Title: Reading Abilities in Down Syndrome and its Relation to Time Spent in a Mainstream Classroom

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Introduction: Down Syndrome (DS) is the most common form of Intellectual Disability (ID) with a known genetic etiology, occurring in 1 infant for every 691 live births (Presson et al., 2013). While advances have been made in our understanding of reading abilities in this population, much of this research has been completed relative to mental age matched peers (Boudreau, 2002; Ricci, 2011). Much less is known about the nature of reading abilities in DS relative to chronological age matched peers with ID and whether the trajectory of reading achievement in this group differs from what is observed in children with ID due to another etiology. Moreover, while there is a small research literature on predictors of time spent in mainstream education for children with DS (e.g., Turner et al., 2008), little is known about the relationship between reading achievement and time spent in mainstream educational settings in this group. Thus, the present study aimed to answer three questions. First, do reading achievement trajectories differ in children with DS compared to same age peers with mixed etiology ID evaluated over a three year period? Second, does time spent in mainstream education classrooms vary for these groups across a three year period? Third, do reading abilities predict hours spent in mainstream education in children with ID due to DS or mixed etiologies and does this vary by group?

Method: The present study utilized a subset of students from the Secondary Education Elementary Longitudinal Study (SEELS) with a diagnosis of ID (N = 44; Males = 21,Mage = 11.20) and/or DS (N = 27; Males = 10,Mage = 10.81). The SEELS collected parent-report, school-report, and direct-assessment data over 3 timepoints spread one year apart between 2000-2006. The present study utilized W-scores from the Letter-Word Identification (LW) subtest of the Woodcock Johnson-III to measure reading abilities. Minutes per week spent in mainstream education was obtained from teacher-report measures.

Two, 2x3 mixed model ANOVAs with one between-subjects factor (group: DS vs. ID) and one within-subjects factor (time: T1 vs. T2 vs. T3) were completed to assess differences in (1) reading abilities across group and time and (2) minutes spent in a mainstream setting across group and time. In addition, a multiple linear regression was conducted to evaluate the predictive value of time 1 reading skills, diagnosis, and their interaction on time spent in a mainstream classroom setting one year later (time 2).

Results: The results of the 2x3 mixed measures ANOVA assessing reading abilities indicated significant main effects for both diagnostic group (p = 0.001, partial η² = 0.152) and time (p < 0.001, partial η² = 0.305). Specifically, across all timepoints, the ID group outperformed the DS group, and across both groups, reading scores significantly improved at each timepoint (ps < 0.001). With regards to the 2x3 mixed model ANOVA evaluating time in a mainstream educational setting, a significant group x time interaction ( p = .029, partial η² = 0.102) was identified. An analysis of within group tests of simple effects revealed that the DS group spent significantly less time in a mainstream classroom at timepoint 3 compared to both timepoint 1 (p = 0.002, t(32) = 3.37), and to timepoint 2 (p = 0.006, t(33) = 2.92). No significant differences in time spent in a mainstream classroom across the three timepoints were found in the ID group.

Time spent in a mainstream classroom at timepoint 2 was regressed on diagnostic group, reading skills, and the interaction between the two predictors. The results of the regression indicated that reading skills, b = 33.47, SEb = 3.02, p = 0.03, and the interaction between reading skills and diagnostic group, b = -6.90, SEb = -2.79, p = 0.04, were both predictive of time spent in a mainstream setting one year later. In order to explore the diagnosis x reading skills interaction, Pearson correlations were run for each diagnostic group separately. While a significant moderate association between time spent in a mainstream setting and reading abilities was found for the group with ID (r = 0.44, p = 0.02), this relationship was not observed in the group with DS (r = -0.12 , p = 0.66).

Discussion: The findings of this study indicate that while there are disparities in reading skills between youth with DS and ID, the rate of skill acquisition over a three year period is similar. Despite the similarities in reading growth patterns, youth with DS spent significantly less time in a mainstream setting as their schooling progressed, while time spent in a mainstream setting appeared stable across time for youth with ID. These findings parallel the results of our regression analyses which indicated there was a relationship between baseline reading abilities and time spent in a mainstream setting for children
with ID, but not for the children with DS included in this sample. These results suggest that further research is needed into the factors that are predictive of time spent in a mainstream setting for children with DS. Identifying these factors will be important for targeting policies and intervention to help increase academic and real world outcomes for this group.

References/Citations: