Title: Age of Onset of Deictic Gestures and Expressive Vocabulary Size at 24 Months Predict Later Lexical and Intellectual Abilities in 4-year-olds with Williams Syndrome

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Introduction: Studies of early language acquisition of children in the general population and children with autism or Down syndrome have consistently found that the onset of deictic gestures such as give, show, and point precedes the onset of first words (Ozçaliscan et al., 2015; Rowe et al., 2008). A previous study of a small sample of children with Williams syndrome (WS) found that in contrast to this pattern, for most children with WS onset of referential language occurred prior to the onset of referential pointing gestures (Mervis & Becerra, 2007). The aim of the present study was two-fold: To delineate the age of onset of three deictic gestures (give, show, and point) relative to the onset of expressive vocabulary (EV) in a larger sample of children with WS and to consider whether individual differences in age of onset of deictic pointing gestures and in EV at 24 months make significant unique contributions to the variance in lexical abilities and overall intellectual ability at age 48 months.

Method: Participants were 46 children (20 girls, 26 boys) with WS and their parents. Age of onset of give, show, and point were determined from parental report on the Early Communicative Checklist of the MacArthur-Bates Communicative Development Inventories (CDI): Words & Gestures (Fenson et al., 2007). EV at age of onset of each of the three deictic gestures and at 24 and 48 months of age was determined from parental report on the Vocabulary Checklist of the CDI: Words & Sentences. Receptive vocabulary ability at 48 months was determined from the Peabody Picture Vocabulary Test-4 (PPVT-4; Dunn & Dunn, 2007) and expressive vocabulary ability from the Expressive Vocabulary Test-2 (EVT-2; Williams, 2007). Overall intellectual ability at 48 months was determined using the Early Learning Composite (ELC) of the Mullen Scales of Early Learning (MSEL; Mullen, 1995).

Results: Median age of onset of give was 19.30 months (range = 13.37 – 34.73, IQR = 17.13 – 23.24); at that time median EV was 3 words (range = 0 – 60, IQR = 1.50 – 12.50). Median age of onset of show was 21.03 months (range = 13.73 – 61.00, IQR = 17.58 – 25.38); at that time median EV was 6 words (range = 0 – 60, IQR = 1.50 – 12.50). Median age of onset of point was 24.23 months (range = 14.55 – 63.54, IQR = 20.62 – 33.32); at that time median EV was 14 words (range = 0 – 246; IQR = 7 – 45). A series of multiple regression analyses was performed to determine the contributions of individual differences in age of onset of point and in EV at 24 months (Mdn = 20.50 words, range = 0 – 176, IQR = 3.75 – 38) to individual differences in 48-month lexical and intellectual abilities. Age of onset of point and EV at 24 months were both significant predictors of individual differences in all three lexical measures at 48 months: EV [F(2,43) = 53.23, p < .001, accounting for 70% of the variance], PPVT-4 standard score [F(2,43) = 29.73, p < .001, accounting for 62% of the variance], and EVT-2 standard score [F(2,43) = 49.37, p < .001, accounting for 73% of the variance]. Age of onset of point and EV at 24 months both also made significant independent contributions to individual differences in MSEL ELC at 48 months [F(2,43) = 39.76, p < .001, accounting for 63% of the variance].

Discussion: The present study replicates the previous finding that almost all children with WS begin to produce expressive language prior to the onset of referential pointing gestures. This finding indicates that the production of pointing gestures is not critical for the onset of expressive language. In addition, the majority of children with WS began to produce expressive language even before they began to produce give and show gestures. Consistent with previous findings for children in the general population and children with ASD, individual differences in age of onset of referential pointing gestures contributed significantly to individual differences in later lexical abilities, beyond the contribution of 24-month expressive vocabulary size. Individual differences in age of onset of referential pointing gestures also contributed significantly to individual differences in 48-month overall intellectual ability beyond the contribution of 24-month expressive vocabulary size, highlighting the potential importance of early acquisition of deictic gestures for later intellectual and language abilities. Theoretical and practical implications will be discussed.

References/Citations: