

Background

- Autism Spectrum Disorder (ASD) is a neurological disorder that causes developmental delays and difficulties in communication.
- Previous research suggests that children with mothers who completed college are more verbal and show stronger communication skills in comparison to children with mothers that have not completed college (Olson et al., 2021). This could potentially be due to an increased awareness of the importance of communicative skills among mothers who have a higher education.
- Our aim is to look at parental education and household structure and their relation to child language skills to investigate the impact of socioeconomic factors (SES) on language development.
- Hypothesis:
 - We hypothesize children with parents of higher education will have stronger language skills than children with parents of lower educational levels.
 - We also expect to see children in multi-member households to have better language outcomes.

Methods

Participants included 275 children, ages 8-17 years with and without ASD from the NIH funded ACE GENDAAR Study. ASD diagnosis was confirmed via standardized assessments such as, ADOS-2 and ADI-R and all participants included had a verbal IQ > 70.

CELF-4

Participants completed the Clinical Evaluation of Language Fundamentals (CELF-4) measure that focused on language skills in areas including formulated sentence (fs) among others.

- Formulated sentences focuses on ability to formulate sentences about visual stimuli using targeted word or phrase.

ACE Demographic Questionnaire

Parents completed the ACE Demographic questionnaire and answered questions about parental education, and household structure among other demographic factors. Parent education was coded as maternal and paternal education and into the following categories:

- (0) High school or Less,
- (1) Some college,
- (2) Associates Degree,
- (3) Bachelor's Degree,
- (4) Graduate Degree

Number in household was categorized as number of individuals other than the youth:

- (0) 1 person,
- (1) 2-3 people,
- (2) 4-5 people,
- (3) 6-7 people,
- (4) 8-9 people

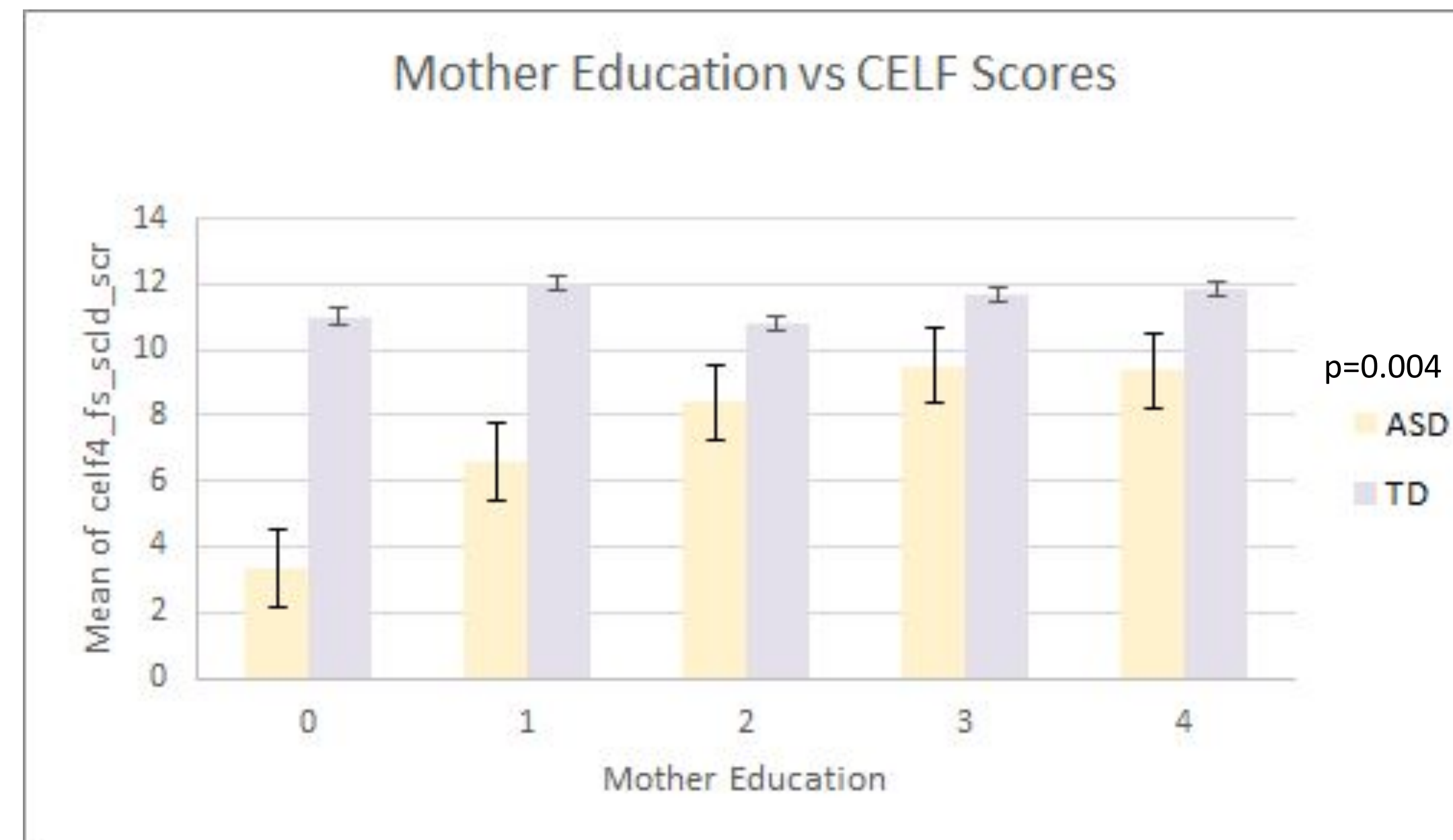
Demographics Table: Average CELF scores and age for the sample

| Cohort | N | Average CELF (fs) Scores | Average Age (months) |
|--------|-----|--------------------------|----------------------|
| ASD | 140 | 8.82 | 147.93 |
| | | SD: 3.631 | SD: 34.124 |
| TD | 135 | 11.53 | 156.33 |
| | | SD: 2.372 | SD: 35.668 |

Results

Aim 1: Measuring Maternal Education with CELF Scores

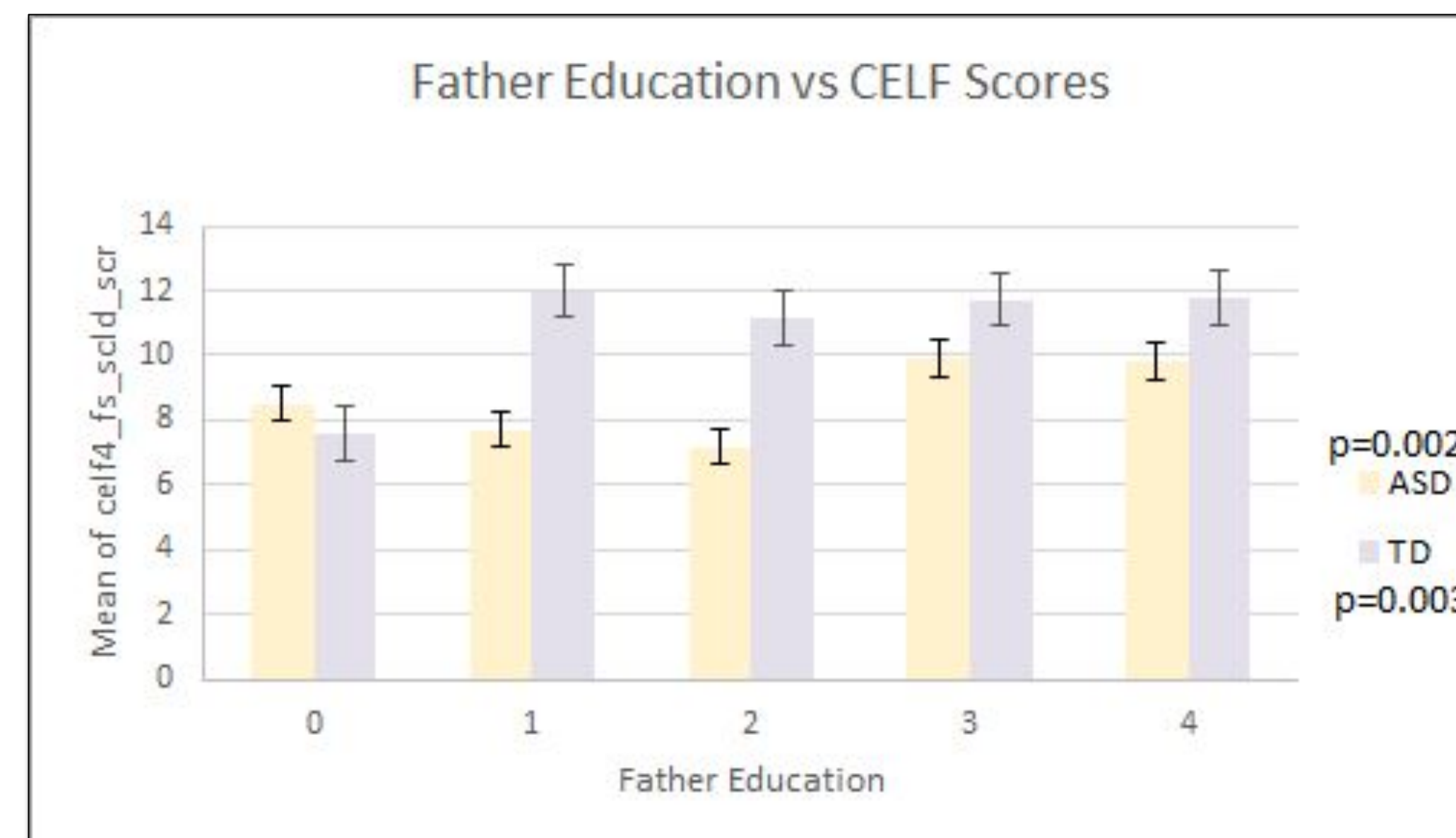
A one way ANOVA was run to look at maternal education and later verbal skills via CELF FS scores in children



- Our results indicate that mothers in the highest education categories had ASD children with elevated verbal scores; $F(4, 135) = 3.964, p = 0.004$.
- The TD group did not show any significant effects of maternal education category on child language ability; $F(4, 130) = 1.034, p = 0.392$

Aim 2: Measuring Paternal Education with CELF Scores

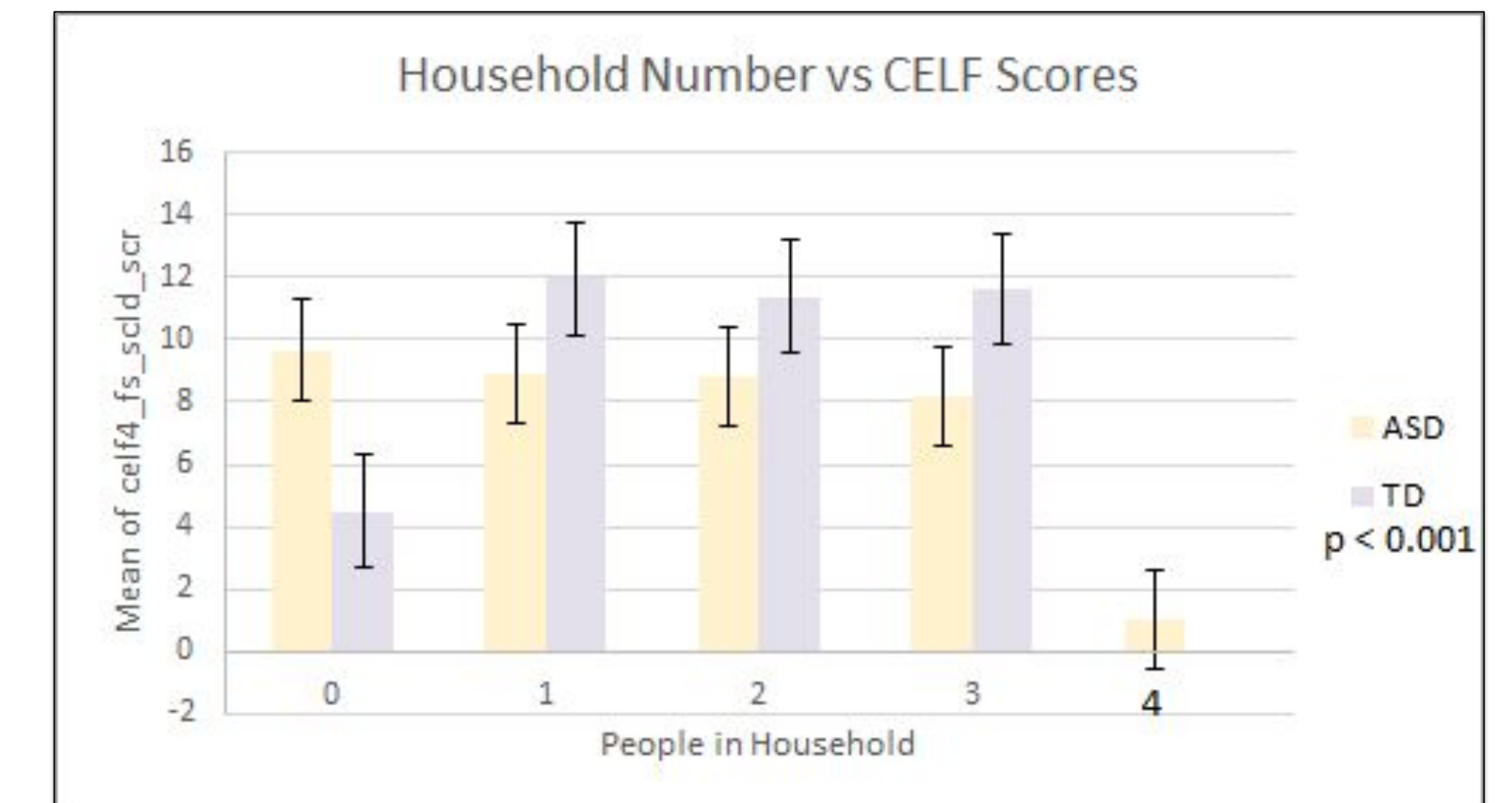
A one way ANOVA was run to look at paternal education and later verbal skills via CELF FS in children



- Our results indicate that fathers in the highest education categories had ASD children with elevated verbal scores; $F(4, 135) = 4.393, p = 0.002$.
- The TD group show significant differences for the paternal education category; $F(4, 130) = 4.331, p = 0.003$. Fathers in the higher paternal education category (college and beyond) had TD children with elevated verbal scores.

Aim 3: Measuring Household Number with CELF Scores

A one way ANOVA was run to look at household structure and later verbal skills via CELF FS in children



- Our results indicate that number of people living in household had no impact on verbal scores within the ASD group; $F(4, 133) = 1.261, p = 0.298$
- The TD group did show a main effect of household number category, $F(3, 128) = 7.564, p < 0.001$. Children with more than 2 or more other members in the household compared to those with only 1 member had higher verbal scores.

Discussion

- In ASD groups, children with parents who have higher education had more advanced language skills, confirming results from previous research. This could be a result of increased awareness of importance of verbal skills or more resources to support language (e.g., books) from parents of higher education levels. It could also be possible that parents of higher education are able to better assist their children with school work (e.g., homework and projects).
- Our TD group only showed significant difference in language related to paternal education category but not maternal education.
- We found that children with more than one (other) member in the household had higher verbal scores. This could be a result of increased opportunities for verbal communication in a multi-member household.
- This study did not take severity of ASD symptoms or current use/history of language therapies into account. Both of these factors could contribute to verbal skill level.
- Further studies should explore whether parental education is directly linked to income as access to resources needed for verbal development could be related to income level.
- Future research should also explore relationships between SES and verbal skills.. CELF is a clinician administered test which could attribute to anxiety in children when they are being asked questions by a stranger. A self or parent reported assessment could be used along with the CELF-4 to assure language skills are as assessed in a more natural setting.

Acknowledgements and References

Olson, L., Kinnear, M., Chen, B., Reynolds, S., Ibarra, C., Wang, T., . . . Fishman, I. (2021). Socioeconomic Factors Account for Variability in Language Skills in Preschoolers with Autism Spectrum Disorders. Retrieved March 12, 2021, from <https://link.springer.com/officecampus.lib.washington.edu/article/10.1007/s10803-020-04646-6>

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