Title: Children with 22q11.2 Deletion Syndrome Show Lower Spatial and Temporal Acuity than Typically Developing Children in Continuously Varying Tasks

Authors: Abbie M. Popa, Heather Shapiro, Danielle Harvey, Michele Amato, Josh Cruz, Nina Cung, Dave Reyes, Tony J. Simon

Introduction: We hypothesized that reduced resolution of mental representations of spatial and temporal information in 22q11.2 deletion syndrome (22q) creates cognitive impairments (Simon, 2008). In visual and attention tasks we asked children (22q n=61, TD n=42) to respond to spatial and temporal stimuli with varying difference ratios.

Method: The Vernier (Ve) tested spatial vision, the Crowded-Vernier (CV) tested spatial attention, and the Flicker Phase (FP) tested temporal resolution. In the FP, children saw 3 images flicker together as a fourth flickered out of phase. They picked the odd image at different flicker rates. In the Ve, children saw 3 vertical line segments and, at varying offset distances, chose which side the central one was on. The CV tested spatial attention by adding, to the Ve, parallel “crowding” lines at varying distances from the target ones.

Results: In the FP, all children performed worse at faster rates (p<0.0001) but the 22q group was less accurate (p<0.0001). In the Ve, all children performed worse with smaller offsets (p<0.0001) but at the smallest offsets the 22q group suffered more (p<0.01). In the least crowded VC all children performed worse with smaller offsets (p<0.0001) but in the most crowded VC the 22q group needed a larger offset to perform as well as the TD children (p<0.02).

Discussion: In the FP, children with 22q showed the same improvement as TD children with slower flicker but were 29% less accurate for all difficulty levels. The Ve showed similar spatial vision in the 22q and TD groups. In the crowding condition, the 22q group showed more difficulty in the most crowded but not the least crowded condition, implying that when crowders were close enough to interfere with attention the 22q group struggled more. Thus results show that, despite intact spatial vision, resolution of spatial and temporal information is significantly worse in children with 22q.

References/Citations: