Introduction

Sensory over-responsiveness refers to exaggerated or negative response to sensory stimuli. It is highly prevalent in individuals with autism spectrum disorders (ASD) and typically persist into adulthood. Unusual sensory processing can negatively impact on individual's daily living, and even mental health status.

Importantly, previous studies have observed the link between sensory symptoms and co-occurring anxiety problems, but the findings still within in children and adolescents with ASD, rather than adults.

Another problem associated with anxiety in ASD is its relationship with loneliness. Loneliness is a subjective and negative experience which may affect individual's self-esteem, social functioning and behavior. Evidence shown that loneliness was correlated with increased depression and anxiety in adults with ASD.

However, the associations between sensory over-responsiveness, anxiety, and loneliness have yet to be examined among adults with ASD. The purpose of this study was to explore relationships among sensory over-responsiveness, anxiety, and loneliness in a sample of adults with ASD.

Method

Procedures
- The study protocol has been approved by the Institutional Review Board (A-BR-101-074).
- Fliers were used to recruit adults with ASD from the clinic and local autism groups.

Participants
- Participants (N = 70) were 46 men and 24 women between 20 to 39 years of age, with a mean age of 27.8 (SD = 5.0) years.
- All the participants had been diagnosed with ASD using the Diagnostic and Statistical Manual IV Text Revision (DSM-IV-TR) criteria.
- People with intellectual disabilities (IQ < 70) were excluded.
- All of the participants with ASD were able to read and write Mandarin Chinese.

Measures
- Adult Sensory Profile (ASP) - Chinese version
  Higher scores indicate that certain sensory patterns occur more frequently than others. The internal consistency of the four quadrants are between .71 to .80 (Tseng & Chen, 2009).
- Beck Anxiety Inventory (BAI)
  Higher scores indicate more anxiety. It has strong construct validity (Beck & Steer, 1990) and a reliability coefficient of .95 for the Chinese version (Che, Lu, Chen, Chang, & Lee, 2006).
- The short-form UCLA loneliness scale (ULS-8)
  Higher scores indicate higher levels of loneliness and social isolation. It has an internal reliability of .84 and good validity (Wu & Yao, 2008).
- Demographic information.
  It includes age, gender, diagnosis, education level, employment status, occupation, marital status, comorbid psychiatric disorders, smoking habits, and drinking habits.

Data analysis
- SPSS 17.0 for Windows (SPSS Inc., Chicago, IL) was used.
- Descriptive statistics examine the demographic data and outcome measures for the study variables.
- Bivariate correlations and multivariate regression analyses were computed to identify significant relationships among all variables.

Results

Descriptive Statistics
- The participants scored in the more than most people in the sensory avoidance (75.7%) and sensation sensitivity (60.0%) quadrants.
- Over 70% of the participants reported a moderate or severe level of anxiety.
- Approximately one third of the participants (32.9%) had scores over the cut-off score on the ULS-8.

Table 2. Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>SOR</th>
<th>Anxiety</th>
<th>Loneliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>89.0 ± 16.5</td>
<td>21.2 ± 11.9</td>
<td>21.9 ± 4.9</td>
</tr>
</tbody>
</table>

SOR = Sensory Over-Responsiveness

Relationship between Sensory Over-Responsivity, Anxiety and Loneliness

Table 3. Intercorrelations between outcome variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>SOR</th>
<th>Anxiety</th>
<th>Loneliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOR</td>
<td>--</td>
<td>.277***</td>
<td>--</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.281*</td>
<td>--</td>
<td>.501***</td>
</tr>
<tr>
<td>Loneliness</td>
<td>.277*</td>
<td>.501***</td>
<td>--</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001. SOR = Sensory Over-Responsiveness.

Mediation effect
- Through the method outlined by Baron and Kenny (1986), the results showed that anxiety mediated the relationship between sensory over-responsiveness and loneliness.
- Analyses using Sobel's t test (Preacher & Hayes, 2004) indicated that anxiety was a significant mediator of the relationship between sensory over-responsiveness and loneliness.
- The higher level of loneliness in participants with greater sensory over-responsiveness was accounted for by their higher level of anxiety.

Figure 1. Mediation by Anxiety on Relationship between Sensory Over-Responsiveness and Loneliness

<table>
<thead>
<tr>
<th>Anxiety</th>
<th>Sensory Over-Responsiveness</th>
<th>Loneliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>β = .277**</td>
<td>β = .501***</td>
<td>β = .154</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01. β referred to standardized coefficient after controlling for anxiety.

Conclusion

The results from the present study suggest that anxiety mediated the relationship between sensory over-responsiveness and loneliness in ASD adults. Therapeutic interventions are required for adults with ASD. Practitioners have to consider the presence of sensory over-responsiveness and anxiety among some adults with ASD to address their psychological well-being.

Reference


Ya-Cing Syu & Ling-Yi Lin
Department of Occupational Therapy, National Cheng Kung University, Tainan, Taiwan