Differences in Repetitive Behavior Severity in Children with ASD and Comorbid Anxiety Disorders

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Background

Autism Spectrum Disorder is a developmental disorder that is characterized by impairments in social communication and behavioral skills (CDC, 2020).

- Individuals with ASD often exhibit repetitive behaviors such as motor movements like hand flapping or more ritualistic behaviors such as performing tasks in a particular order (Lam & Aman, 2006).
- Repetitive behaviors are also often seen in individuals with anxiety disorders (most notably in OCD) (Postorino et al., 2017).
- Other studies have shown that the presence of a comorbid anxiety disorder can lead to an increase in symptom severity in the social or communication impairments of ASD (Zaboski & Storch, 2018).
- Given that repetitive behaviors are seen in both ASD and in anxiety disorders and the tendency for comorbid anxiety to exacerbate some ASD symptoms, we hypothesize that:
  1. Children with ASD and a comorbid anxiety disorder will have higher severity scores than ASD only children on an assessment for overall repetitive behavior.
  2. Children with ASD and a comorbid anxiety disorder will have higher severity scores than ASD only children on repetitive behavior subscales.
  3. Sex differences will also be explored to see if they interact with these relationships.

Methods

Participants
A total of 183 children between the ages of 8 and 17 with a confirmed diagnosis of ASD were included in this study.

<table>
<thead>
<tr>
<th></th>
<th>ASD only</th>
<th>ASD + Anxiety</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>123</td>
<td>60</td>
<td>58</td>
<td>12</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>149.59</td>
<td>153.53</td>
<td>33.90</td>
<td>35.38</td>
</tr>
</tbody>
</table>

Measures

Parents completed the Autism Center of Excellence (ACE) medical history questionnaire used to assess the presence or absence of a comorbid anxiety disorder.

- The presence or absence of an anxiety disorder was self-reported.
- Children with an indicated anxiety disorder were placed into the ASD + anxiety group, those who did not were placed into the ASD only group.

Parents also completed the Repetitive Behavior Scale- Revised (RBS-R) which is a 44-item questionnaire that assess repetitive behaviors overall and on six different subscales (Lam & Aman, 2006):

- Stereotyped behavior: consists of bodily movements that serve no clear function other than to be repeated
- Self-injurious behavior: consists of behavior that can cause harm or injury to the body
- Compulsive behavior: repeating actions according to some rule
- Ritualistic behavior: consists of going about daily tasks in similar manner
- Sameness behavior: consists of being unwilling or resistant to change
- Restricted behavior: consists of wanting to focus only on certain activities or interests

Results

Question 1: Is there a difference in total RBS-R score in children with ASD with and without anxiety?
An independent samples T-test was run in order to compare mean total RBS-R scores between the ASD only and ASD + anxiety groups.

<table>
<thead>
<tr>
<th></th>
<th>ASD Only</th>
<th>ASD + Anxiety</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean RBS-R Total Score</td>
<td>40.50</td>
<td>55.30</td>
<td>-12.12</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Individuals in the ASD + anxiety group scored significantly higher RBS-R total scores compared to the ASD only group ($t(181) = -12.12, p < 0.05$).

Question 2: Is there a difference in RBS-R subscale scores in children with ASD with and without anxiety?
A series of independent sample T-tests were then conducted in order to see which RBS-R subscales showed a significant difference in scores between the ASD only and ASD + anxiety groups.

<table>
<thead>
<tr>
<th></th>
<th>ASD Only</th>
<th>ASD + Anxiety</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stereotyped behavior</td>
<td>6.50</td>
<td>11.30</td>
<td>-3.15</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Self-injurious behavior</td>
<td>3.20</td>
<td>5.00</td>
<td>-3.80</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Compulsive behavior</td>
<td>4.00</td>
<td>6.80</td>
<td>-3.60</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Ritualistic behavior</td>
<td>3.10</td>
<td>4.90</td>
<td>-3.15</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Sameness behavior</td>
<td>2.30</td>
<td>3.10</td>
<td>-1.90</td>
<td>0.06</td>
</tr>
<tr>
<td>Restricted behavior</td>
<td>1.50</td>
<td>2.30</td>
<td>-1.00</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Individuals in the ASD + anxiety group scored significantly higher than those in the ASD only group on the RBS-R subscales for self-injurious, compulsive, ritualistic, sameness, and restricted behavior scales.

Results (cont.)

Question 3: Is there an interaction between sex and anxiety group?
In order to assess if there was an interaction between sex and the presence or absence of a comorbid anxiety disorder on the association between RBS-R scores in children with ASD, a series of univariate analysis of variance tests were conducted (for the RBS-R total and subscale scores).

There were no significant interactions found between sex and anxiety group on RBS-R total scores. Only one of the RBS-R subscales (ritualistic behavior) showed a significant interaction between sex and anxiety group ($F(1) = 5.19, p < 0.05$), indicating that on this subscale, the effect of anxiety on RBS-R score is dependent on sex, and the effect is in the opposite direction for ASD only vs ASD + anxiety groups. Additionally, only one RBS-R subscale (restricted behavior) showed a main effect of sex, with boys scoring significantly higher than girls ($F(1) = 5.87, p < 0.05$).

Discussion

Summary

- There were significant differences seen in RBS-R total scores between children in ASD only and ASD + anxiety groups, with ASD + anxiety having more repetitive and restrictive behaviors.
- Only two of the RBS-R subscales, however, we found significant differences between the ASD only and ASD + anxiety groups. The subscales for self-injurious and compulsive behavior both had significantly higher scores for the group of children with ASD and anxiety.
- There were no interactions found between sex and anxiety group for the RBS-R total scores, indicating that this relationship was not moderated by sex.
- Of all the RBS subscales, only ritualistic behavior showed a significant interaction, suggesting that for this type of behavior, sex does have a moderating effect.

Limitations

- The ACE medical history questionnaire used to assess the presence or absence of a comorbid anxiety disorder was a self-report questionnaire and it is possible parents may have misreported their child’s diagnosis. Additionally, there was no information provided about the type or severity of anxiety disorder.
- The relatively small sample size, particularly for the ASD + anxiety group compared to the ASD only group, limited the power of this study to detect smaller differences between groups.

Future Directions

- It would be interesting to see a study explore how severity of a comorbid anxiety disorder in children with ASD influences repetitive behaviors.
- Additionally, it would be interesting to see a larger study with more power to assess potential sex differences across these groups.
- It would be interesting to see how the relationship between anxiety group and repetitive behaviors changes over time.