**Title**: Elevated Scatter in WISC-V IQ Profiles Weakens the Validity of FSIQ in Predicting Academic Achievement in Youth with Neurodevelopmental Disorders

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**Introduction**: The interpretability of the full scale IQ (FSIQ) is often believed to depend on the variability across factors. Namely, studies have argued that in the presence of a large scatter among factors, the FSIQ is not an accurate estimate of the general ability and therefore cannot be used to predict academic achievement (Fiorello et al., 2002; Flanagan & Kaufman, 2004; Hale et al., 2003). However, more recently, studies have consistently found that the general intelligence is by far the most robust predictor of academic achievement compared to factors or broad abilities (For review, see Zaboski II et al., 2018) and that this effect of general intelligence is preserved regardless of scatter (Freberg et al., 2008; Watkins et al., 2007). There is a need to replicate these results with individuals with neurodevelopmental disorders given their larger variability in IQ factors (Doi et al., 2022; Nader et al., 2015; Siegel et al., 1996). Therefore, this study aimed to investigate whether IQ scatter affects the predictive validity of FSIQ on academic achievement in youth with neurodevelopmental disorders.

**Method**: A retrospective chart review was conducted with patients evaluated at a developmental assessment clinic between 3/2018 and 12/2022. Patients aged between 6 and 16 years with available data on the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) and the Woodcock-Johnson, Fourth Edition (WJ-IV) were included (*n* = 76, 74% male; *Mage* = 10.8, *SDage* = 2.4; FSIQ range = 55 – 132; Scatter range = 11 – 69). The majority of the participants had a diagnosis of Autism Spectrum Disorder (ASD; 53%) or Attention-Deficit/Hyperactivity Disorder (ADHD; 59%). A series of regression-based moderation analyses were conducted using the FSIQ as a predictor, scatter score (i.e., highest index score – lowest index score) as a moderator, and academic achievement factors (i.e., Broad Achievement, Broad Reading, Broad Mathematics, Broad Written Language, Academic Skills, and Academic Fluency) as separate dependent variables.

**Results**: Results indicated that scatter score was a significant moderator for the predictive effect of FSIQ on Broad Achievement (*b* = -0.014, *p* = 0.030), Broad Written Language (*b* = -0.016, *p* = 0.028), Academic Skills (*b* = -0.021, *p* = 0.005), and Academic Fluency (*b* = -0.019, *p* = 0.009). When there is no scatter (i.e., scatter = 0), the effect of FSIQ on Broad Achievement was *b* = 1.125. Therefore, when the scatter between the highest and lowest factors is 15, the effect is *b* = 0.918, when 30, *b* = 0.712; however, when it increases to 45, the effect reduces to *b* = 0.506. The largest moderating effect was found with Academic Skills (See Figure 1). When there is no scatter across factors, the effect of FSIQ on Academic Skills was *b* = 1.132, however, when there is 45 score difference across factors, the effect reduces to *b* = 0.183. There were no significant differences in the moderating effect of scatter between participants with ASD (*n* = 40) and without ASD (*n* = 36).

**Discussion:** The results are partially consistent with previous studies (Freberg et al., 2008; Watkins et al., 2007) as the robust predictive validity of FSIQ was demonstrated when the scatter is not large (e.g., below 30). However, this study also provides novel information, specifically, that FSIQ is less predictive of academic achievement as scatter between index scores increases. The current results highlight the need for clinicians and researchers to continue to investigate whether FSIQ is an accurate estimate of the general intelligence and whether it’s a predictor of academic achievement in youth with neurodevelopmental disorders.

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Figure 1. The Moderating Effect of Scatter on the Predictive Validity of FSIQ on Academic Skills

A graph with blue lines and numbers

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