



Linguistic Demands of Preschool Cognitive Assessments

Glenna Bieno, Megan Eparvier, Anne Kulinski

Faculty Mentor: Mary Beth Tusing



Introduction

In daily practice, the relevance of norm referenced assessments for young children from diverse linguistic or socio-economic backgrounds must be continually assessed. Flanagan, Mascolo, and Genshaft (2000) referred to such information as the “qualitative knowledge base” needed by practitioners to make informed assessment tool selection and interpretation decisions.

The linguistic demands of assessments can pose significant challenges to a practitioner’s ability to validly estimate a child’s cognitive functioning. If the spoken directions of an assessment demand receptive language abilities that are greater than typical expectations for the child’s chronological age, results may underestimate the child’s true cognitive functioning. Likewise, expressive language demands of the assessment can impact the child’s ability to demonstrate his/her knowledge.

Bracken (1987) provided the first review of the linguistic demands of preschool cognitive assessments. He employed the methodology of identifying the incidence of basic concept words in orally spoken test directions. After analyzing the number of concept words used and the typical age ranges at which children demonstrate an understanding of the concept words, Bracken offered recommendations about the appropriateness of the assessment tool for children of different ages.

Flanagan, Mascolo, and Genshaft (2000) provided a review of the linguistic demands of preschool assessment tools by utilizing expert analysis to categorize tests as high, moderate, or low in linguistic demand. Review criteria included features such as length of test directions, use of gestures, and ability of the child to respond by pointing or completing a nonverbal task.

Cormier, McGrew, and Evans (2011) introduced a new methodology to quantify the linguistic demand of assessment test directions. They analyzed the linguistic demands of test directions via analysis of commonly used readability formulae. Total words, total sentences, average number of words per sentence, and average syllables per word were categorized into the factors of “verbosity” and “complexity” and analyzed to determine whether subtests had low, medium, or high linguistic demand. Correlational analysis suggested that the indexes of verbosity and complexity represented different dimensions of the test directions.

Method

We employed three methodologies to review recently revised preschool tests of cognitive abilities.

Basic Concept Review

The frequency of basic concept words in the test directions of the WPPSI III, DAS II, and KABC II was compared to the standardization data of the Bracken Basic Concept Scale (BBCS) and the Boehm Test of Basic Concepts. If either the BBCS or the Boehm indicated that 75% of children within a certain age range did not pass the concept word tested on the respected assessment, the word was counted as a concept word violation. The review of test directions only included those concept words meant to guide, direct, or give feedback to the child.

Verbosity and Complexity Review

Methodology introduced by Cormier et al. (2011) was applied to the standard test directions of each assessment. This involved calculating total words, total sentences, average number of words per sentence, and average number of syllables per word using an online readability calculator www.onlineutility.org. The overall scores were then transformed into z scores to allow for a relative comparison across all subtests from all assessments. A total Verbosity and total Complexity score was calculated. Total Verbosity reflects the average of z scores for each subtest’s total words and total sentences calculations. Total Complexity reflects the average of z scores for the subtest’s average syllables per word and average words per sentence scores.

Finally, Total Demand represents the average of the Complexity and Verbosity indices.

Expert Analysis of Linguistic Demand

Utilizing reviews provided by Ortiz’s (2005) culture-language test classifications, we classified the preschool cognitive assessments as high, moderate, and low in linguistic demand.

Results

Test Battery	Ortiz Review	Readability Indices			Concept Word Violations		
		Verbosity	Complexity	Demand			
<i>Differential Ability Scales II</i>							
Copying	Low	-0.50	-0.76	-0.63	2	2	0
Matrices	Low	2.60	-0.28	1.16	27	22	9
Pattern Construction	Low	2.26	0.23	1.24	13	11	5
Picture Similarities	Low	-0.79	0.11	-0.34	17	15	0
Verbal Comprehension	Moderate	-0.35	0.71	0.18	-	-	-
Naming Vocabulary	Moderate	-0.88	-0.87	-0.87	2	2	2
<i>Kaufman Assessment Battery for Children II</i>							
Atlantis	Low	-0.61	-0.61	-0.61	6	1	0
Face Recognition	Low	-0.87	-0.15	-0.51	4	0	0
Pattern Reasoning	Low	-0.29	0.10	-0.10			
Triangles	Low	0.14	0.08	0.11	8	5	0
Conceptual Thinking	Moderate	-0.71	-0.01	-0.36	31	0	0
Number Recall	Moderate	-0.82	0.10	-0.36	1	0	0
Rebus	Moderate	-0.21	-0.11	-0.16	24	20	19
Word Order	Moderate	1.79	0.26	1.02	2	1	0
Expressive Vocabulary	High	-0.71	-0.01	-0.36	1	0	0
Riddles	High	-0.64	1.35	0.36	-	-	-
<i>Wechsler Preschool and Primary Intelligence Scale III</i>							
Matrix Reasoning	Low	0.26	-0.53	-0.14		11	9
Picture Completion	Low	0.37	-0.95	-0.29		16	4
Block Design	Moderate	1.73	-0.25	0.74		2	0
Coding	Moderate	1.80	-0.31	0.75		6	4
Picture Concepts	Moderate	-0.08	-0.97	-0.53		4	2
Symbol Search	Moderate	1.24	0.28	0.76		2	1
Comprehension	High	-0.81	2.41	0.80		2	0
Information	High	-0.75	-0.27	-0.51		6	4
Similarities	High	-0.74	0.47	-0.14		9	2
Vocabulary	High	-0.81	-0.69	-0.75		-	-
Word Reasoning	High	0.72	-0.29	0.22		8	8
<i>Wechsler Preschool and Primary Intelligence Scale III Ages 2-3</i>							
Object Assembly	Low	0.54	0.51	0.52		2	
Picture Naming	Moderate	-0.97	-1.75	-1.36		-	
Block Design	Moderate	1.80	-0.25	0.77		8	
Receptive Vocabulary	Moderate	-0.96	-1.57	-1.26		1	
Information	High	-0.75	-0.27	-0.51		8	

Discussion

Findings from the current study provide a variety of lenses from which school psychologists can examine the potential impact of linguistic demands in test directions on assessment outcomes. Such working knowledge is critical for practitioners when assessing preschool children from linguistically diverse backgrounds. The findings are also timely in that an updated review of recently revised preschool cognitive assessments has not yet occurred.

Conclusions to be drawn regarding the linguistic demands of the three assessment tools appear to vary as a function of analysis type. In several cases, subtests with a higher number of basic concept word violations did not have correspondingly high verbosity or complexity scores. Similarly, several subtests rated as “high” in linguistic demand by Ortiz (2005) did not result in high verbosity or complexity scores and likewise, subtests high in linguistic demand as determined by readability indices were sometimes rated as “low” in linguistic demand by Ortiz.

Cormier et al. (2011) noted similar findings and argued that the linguistic demands of assessment tools are likely multidimensional in nature, and are not easily categorized unidimensionally as low, moderate, or high. As a result, practitioners are encouraged to consider the various ways in which a child’s linguistic competencies may impact test performance and select the cognitive assessment tool least likely to be impacted by the child’s linguistic differences.

For example, assessments with high numbers of concept word violations may be particularly problematic for children with language delays. However, assessments with lengthy test directions (i.e., verbosity) or more complex language may be more problematic for children with limited English proficiency. Likewise, assessments with high expressive language demands, which Ortiz’s categorization considers, may be problematic for children with expressive language needs.

Findings from the current study are interpreted with caution for a number of reasons. First, the methods employed to review the current assessments are theoretical in orientation. Findings should be cross validated with data on assessment outcomes for students from diverse linguistic backgrounds. Second, the types of review methods employed are subject to application error. Inter-rater reliability was not yet completed at the time of this publication.

This poster supported by the UWEC Differential Tuition Program and the Office of Research and Sponsored Programs