Age of first parental concern of language/behavior and later language development in youth with ASD: The GENDAAR study

Premkumar, M; Santhosh, M; Neuhaus, E; Webb, S.J & the GENDAAR Consortium

Department of Child Health Behavior and Development, Seattle Children's Research Institute

Background

- Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social communication and repetitive behaviors.
- Early diagnoses has shown to have positive language trajectory later in life.
- The more severe the child's early language delays are, the more likely they are to have impaired language functioning later in life.
- The aim of this project is to look at the relationship between age at first parent concern of language and behavior and later language development in children with autism.
- The age of first concern in months is when parents noticed a problem or concern with development/language in their child.
- We predict that early concerns from parents about their child having ASD will mean that the child has more delays or is more atypical in their language and thus was identified earlier.
- Additionally, we will explore gender differences in age of first concerns and language skills. We predict females will have higher verbal skills than males.

Methods

This study used data from the GENDAAR study, a four site NIH funded study looking at sex differences in autism.

Participants

- Participants included 58 childrens with ASD (Females=25, Males=33) between the ages 8-17 years.
- All children met ASD criteria via standardized measures and had a verbal IQ>70.

Table 1: Mean and standard deviation of age of first concern in months, verbal IQ, CSS scores, CELF formulating sentences (fs), and CELF recalling sentences (rs) for male & female ASD participants.

Gender	N	Age of concern (months) avg	Verbal IQ avg	CSS Scores	CELF4 fs	CELF4 rs
Male	33	24.24	98.36	7.73	7.65	7.45
		SD: 13.551	SD: 21.428	SD: 1.807	SD: 3.747	SD: 4.009
Female	25	28.76	107.04	5.96	10.04	9.88
		SD: 26.724	SD: 21.196	SD: 1.814	SD: 2.965	SD: 3.644

Measures

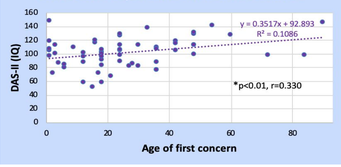
- Parents of participants completed the Autism Diagnostic Interview (ADI-R), which included questions related to when they observed the first signs of language and behavioral concerns and if the concerns started at certain milestones ages (before 12 months, 18 months).
- Child participants completed a clinician administered language task (CELF-IV) which included answering questions related to recalling and formulation sentences. CELF-IV rs is the recalling sentences where participants would have to recall a collection of sentences and CELF-IV fs is the formulating sentences where the participant would have to formulate a compound sentences.
- Participants in the study completed the Differential Ability Scale, 2nd edition (DAS-II) which a standardized instrument administered by a clinician that measures cognitive abilities and verbal IQ. All the participants in the study had an IQ>70.
- Autism severity for participants were classified based on ADOS-2 Calibrated Severity Score (CSS) with higher scores indicating more severe symptoms.
- Parents of participants completed an early hindsight question that allowed them to think back to when they first noticed the signs of autism spectrum disorder in their child and decide whether they noticed these signs before they were diagnosed or if it was around the same time.

Results

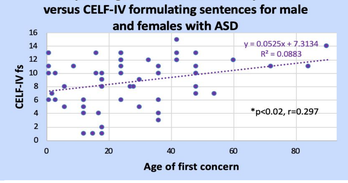
Aim 1: Is there a correlation between age of first concern and later language ability in youth with ASD?

Correlations were run for the age of first concern from parents and DAS-II, CELF-IV rs, and CELF-IV fs for ASD participants

Graph 1: Age of first concern from parents versus verbal IQ for male and females with ASD



Graph 2: Age of first concern from parents versus CELF-IV formulating sentences for male and females with ASD

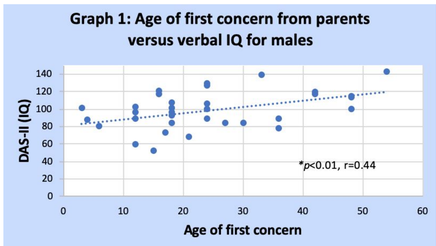


Age of first concern was positively correlated with verbal IQ (p<.01, r=.330) and formulating sentences (p=.02, r=.297) for the ASD participants, but there was no significant results for the recalling sentences subscale (p=ns, r=0.212).

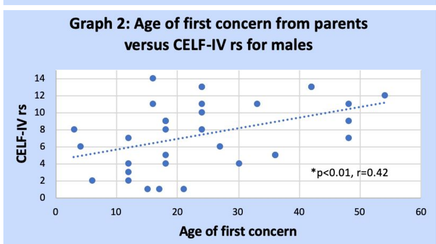
Aim 2: Is there a difference in correlation between age of first concerns of language with later language ability in males compared to females?

Correlations were run for the age of first concern from parents and DAS-II, CELF-IV rs, and CELF-IV fs for male and female ASD participants separately.

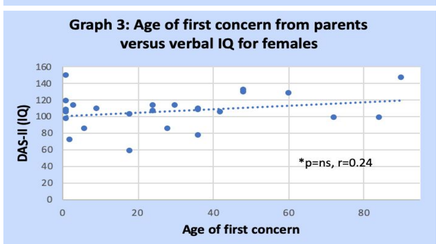
Graph 1: Age of first concern from parents versus verbal IQ for males



Graph 2: Age of first concern from parents versus CELF-IV rs for males



Graph 3: Age of first concern from parents versus verbal IQ for females

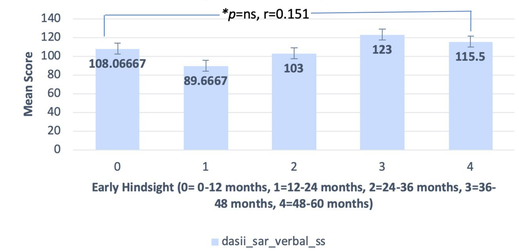


Age of first concern was positively correlated to verbal IQ and recalling sentences in males, which shows that the older the age of concern the higher later language skills and the younger the age of concern the lower language skills. In Males, the relation between age of first concern or verbal IQ (r=0.44, p<0.01) *or* recalling sentences task (r=0.42, p<0.01) was significant. This was not significant for females (verbal IQ r=0.25 p=ns; recalling sentences, r=0.03 p=ns). Similar to the overall analyses, neither males (r=0.27, p=ns) nor females (r=0.34, p=ns) had a significant relation between age at first concerns and the formulating sentences subscale.

Aim 3: Does early hindsight from parents relate to a better later language ability in youth with ASD.

A series of two-way ANOVAs were implemented between early hindsight and sex with the dependent as DAS-II, CELF-IV recalling sentences and, CELF-IV formulating sentences.

Mean DAS-II (Verbal IQ) for females based on early hindsight scores from parents



We found no significant differences between early hindsight and sex as the independent variable and DAS-II, CELF-IV recalling sentences, and CELF-IV formulating sentences as the dependent variables. For males the values the DAS-II (p=ns, r^2=0.014), CELF-IV recalling sentences (p=ns, r^2=0.033), and CELF-IV formulating sentences (p=ns, r^2=0.114) weren't significant. For females the values for the DAS-II (p=ns, r^2= 0.151), CELF-IV recalling sentences (p=ns, r^2=0.091), and CELF-IV formulating sentences (p=ns, r^2=0.256) weren't significant.

Discussion

- Our results indicate that there is a positive correlation for age of parental concern and later language skills. The older the child was when parents identified concerns, the better language skills were later on in childhood. Those who have earlier age of concern might have higher severity of autism leading to lower language skills later in life. No significant differences were observed for females.
- There were no significant differences in early hindsight and later language skills for males or females.
- Some possible limitations of this study are that we had a small sample size. With a larger sample size we could take into account autism severity, because we would expect those with higher autism severity to have more impairments and to be identified earlier.
- Further research should look at other factors that could impact language, such as demographics, socioeconomic status, and behavioral or speech therapy interventions. Further research could also consider sample size and the number of female and male participants in the study.
- This research can shed light on importance of providing training to parents to recognize language delays in children.

References and Acknowledgements

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