Title: Relations between BRIEF Parent Ratings and DCCS Lab-Based Performance for Youth with Williams Syndrome

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Introduction: A growing body of research has established significant attention and executive functioning difficulties as measured by traditional lab-based EF tasks in youth with Williams syndrome (WS; Carney, Brown & Henry, 2013; John & Mervis, 2010). Yet, the study of everyday executive functioning (as observed by parents) has been relatively neglected. Given the lowered cognitive abilities in individuals with WS, it is unclear whether traditional EF tasks measure the same abilities as they do in individuals with average intellectual functioning. There also has been no investigation of the correspondence between lab-based measures and executive functioning behaviors observed by parents in everyday contexts in youth with WS. This study is the first to examine the degree to which lab-based performance on a task intended to measure executive functioning relates to parent-reported everyday executive functioning behaviors (broad “general executive functioning,” metacognition, and more narrow “core” EFs of working memory, inhibition, and shifting) after controlling for age, gender, and nonverbal reasoning ability in youth with WS.

Method: 81 children and adolescents with WS (44 girls, 37 boys), ages 8 – 15 years (M=11.19, SD=2.51) and their parents participated. Parents completed the Behavior Rating Inventory of Executive Function (BRIEF) to assess child executive functioning in everyday contexts. Lab-based executive functioning was assessed by the Dimensional Change Card Sort (DCCS). Children sorted cards by color during Phase 1 and by shape during Phase 2. In Phase 3 (“rapid switching” phase) children sorted pseudo-randomly by either color or shape depending on whether a border was present on a particular card. DCCS performance was analyzed both by number of phases passed (1-3) and number of correct trials in Phase 3. Child nonverbal reasoning (NVR) ability was measured with the Kaufman Brief Intelligence Test-2 Matrices task (KBIT-2 NVR).

Results: A series of multiple regression models was conducted to examine the degree to which lab-based executive functioning performance predicted parent-reported executive functioning behaviors after controlling for age, gender, and absolute NVR ability (KBIT-2 NVR raw score). Several multivariate outliers depending on the regression model (ranging from 0 to 12) were identified, and results reflect models with outliers removed. After controlling for age, KBIT-2 NVR raw score, and gender, DCCS number of phases passed significantly and uniquely predicted BRIEF Inhibit T-scores (sr=.32, p<.02) and BRIEF Working Memory T-scores (sr=.32, p=.02) but not BRIEF Shift (sr=.10), General Executive Composite (sr=.22), or Metacognition (sr=.22) T-scores. However, after controlling for age, gender, and KBIT-2 NVR raw score, DCCS number of border items correct (during Phase 3) significantly predicted all BRIEF composites and individual scale T-scores including BRIEF General Executive Composite (sr=.33, p=.004), Metacognition Index (sr=.32, p=.008), Inhibit (sr=.32, p=.008), and Working Memory (sr=.32, p=.005) except for BRIEF Shift (sr=.10).

Discussion: The current study provides evidence that lab-based EF performance is related to everyday EF behaviors in youth with WS and specifically that the Dimensional Card Sort task may be useful for assessing general executive functioning in youth with WS. Criterion-based performance on a switching task (number of phases passed) was related to the core EFs of inhibition and working memory, while a more continuous approach to assessing switching abilities (number of correct trials during the rapid-switching phase) showed relations not only to these two core EFs but also to broader indices of everyday EF behavior. The implications of these findings for the measurement of EF in youth with WS will be discussed.

References/Citations: