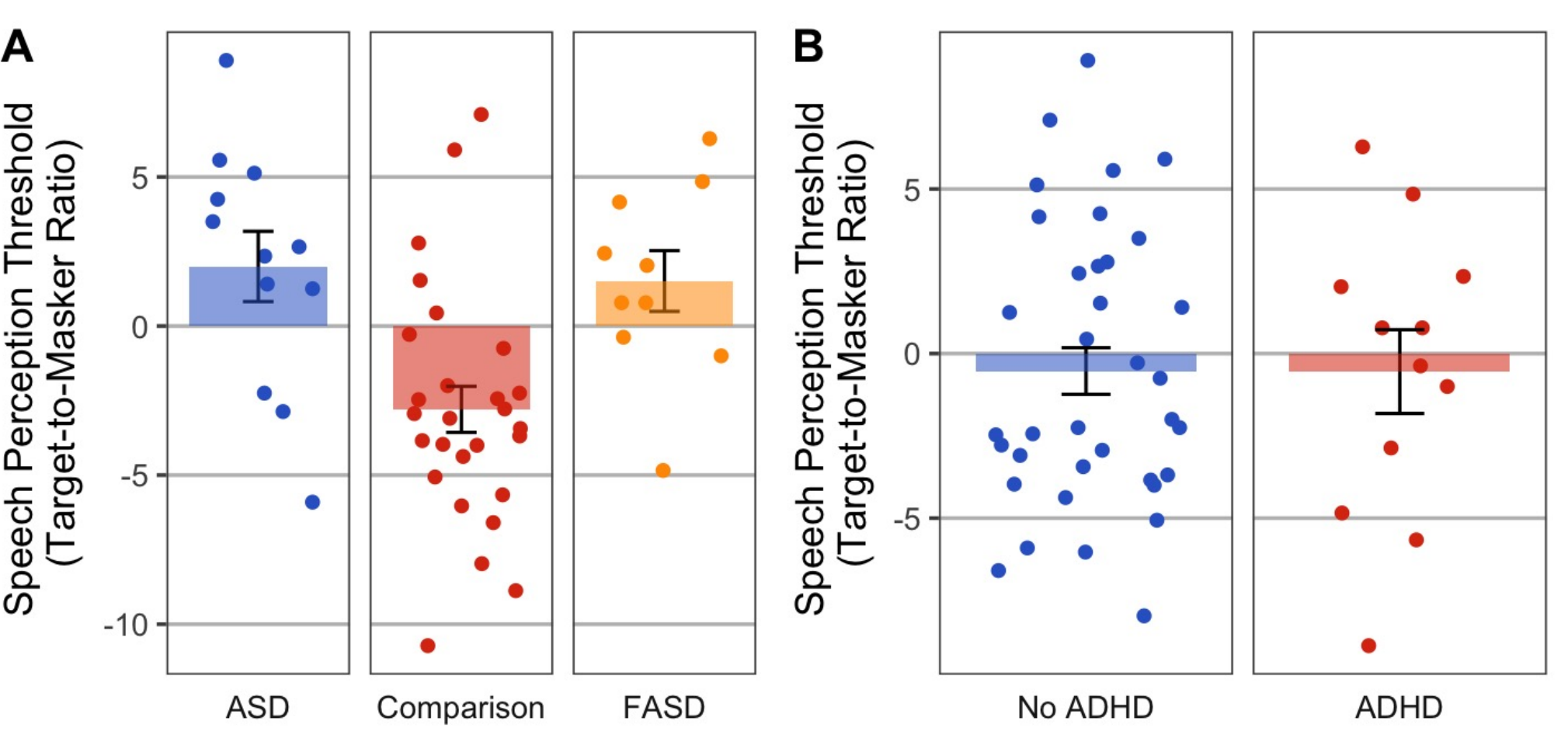


Fig 3. A) Speech perception thresholds by participant group. Higher speech perception thresholds observed in ASD and FASD groups. **B) Speech perception thresholds as a function of ADHD status.** No difference in thresholds observed between individuals with and without a clinical diagnosis of ADHD.

CONCLUSIONS & DISCUSSION

- We observed a highly significant association between intellectual ability and speech perception thresholds.
- On average, participants in the ASD and FASD groups required the target speaker to be louder than the two competing talkers, as reflected by overall positive speech perception thresholds.
- Results suggest cognition plays an integral role in listening in complex environments and that deficits in intellectual ability may heighten difficulties listening in noisy conditions.

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