

Title: Pragmatic Communication Abilities of 6-year-old Children with Williams Syndrome

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Introduction: The characteristics of the cognitive and personality profiles of children with Williams syndrome (WS) have led to a popular misunderstanding of the social communication abilities of this group of children. The relative strength in language abilities, specifically vocabulary, and the increase in social drive has led many to assume that children with WS have good social communication skills. In contrast, empirical studies have provided evidence of significant limitations in pragmatic skills such as use and comprehension of gestures, appropriately initiating and maintaining a conversation, and quality of eye gaze during conversation (see Klein-Tasman, et al., 2018 for review). Parents of children with WS also consistently report that their children (average age of 9 years) have significant difficulties in pragmatic communication (Lane et. al., 2019; Philofsky et. al., 2007). Pragmatic abilities still need to be addressed in a larger sample of younger school-age children with WS. The aim of the present study was two-fold: To characterize the pragmatic abilities of 6-year-olds with WS and to determine the concurrent relations of these abilities with standardized measures of intellectual and language abilities.

Method: Participants were 124 children with genetically-confirmed classic deletions of the WS region (61 girls, 62 boys) and their parents. Mean age was 6.03 years, (SD = 0.28, range = 6.00 – 6.99 years). Parents completed the Children’s Communication Checklist-2 (Bishop, 2003). The CCC-2 contains four scales related to pragmatic communication: Initiation, Scripted Language, Use of Context, and Nonverbal Communication, each of which yields a scaled score (mean = 10 and SD = 3 for the general population). The CCC-2 also includes four scales related to language structure: Speech, Syntax, Semantics, and Coherence. The mean scaled score for the Language Structure (LS) scales was used as a parent-report measure of nonpragmatic language ability. The Clinical Evaluation of Language Fundamentals Preschool-2 (CELF-Pre2; Wiig et al., 2004), was administered to 50 children, from which we determined the Core Language Score (CLS), a measure of general language ability. Verbal standard score (SS) and Nonverbal SS were determined from the Kaufman Brief Intelligence Test-2 (KBIT-2, Kaufman & Kaufman, 2004) for 113 children. Receptive vocabulary was assessed with the Peabody Picture Vocabulary Test-4 (PPVT-4; Dunn & Dunn, 2007) and expressive vocabulary with the Expressive Vocabulary Test-2 (EVT-2; Williams, 2007) for 102 children.

Results: Descriptive statistics for the CCC-2 measures are presented in Table 1. A mixed ANOVA indicated a significant effect of Pragmatic Scale, $F(3,369) = 74.72, p < .001$, with no significant effect of Sex ($p = .08$) or Scale X Sex interaction ($p = .38$). Post hoc comparisons using Šidák correction indicated that Scripted Language scaled scores were significantly higher than scaled scores for the other three scales, and Nonverbal Communication scaled scores were significantly higher than scaled scores for Use of Context and Initiation. No significant difference was found between scaled scores for Initiation and Use of Context.

	Mean	SD	Range
Language Structure (mean)	6.80	2.04	1.75 – 12.25
Initiation	5.11	2.49	1 – 13
Scripted Language	8.08	2.55	2 – 14
Use of Context	5.62	2.35	1 – 10
Nonverbal Communication	7.10	2.22	2 – 14

All correlations between scaled scores for the four CCC-2 pragmatic scales were significant ($p < .001$), with r s ranging from .37 – .56. Correlations between CCC-2 pragmatic scaled scores and the CCC-2 LS mean scaled score and SSs from

CCC-2 Pragmatic Subscale	Measure					
	CCC-2 LS	CELF-Pre2 CLS	K-BIT Verbal SS	K-BIT NonVerb SS	PPVT-4 SS	EVT-2 SS
Initiation	.51*	.48*	.34*	.26*	.26*	.26*
Scripted Language	.54*	.43*	.31*	.22**	.25**	.25**
Use of Context	.54*	.14	.28*	.08	.36*	.29*
Nonverbal Communication	.41*	.43*	.31*	.14	.27*	.19

* $p < .01$ ** $p < .001$

standardized measures of cognitive and language abilities are presented in Table 2. Initiation and Scripted Language scaled scores were significantly correlated with mean LS scaled score and SSs from all of the standardized assessments. Fewer significant relations were identified for Use of Context and Nonverbal Communication scaled scores.

Discussion: These findings evidence a profile of relative strengths and weaknesses in pragmatic abilities for 6-year-olds with WS. On average, 6-year-olds with WS perform at the bottom of the average range for the general population on the Scripted Language scale and at the top of the mild language disability range for Nonverbal Communication. Pragmatic abilities related to Initiation and Use of Context are the areas of greatest difficulty, with average scaled scores at the bottom of the mild language disability range. These results highlight the importance of addressing pragmatic communication skills both in speech/language therapy and throughout the academic curriculum for children with WS. Practical and theoretical implications will be discussed.

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