**Background and Purpose**

- According to the CDC, 1 in 59 children have autism spectrum disorder (ASD), with a male to female ratio of 4:1.
- Main characteristics of ASD such as social communication issues and unusual restrictive and repetitive behaviors are well described in the literature.
- Problems with adaptive behavior, sensory processing differences, and atypical internalizing/externalizing behaviors are also common, but have been given less attention.
- Differences in profiles between boys and girls with ASD has been minimally explored.

**Purpose**

- Describe the behavioral, sensory processing, and developmental profiles of young boys and girls with ASD.
- Gain a better understanding of typical characteristics to assist with early identification and individualized/appropriate intervention programming.

**Procedures**

- A retrospective, non-experimental design was performed using data from medical records obtained from the Seacoast Child Development Clinic (SCDC) from 2014-2017.
- The SCDC is a community clinic that provides consultative services for children with neurodevelopmental disabilities and their families including diagnostic evaluations for ASD by a team of trained professionals.
- Procedures were approved by the Institution’s Internal Review Board for Protection of Human Subjects.
- Data includes demographics (age, gender, race, socioeconomic status), scores from Vineland Adaptive Behavior Scales-II, Sensory Profile, Child Behavior Checklist and the ADOS/ADOS-2.
- Using SPSS v24, descriptive statistics, and correlation analyses were computed to describe behavioral and developmental characteristics, and to examine relations among sensory processing differences, behavioral characteristics and adaptive behavior.
- Differences in the profiles and characteristics between sexes were also examined using inferential tests.

**Participants**

- Assessment data from 123 children diagnosed with ASD including 98 males and 25 females.
- Mean age was 42 months and ranged from 21-70 months.
- 93.5% of the sample were Caucasian, and most were from middle income families from the Seacoast of New Hampshire.
- Based on ADOS/ADOS-2 scores, 87% girls met criteria for Autism, 13% for ASD. For boys, 91% s met criteria for Autism, and 8% for ASD.

**RESULTS**

**Vineland Adaptive Behavior Scales Scores by Gender and Domain**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Boys (n=94)</th>
<th>Girls (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>86.0 (12.6)</td>
<td>72.7 (16.4)</td>
</tr>
<tr>
<td>Daily Living</td>
<td>80.1 (14.4)</td>
<td>72.7 (16.4)</td>
</tr>
<tr>
<td>Motor Behavior</td>
<td>80.7 (14.7)</td>
<td>65.5 (19.3)</td>
</tr>
<tr>
<td>Total</td>
<td>76.6 (13.8)</td>
<td>70.8 (16.8)</td>
</tr>
</tbody>
</table>

- Both boys and girls had below average mean scores in all areas with social and communication skills being the weakest, and the motor area being the strongest.
- Without the exception of motor skills, girls tended to out-perform boys in all areas.
- Mean scores between the sexes were not statistically significantly different across all areas.

**Child Behavior Checklist Behavior Profiles by Gender**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Boys (n=87)</th>
<th>Girls (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing</td>
<td>64.0 (14.2)</td>
<td>61.5 (13.6)</td>
</tr>
<tr>
<td>Externalizing</td>
<td>58.0 (13.3)</td>
<td>58.2 (12.5)</td>
</tr>
<tr>
<td>Total score</td>
<td>68.6 (13.8)</td>
<td>65.6 (13.1)</td>
</tr>
</tbody>
</table>

- Girls tended to have more internalizing than externalizing problems.
- The atypical behavior of boys was equally prevalent between internalizing and externalizing.

**CBCL Results by Gender for DSM-IV Categories**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Boys (n=87)</th>
<th>Girls (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>59.0 (13.9)</td>
<td>58.7 (13.3)</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>57.6 (12.7)</td>
<td>58.3 (14.0)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>62.4 (10.3)</td>
<td>61.9 (12.1)</td>
</tr>
<tr>
<td>Total</td>
<td>60.3 (10.9)</td>
<td>60.9 (10.8)</td>
</tr>
</tbody>
</table>

- Both boys and girls showed a high percentage of behaviors associated with ADHD when compared to other categories.
- In addition to PDD, many girls also showed ADHD and Attention Deficit/Hyperactivity Disorder (ADHD).
- More boys than girls showed signs of Anxiety and Hyperactivity.

**Sensory Profile Results by Gender and Domain**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Boys (n=87)</th>
<th>Girls (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Over-responsivity</td>
<td>57.8 (15.2)</td>
<td>56.7 (15.7)</td>
</tr>
<tr>
<td>Sensory Under-responsivity</td>
<td>58.9 (13.7)</td>
<td>59.2 (13.4)</td>
</tr>
<tr>
<td>Sensory motor problems</td>
<td>62.7 (11.9)</td>
<td>63.2 (12.0)</td>
</tr>
<tr>
<td>Total</td>
<td>60.8 (11.6)</td>
<td>60.5 (11.6)</td>
</tr>
</tbody>
</table>

- Girls had slightly more problems than boys with sensory over/under responsivity.
- More boys than girls showed significant sensory processing and were less likely to exhibit sensory craving and sensory based motor problems.
- Both boys and girls tended to have more than one type/subtype of SPD.

**Adaptive Behavior**

- Girls and boys had a similar Vineland-II scores showing adaptive behavior problems in all areas, with socialization and communication scores being the weakest areas and with a relative strength in the motor domain. Girls slightly out-performed boys in all domains.

**Study Limitations and Directions for Research**

- Generalizability of the results was limited due to a lack of ethnic, geographic and socio-economic status variability in the data set.
- The results from the current study indicated fewer differences in the developmental and behavioral profiles of boys versus girls with ASD than what has been shown in previous research. There is a need for further investigation regarding gender differences in ASD behavioral and developmental profiles.
- It is important that interventions for young boys and girls with ASD be designed to address common behavioral and sensory processing deficits, and that such comprehensive programs are evaluated for efficiency and effectiveness.
- Outcomes for efficacy research should include measures of adaptive behavior.

**Discussion of Results**

- Co-existing behavior problems are common in children with ASD. Girls and boys displayed both internalizing and externalizing behavior. Girls tended to have more internalizing than externalizing problems.
- Interestingly, girls displayed slightly higher scores with ADHD type symptoms when compared to boys.
- Both boys and girls scored in the dysfunctional range for CBCL, PDD was expected, while borderline scores were evident for all other DSM-IV mental disorder scales of the CBCL.

- Sensory Processing Differences:
  - Girls had slightly more problems than boys with sensory over/under responsivity, and were less likely to exhibit sensory craving and sensory based motor problems.

- Adaptive Behavior:
  - Girls and boys had very similar Vineland-II scores showing adaptive behavior problems in all areas, with socialization and communication scores being the weakest areas and with a relative strength in the motor domain. Girls slightly out-performed boys in all domains.

References

2. American Psychiatric Association. (2013) DSM-IV = Diagnostic and Statistical of Mental Disorders