The Renfrew Bus Story: An investigation of the elements and predictive validity of a measure of early language

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INTRODUCTION

This study examined a measure of children's early language skills that is growing in popularity: the Renfrew Bus Story. Research on the Renfrew has linked early scores to later language assessments, but suggests use as a predictor rather than an identification, or diagnostic, tool. Research on the predictive validity of general narrative recall is somewhat divided and not particularly rigorous, and a large part of this research has focused on white, middle-class, kindergarten-age children with specific learning disabilities, including the normative sample for the Renfrew. In this study, authors examined the relationship among scoring categories of the Renfrew, and also looked at the predictive relationship between children's preschool language ability and their kindergarten achievement. Conducted as part of a larger randomized scale-up of a preschool mathematics curriculum in low-income preschools, this study explored four primary aspects of the Renfrew:

1. The relationship among Renfrew variables
2. The relationship between Renfrew scores and other concurrent measures
3. The prediction from beginning Pre-K to end of Pre-K and end of Kindergarten language, literacy, and math skills
4. The impact of an early mathematics curriculum on narrative recall

Quantitative analyses were used to examine these four sets of relationships. This study is an addition to, rather than a replication of, most of the research on using the Renfrew as a predictive tool, using a predominately African American, low-income, typically-developing preschool sample.

METHOD

Sample

- Part of SUNY Buffalo/Vanderbilt scale-up of the *Building Blocks for Math Prekindergarten Curriculum*
- 57 preschool classrooms from 20 sites (16 public schools and 4 large Head Start centers)
  - Sites randomly assigned to either the treatment or "business as usual" condition: 31 classrooms in treatment; 26 classrooms in control
  - All programs primarily served children from low-income households
- 667 children with both preschool year pre- and post-test scores on the Renfrew Bus Story (fall and spring)
  - 56% Female, 79% Black, 10% English Language Learners, Mean age at pretest = 4.5

Instruments

- RENFREW BUS STORY-AMERICAN EDITION
  - Given in spring and fall of Pre-K
  - Scoring Components:
    - *duration of retelling* – how long the child took to tell the story from start to finish
    - *length of utterances* – the average length of the five longest lines spoken by the child
    - *information provided* – accuracy and completeness of the retelling
    - *complexity of speech* – child's use of complex sentence structure (i.e., subordinate clauses)
    - *independence of retelling* – how much the child needed prompting by the assessor
- WOODCOCK JOHNSON III
  - Given in spring and fall of Pre-K and fall of K
  - Letter-Word Identification, Applied Problems, Quantitative Concepts, and Story Recall (fall of K only) Subtests
- THE BUILDING BLOCKS ASSESSMENT
  - Given in spring and fall of Pre-K and fall of K
  - Number and Geometry Subtests

Explorations 1 & 2: Correlations Among Renfrew Variables and Other Outcome Measures

Time 1

	Renfrew Duration	Renfrew Length	Renfrew Information	Renfrew Complexity	Renfrew Independence
Renfrew Length	**-.127**				
Renfrew Information	**-.111**	**.613**			
Renfrew Complexity	.060	**.439**	**.252**		
Renfrew Independence	**-.325**	**.452**	**.448**	**.214**	
WJ Letter-Word ID	-.043	**.206**	**.312**	.072	**.135**
WJ Applied Problems	-.065	**.321**	**.459**	**.095**	**.161**
WJ Quantitative Concepts	.005	**.223**	**.392**	**.078**	**.115**
REMA Number	-.062	**.278**	**.521**	**.093**	**.238**
REMA Geometry	.014	**.158**	**.326**	.045	**.124**

Time 2

	Renfrew Duration	Renfrew Length	Renfrew Information	Renfrew Complexity	Renfrew Independence
Renfrew Length	**-.186**				
Renfrew Information	**-.187**	**.684**			
Renfrew Complexity	-.043	**.561**	**.376**		
Renfrew Independence	**-.305**	**.401**	**.460**	**.194**	
WJ Letter-Word ID	-.041	**.215**	**.260**	**.077**	.062
WJ Applied Problems	.006	**.299**	**.440**	**.184**	**.147**
WJ Quantitative Concepts	-.006	**.273**	**.370**	**.181**	**.202**
REMA Number	-.034	**.310**	**.430**	**.226**	**.230**
REMA Geometry	.011	**.306**	**.442**	**.220**	**.179**

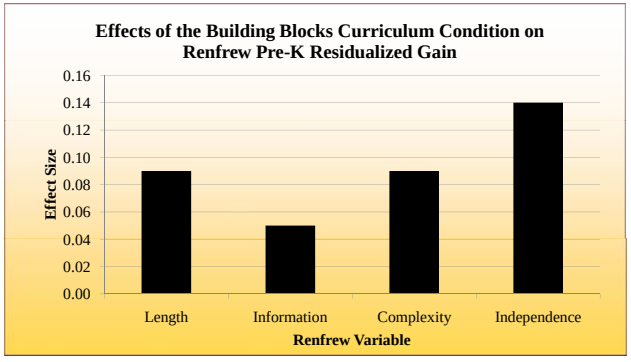
Note. Bolded correlations are significant at the p<.05 level

Exploration 3 : The predictive validity of Entering Renfrew scores to end of Pre-K and End of K skills

	Significant Predictor at End of Pre-K*	Significant Predictor at End of K*
Predictor: Length		
WJ Letter-Word ID		
WJ Applied Problems	X	X
WJ Quantitative Concepts		
WJ Story Recall	(N/A)	X
REMA Number	X	
REMA Geometry	X	X
Predictor: Information		
WJ Letter-Word ID	X	X
WJ Applied Problems	X	X
WJ Quantitative Concepts	X	X
WJ Story Recall	(N/A)	X
REMA Number	X	X
REMA Geometry	X	X
Predictor: Complexity		
WJ Letter-Word ID		
WJ Applied Problems		
WJ Quantitative Concepts		
WJ Story Recall	(N/A)	X
REMA Number		
REMA Geometry	X	
Predictor: Independence		
WJ Letter-Word ID		X
WJ Applied Problems	X	X
WJ Quantitative Concepts	X	X
WJ Story Recall	(N/A)	X
REMA Number		
REMA Geometry	X	X

*p<.10

Exploration 4: The impact of a math curriculum on residualized Pre-K Renfrew gain



Although it is a math-focused program, the *Building Blocks for Math Pre-K Curriculum* relies heavily on encouraging children to use language. This spotlight on language leads to the question of whether the curriculum has an effect on children's narrative skills.

Prediction analyses were conducted using hierarchical regressions, due to the nested nature of the data. Beginning of Pre-K pretests and child demographics were controlled for in all analyses. Children were nested within classrooms and schools.

RESULTS

Explorations 1 and 2: Correlations

- The longer it takes to tell the story, the lower one's other Renfrew scores are. Children who struggled with the retelling or required a lot of prompting generally scored poorly on all scoring categories.
- Generally, Renfrew scores hang with other measures. Specifically, Renfrew length and information scores are positively and significantly correlated with all other outcome measures at the beginning and end of Pre-K.

Exploration 3: Predictive Validity

- Entering Information scores are the best predictor of other skills later on, and entering Independence scores emerge as a good predictor of K skills (over and above pretest and demographics). These Renfrew variables are explaining variation in children's later skills in addition to what their pretest scores and characteristics explain.
- Children's Woodcock Johnson Story Recall scores at the end of Kindergarten are significantly predicted by all four Renfrew variables (over and above pretest and demographics), suggesting the concurrent validity of the Renfrew in measuring children's narrative recall skills.

Exploration 4: Curricular Effects

- The *Building Blocks* curriculum did not significantly predict end of Pre-K Renfrew scores, although the size of the effect on children's Independence scores is not trivial.

DISCUSSION

This study addresses important questions about an increasingly popular measure of early language. In particular, both the inter-relationships between various Bus Story score components, as well as the measure's predictive validity were examined.

Findings suggest that children's retelling scores at the beginning of prekindergarten predict their later achievement through kindergarten in both literacy and math, controlling for demographics and pretest scores associated with the outcome. This indicates that children's narrative skills as measured by Renfrew variables provide information about a child's later achievement that is not indicated by their age, gender, or performance on pretest measures.

This study showed that the *Building Blocks* curriculum, a math-focused program, affected to some degree the Renfrew variables, particularly the Independence scores. This variable was not the focus of the curriculum, nor the best predictor of later skills. However, this effect could be due to the nature of the curriculum which focuses on prompting children to use language, encouraging more independent work through small group activities, etc. Perhaps if we had seen better fidelity of implementation in the experimental group, we would have seen larger effects on these variables.

Unfortunately, the Renfrew is time-consuming and costly to administer and score, due to the transcription component and specific scoring protocols of the measure. It is our belief that Information, which is the best Renfrew predictor of later achievement on other measures, may be able to be scored live, eliminating the need for transcriptions. If this is the case, the Renfrew becomes a much more cost-effective tool to use.

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