Title: Predictive Validity of the MacArthur-Bates Communicative Development Inventory: Words & Sentences at Age 30 Months for Language and Intellectual Abilities at Age 48 Months: Children with Williams Syndrome

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Introduction: Although previous research clearly has shown that language acquisition is delayed for children with Williams syndrome (WS), there are large individual differences in early lexical development among toddlers with this syndrome (e.g., Mervis & Becerra, 2007). The present study addresses the question of whether these early individual differences are reflected in later language and cognitive development by determining the relations between the expressive vocabulary of 30-month-olds with WS and their lexical, grammatical, and intellectual abilities at age 48 months. The study further addresses the question of whether early parental report of concurrent child language abilities is an effective predictor of later parental report of child language abilities, later child language during a later play interaction, and later performance on standardized assessments of language and intellectual abilities.

Methods: Participants were 50 children with WS (23 girls, 27 boys) whose parent completed the MacArthur-Bates Communicative Development Inventory: Words & Sentences (CDI; Fenson et al., 2007) when their child was both 30 and 48 months old. Age at 30 months ranged from 29.86 – 31.14 (mean = 30.59, SD: 0.34), and age at 48 months ranged from 47.57 – 49.02 (mean = 48.47, SD: .31). Forty of the children also completed a 30-minute videotaped play session with a parent. Play sessions were transcribed using the Systematic Analysis of Language Transcripts (SALT; Miller, 2016). Dependent variables were number of different (non-imitated) root words produced by the child and mean length of utterance in morphemes (MLUm). Thirty-one of the 40 children also completed the Differential Ability Scales-II (DAS-II; Elliott, 2007). The DAS-II provides a measure of overall intellectual ability (General Conceptual Ability [GCA], similar to IQ) based on performance on 6 core subtests, 2 each for the Verbal, Nonverbal Reasoning, and Spatial clusters. Children also completed the Peabody Picture Vocabulary Test-4 (PPVT-4; Dunn & Dunn, 2007), measuring receptive single-word vocabulary; and the Expressive Vocabulary Test-2 (EVT-2; Williams, 2007), measuring expressive vocabulary. For the standardized assessments, mean standard score (SS) = 100 and SD = 15.

Results: As expected, large individual differences were found in CDI expressive vocabulary size (EV) at both 30 months (mean = 115.30, SD: 113.57, range: 0 – 435) and 48 months (mean = 370.00, SD: 236.34, range: 0 – 679 [out of 680 possible]). At 30 months, sentence complexity score (SC), which ranged from 0 – 12, was 0 for 82% of the children. At 48 months, mean SC was 14.56 (SD: 15.01) with a range from 0 – 37 (maximum possible); 32% earned a score of 0. EV at 30 months was a very strong predictor of both 48-month CDI EV (r = .85, p < .0001) and 48-month SC (r = .87). For the 48-month play session, mean number of different root words was 100.48 (SD: 61.16, range: 1 – 204) and mean MLUm was 2.36 (SD: 0.88, range: 1.00 – 3.96). CDI EV at 30 months was again a very strong predictor of individual differences in language at 48 months: for different root words, r = .80 and for MLUm, r = .81. For the 48-month standardized assessments, mean DAS-II GCA was 63.42 (SD: 15.69, range: 33 [lowest possible] – 89), mean PPVT-4 SS was 78.97 (SD: 26.17, range: 20 [lowest possible] – 113) and mean EVT-2 SS was 79.19 (SD: 25.34, range: 30 [lowest possible] – 111). CDI EV at 30 months was strongly correlated (all ps < .0001) with each of the DAS-II measures (ranging from r = .64 for Spatial cluster SS to r = .85 for GCA) and with both PPVT-4 (r = .76) and EVT-2 (r = .77) SSs.

Discussion: Parental report of child EV on the CDI (Words & Sentences form) at age 30 months was highly predictive not only of child CDI EV at 48 months but also of expressive vocabulary size and MLUm during a play session at 48 months and 48-month performance on standardized assessments of vocabulary and intellectual abilities, including nonverbal reasoning and spatial abilities. These findings offer validation of the use of parental report during the late toddler period to predict later child language and nonverbal abilities. Implications for the use of the CDI as an outcome measure during clinical trials will be discussed.

References/Citations: