Exploring seasonal trajectories in intensity of intervention use for children on the autism spectrum


Background

• Autism individuals have a lifelong need for services across the lifespan, but studies over the last two decades have revealed gaps in service coverage exacerbated by inaccessible public education, race, ethnicity, and socioeconomic status.

• Despite this emerging literature, our understanding of longitudinal intervention use is limited. Studies examining this question have studied demographically restricted samples or examined long-term (lifespan) changes, leaving trajectories of intervention use at the sub-yearly scale still unexplored.

Objectives:

1. To identify and describe trends in trajectories of intensity of intervention use for autistic children

2. To examine the association between different trajectories and child demographic factors

Methods

Participants

Anonymized data from 236 participants in a multisite longitudinal biomarker study, parents of school-age (N=280) children on the autism spectrum reported the number of hours of 18 types of intervention their children received during a series of five consecutive six-week intervals. Parents also reported a range of demographic information, including race/ethnicity of child, parental education, and household income (Table 1).

Table 1 Demographic Information (N=360)

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>GED</th>
<th>Bachelor's degree</th>
<th>Associate's degree</th>
<th>High school or less</th>
<th>College (&lt;4y)</th>
<th>College (4y)</th>
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</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>30</td>
<td>102</td>
<td>40</td>
<td>0</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Black or African American</td>
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<td>125</td>
<td>25</td>
<td>0</td>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
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<td>60</td>
<td>15</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Intervention Intensity Measures

Intervention Hours per Week: Intervention hours for all 18 types of intervention were first clustered using a traditional k-means algorithm using Euclidean distance (N=35).

Clustering Trajectories in Weekly Intervention Hours

Individual trajectories and aggregated by cluster compared to the Low-Stable cluster.

Results

• Monthly changes in intervention hours display significant decreases for both August (t = 2.29, p = 0.012) and January (t = 2.24, p = 0.017) (Figure 2)

• Traditional k-means clustering yielded an ideal partition of 6 clusters (BIC = 153.5). Re-partitioning into 6 clusters with a shape-respecting k-means algorithm yielded the 6 clusters and mean trajectories described in Figures 3 and 4

• Qualitatively, transitions into and out of the summer months seem to partly account for rising and declining trends in cluster means. For example, the Low-Rise cluster includes many participants that began their visits in the summer and ended in the fall, while Low-Stable displays the opposite pattern (Figure 4, red highlights). Qualitatively, transitions into and out of the summer months seem to partly account for rising and declining trends in cluster means. For example, the Low-Rise cluster includes many participants that began their visits in the summer and ended in the fall, while Low-Stable displays the opposite pattern (Figure 4).

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Conclusions

• Clustering the longitudinal trajectories in intensity of intervention use for autistic children yields clusters that not only reflect differences in absolute intensity of services received (High, Medium, Low), but also temporal variability associated with monthly change.

• Cross-sectional work on intervention or service use for autistic children should consider the effect of seasonality when analyzing intensity at a single time point in order to avoid possible confounds.

• The decrease in intervention hours during August and January is most likely attributable to interruptions in the school year, and a consequent lapse in school-based service delivery. Future work with access to data on intervention setting (school, home, clinic) and funding (public, private) is needed to confirm this hypothesis and better assess the extent and impact of service coverage in this population.

• Previous work has found racial and sociocultural factors affect the rate of interventions use11 that could not be evaluated in the present sample and should be studied in larger and more heterogeneous samples. Genetically, the role of risk genes in young children with higher ASD symptomology are more likely to have high intensity intervention utilization over time.

• Further research is also needed to ascertain the impact of short-term interruptions on quality of life and educational progress measures.

References


4. McPartland Lab

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