Title: Lexical and grammatical abilities of 3- and 4-year old children with Down syndrome or Williams syndrome

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Introduction: Almost all children with Down syndrome (DS) or Williams syndrome (WS) evidence language delay, with toddlers with DS evidencing greater vocabulary delay than same-aged toddlers with WS (Mervis & Robinson, 2000). To further understand similarities and differences in the language abilities of children with these syndromes, we compared the lexical, grammatical, and overall intellectual abilities of a sample of 3- and 4-year olds with DS to the abilities of two samples of children with WS, one individually matched to the children in the DS sample for sex and chronological age (CA-match) and one individually matched for sex and parentally-reported expressive vocabulary size (EV-match).

Methods: The DS group included 26 children (19 boys, 7 girls) aged 3.02 – 4.95 years (\(M: 3.91, SD: .61\)). The participants with WS were selected from a large pool of older toddlers and preschoolers to individually match the children with DS as closely as possible. The WS CA-match group included 26 children aged 3.01 – 4.99 years (\(M: 3.91, SD: .62\)) individually matched to the children with DS for sex and CA (\(p = .74\)). The WS EV-match group included 24 children individually matched to the 24 children with DS for whom parentally-reported EV was available for sex and EV (DS \(M: 149.71, SD: 26.38\); WS EV-match \(M: 152.25, SD: 26.67, p = .39\)). Although the children in the WS EV-matched group were selected to minimize the difference in CA between pairs of children, the WS EV-match group was slightly but significantly younger than the DS group (WS EV-match CA \(M: 3.66, SD: .60, p = .04\)). Expressive vocabulary (EV; maximum = 680) and grammatical abilities (sentence complexity; SC, maximum = 37) were determined from parental report on the MacArthur-Bates Communicative Development Inventories: Words and Sentences (CDI, Fenson et al., 2007). Number of different root words (DRW) and mean length of utterance in morphemes (MLUm) were determined from transcripts of 30-minute play sessions with the primary parent. The Mullen Scales of Learning (Mullen, 1995) Early Learning Composite (ELC; general-population \(M: 100, SD: 15\)) was used as a measure of overall intellectual abilities.

Results: Results of Wilcoxon matched-pairs signed-ranks tests indicated that as expected, the DS group had significantly smaller expressive vocabularies than the WS-CA group (DS CDI EV \(Mdn: 99.00\) words, \(IQR: 44.00 – 248.50\); WS-CA CDI EV \(Mdn: 411.00, IQR: 264.75 – 505.25, p < .0001\)) and their utterances were significantly less complex grammatically (DS CDI SC \(Mdn: 0.00, IQR: 0.00 – 2.00\); WS-CA CDI SC \(Mdn: 15.50, IQR: 1.00 – 28.25, p < .0001\)). Exactly the same pattern was found for the play session variables. Overall intellectual abilities (Mullen ELC) were significantly lower for the DS group than the WS-CA group (DS \(Mdn: 52.00, IQR: 47.75 – 57.25\); WS-CA \(Mdn: 65.00, IQR: 55.00 – 76.00, p = .001\)). Despite these differences, all correlations among language measures and the correlations between vocabulary and Mullen ELC were significant for both groups (all \(ps < .0001\)).

When the children with DS were closely individually matched to children with WS for CDI EV and as closely as possible for CA, a different pattern of findings emerged: The two groups did not differ significantly on any of the other language measures or on Mullen ELC. Furthermore, the number of children who produced word combinations in the play session (13/24) was identical.

Discussion: As expected, when children with DS and WS were matched for CA, both the lexical and grammatical abilities of the DS group were less advanced than those of the WS-CA group. Importantly, however, once the groups were matched for CDI EV and as closely as possible for CA, not only did they not differ for the other vocabulary measure, they also did not differ significantly on either of the grammatical ability measures or Mullen ELC. Similarly to typically developing children, lexical abilities are highly correlated with grammatical abilities for both children with DS and children with WS. Theoretical and practical implications will be discussed.

References: