Effects of Social Communication and Language Ability in ASD children with Siblings vs. ASD children without Siblings

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Background

Autism Spectrum Disorder (ASD) is a collection of neurodevelopmental disorders characterized by social-communication and behavioral impairments and affects approximately 1 in 68 children in the U.S. (CDC, 2014).

Children with ASD, on average, score lower on language measures than their typically developing peers (Flusberg, Joseph, & McGrath, 2010) and have social-communication, and interpersonal differences (Foden, Sauder, & White, 2007).

In TD families, siblings have positive influences on social skills (Stormshak, Bellanti, Bierman et al., 1999) and promote language, cognitive development, and understanding of emotions (Brody, 2006).

The aims of the study were:

1. Compare the social communication in children with ASD who have siblings to those children with ASD who do not have siblings.
2. Compare language ability in children with ASD who have siblings to those with ASD who do not have siblings.
3. Explore if sibling characteristics (e.g. sex) impact these measures.
4. Compare the severity level of autism spectrum-related symptoms in children with ASD who have siblings and children with ASD who do not have siblings, factoring age differences between siblings.

We hypothesize that:

1. Children with ASD who have siblings will exhibit better social communication and higher language ability than those who do not have siblings, which is similar to what is seen in TD families.
2. ASD children who are closer in age with their siblings will show more benefit of having a sibling than those that are farther in age.

Methods

Participants:

- Children between the ages of 8 and 17 years old participated in the Gender Exploration of Neurogenetics and Development to Advance Autism Research (GENDAAR) study. To be included in this analysis, children must have (1) a confirmed diagnosis of ASD, (2) have an IQ over 70, and (3) either have one or zero biological siblings under the age of 18.

Table 1: Participants for Aim 1 & 2

<table>
<thead>
<tr>
<th>ASD with Siblings</th>
<th>ASD without Siblings</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>66</td>
</tr>
<tr>
<td>Age (Mo.)</td>
<td>M = 142.26, SD = 34.84</td>
</tr>
<tr>
<td>Nonverbal IQ</td>
<td>M = 101.79, SD = 16.96</td>
</tr>
<tr>
<td>Sibling</td>
<td>31</td>
</tr>
</tbody>
</table>

Aim 1: Measuring Social Communication in ASD with Siblings and ASD without Siblings

- A series of ANOVAs were implemented withADOS-2, SRS-2, SCQ, and ADI as dependent variables.
- We found that there were no significant differences, across all measures, between ASD children with siblings and ASD children without siblings.
- However, there were significant differences when exploring the presence of female sibling in the ASD children with sibling group. ASD children with siblings were separated into two groups: ASD children with female sibling and ASD children with male sibling.

Aim 2: Measuring Language Ability in ASD with Siblings and ASD without Siblings

- A series of ANOVAs were implemented with DAS-2, CEFL-4, and ADI as dependent variables. We found that there were no significant differences, across all measures, between ASD children with siblings and ASD children without siblings.
- However, there were significant differences when exploring the presence of female sibling in the ASD children with sibling group. ASD children with siblings were separated into two groups: ASD children with female sibling and ASD children with male sibling.

Results

Table 2: Groups separated by Sibling Gender

<table>
<thead>
<tr>
<th>Sibling</th>
<th>ADI Social</th>
<th>ADI Communication</th>
<th>SCQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proband</td>
<td></td>
<td></td>
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</tbody>
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Table 3:

<table>
<thead>
<tr>
<th>Measures</th>
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<tbody>
<tr>
<td>Social Communication</td>
</tr>
<tr>
<td>Autism Diagnosis Interview (ADI; Rutter, 2003): An parent interview conducted by a clinician assessing the behaviors in children, including a scale for measuring language ability.</td>
</tr>
<tr>
<td>Social Communication Questionnaire (SCQ; Rutter, 2007): A parent report questionnaire used to provide information on a use of language/communication and style of interaction.</td>
</tr>
<tr>
<td>Autism Diagnostic Interview (ADI; Rutter, 2003): An parent interview conducted by a clinician assessing the behaviors in children.</td>
</tr>
</tbody>
</table>

Discussion

Summary

- Overall, there were no significant differences on social communication and language ability, across all measures, when comparing ASD children who have siblings and ASD children who do not have siblings, which contradicts our first hypothesis.
- However, when taking into account the gender of the sibling, ASD children who have a female sibling showed overall benefit and scored better on measures of social communication when compared to ASD children who have a male sibling.
- ASD children who have a female sibling also showed overall benefit and scored better on language ability when compared to ASD children who have a male sibling. ASD children who have female siblings do not differ from ASD children who do not have a sibling on language ability. These results align with previous research in which females are better at verbal tasks due to having better verbal and nonverbal episodic memory, verbal recall, object recognition memory, and communication skills (McGivern & Pineda, n.d.; Lewis, C., Wolraich, G., & Heritz, A. 2001).
- Furthermore, females may have more sibling contact and closer sibling relationships with siblings with disabilities (Rutter, Hopad, & Uranio, 2004).
- There were no significant differences on overall autism severity or on the social affect scores of the ADOS and SRS between ASD children who have siblings and ASD children who do not have siblings, but differ in restricted, repetitive behavior. Furthermore, children with ASD who are younger than their siblings exhibited less severe restricted and repetitive behaviors, according to ADOS-2, ADI, and SRS scores, than children with ASD who do not have siblings and ASD children who are older than their sibling, which contradicts my second hypothesis.
- However, the results align with previous research in which younger siblings gain cognitively by imitating the older since the older sibling acts as role models, which can lead ASD children to reduce their restrictive and repetitive behavior (Vickrey, 1987; Hassell & Michel, 1992). In one study, ASD children who have siblings, especially if they are older, were reported having less severe restricted and repetitive behaviors than ASD children who do not have siblings because typically developing siblings of individuals with ASD spoke of pride in teaching their sibling with ASD (Foden, 2007).

Conclusions & Limitations

- There could be other factors that may have contributed to these results such as not knowing the dynamic between the ASD child and their family/sibling, considering the number of siblings, excluding step or half siblings in the study, and excluding siblings over 18. Given the complex variety of sibling relationships, replicating the analysis with a larger sample of kids is needed to understand the potential interacting effects of gender, age, number of siblings, etc.
- These findings emphasize the role that siblings play in language and social development in autism and can help improve intervention programs for ASD.