**Title:** The Relationship Between Language Environment, Cognitive Abilities, And English And Spanish Language Abilities in Bilingual Children with And Without Language Impairment.

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**Introduction:** Children with intellectual and developmental disabilities (IDD) have historically been excluded from bilingual language research. Researchers, however, are increasingly aware of the need for more systematic research to understand language and cognitive development in bilingual children with intellectual and developmental disabilities (Kay-Raining Bird, Trudeau, & Sutton, 2016; Rhodes & Washington, 2016). A growing body of research indicates that a number of factors (such as age, language input, and language output) contribute to the language abilities of typically developing bilingual children. Much of this research indicates that the quality and quantity of language input and language output are key predictors of vocabulary and morphosyntactic abilities in toddlers, pre-schoolers and school-aged bilingual children (e.g., Bedore, Peña, Griffin, & Hixon, 2016; Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010; Hoff & Core, 2013; Ribot, Hoff, & Burridge, 2018). At the same time, it is clear that there is a complex relationship between bilingual language development and cognitive abilities (e.g., non-verbal IQ, processing speed) and children who are bilingual provide a unique context in which to investigate these relationships. Few studies have investigated the relationships between language input and output, cognitive skills, and language abilities in bilingual children with language impairments. The aim of the current study was to identify the relationship between language input and output, age, nonverbal IQ, and processing speed on semantics and morphosyntactic abilities in English and Spanish in 4-6 year old bilingual children with and without language impairments.

**Method:** Data were collected from 58 parent-child dyads as part of a larger study. Child participants (38 males) were exposed to English and Spanish on a regular basis and ranged in age from 4;0 – 6;11 (M age = 5.35 years). All children had at least one parent who identified as Hispanic and 23 child participants had a language impairment (61%). Parents of child participants completed a survey to provide demographic information about themselves and their child (e.g., developmental history, ethnicity, parent education, and employment) and information about language use in the home (e.g., frequency of code-switching in the home, number of children and adults in the home). Parents also participated in a language environment interview in which they provided information about the frequency with which their child heard (input) and used (output) English and Spanish on a daily basis. Each child completed the following standardized assessments: the Bilingual English Spanish Assessment (BESA; Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2014) to measure expressive and receptive vocabulary and grammar, and the Leiter International Performance Scales, Third Edition (Roid, Miller, Pomplun, & Koch, 2013) to assess nonverbal cognitive ability and processing speed. The BESA yields composite scores for morphosyntax (i.e., grammar) and semantics (i.e, vocabulary) in English and Spanish as well as an overall bilingual language index. The Leiter-3 provides composite scores for non-verbal IQ and for processing speed.

**Results:** Structural Equation Modeling (SEM) was used to determine the relationships between the predictors of English and Spanish language abilities in bilingual children with and without language impairments. The goodness of fit of two models were compared. The first model (model 1) included processing speed and non-verbal IQ as predictors of the latent variables English and Spanish language abilities. Both English and Spanish language abilities included MorphoSyntax and Semantics (of English and Spanish, respectively) as indicators of each latent variable. In the second model (model 2), English language input and output was added along with processing speed and non-verbal IQ as predictors to determine if the addition of these variables contributed to an increase in the explained variance in English and Spanish language abilities. The results showed that the second model, with English language input and output included, produced a better fit than the first model; model 1: \(\chi^2 (19) = 16.91, p = n.s., \text{RMSEA} = .12, \text{CFI} = .96, \text{SRMR} = .098\); model 2: \(\chi^2 (14) = 20.23, p = n.s., \text{RMSEA} = .088, \text{CFI} = .97, \text{SRMR} = .096\). The model indicated that morphosyntax and semantics were strong indicators of the latent variables. The model also suggested that while English language input and output had a negative association with Spanish language abilities, \(\beta = -.44, p < .001\), English language input and output were not predictive of English language abilities, \(\beta = .08, p = n.s.\). Processing speed and non-verbal IQ were also predictive of both Spanish, \(\beta = .33, p = .01\) and \(\beta = .28, p < .05\), and English language abilities, \(\beta = .83, p < .001\) \& \(\beta = .40, p < .01\), respectively. Initial findings indicate that Nonverbal IQ and processing speed differentiated the children with IDD from those with typical development.

**Discussion:** Findings from this research indicate that nonverbal IQ and processing speed contribute uniquely to semantic and morphosyntactic abilities in bilingual children and extend the research indicating that language environment (e.g., input and output) predicts language outcomes in bilingual children. Furthermore, this research advances our understanding of the
cognitive and language abilities of bilingual children with IDD. Understanding the linguistic and cognitive mechanisms that underlie individual variation in bilingual children with language impairments and typical development is important to advance both basic science and clinical practice.

References:


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