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Comparing Nonword Repetition Measures in Bilingual Preschoolers

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Background

- Nonword repetition (NWR) tests have been shown (e.g., Dollaghan & Campbell, 1998; Estes et al., 2007; Dispaldro, Leonard, & Deevy, 2013) to be reliable methods for identifying language learning problems in children.
- However, NWR tests are biased toward the language in which they were created.
 - Nonwords in tests devised for English-speaking children resemble English words (a nonword such as *rubid* resembles the English word *ruby*; knowing *ruby* would help a child remember and repeat *rubid*; children who do not know *ruby* will have more trouble with *rubid*).
- This introduces a potential for bias when using NWR to identify language disorders in children learning English as a second language.

Purpose

- We aimed to compare two nonword repetition measures, each designed to avoid the bias toward English words.
 - NWRT (Ferre, dos Santos, & DeAlmeida, 2011) identifies language difficulties in children learning a variety of first and second languages. It makes use of a range of consonants and syllable shapes.
 - Syllable Repetition Test (SRT; Shriberg, 2009) measure minimizes articulatory difficulty by using only a small number of consonants common to virtually all languages (/b/, /p/, /d/, /t/, /m/, /n/, /a/).
- We compare performance on these two measures in monolingual and bilingual preschool children in an inner city public preschool program.

Methods: Participants

- 50 4-year old children enrolled in an inner city preschool program for low income families participated.
 - 60% from monolingual English homes
 - 20% from Spanish speaking homes; 20% from Portuguese
- Consent forms distributed in English, Spanish, and Portuguese
- All the children have been in school readiness since their third birthday; the school readiness program is conducted in English; all students participate in school activities in English.
- The children from Spanish and Portuguese speaking homes, are considered bilingual.

Methods: Procedures

- Each child was administered NWRT and SRT by trained SHU graduate students fluent in English, Spanish and/or Portuguese
 - Instructions were given in child's native language.
 - Order of presentation of the two tests was randomized.
- Responses were audiorecorded and scored online by trained raters
- Intraclass correlation coefficients (ICC) were computed as a metric of reliability
 - Very Good (NWRT, ICC = .89) to Excellent (SRT, ICC = .95) consistency was obtained for both tasks

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Methods: Characterization

The following measures were given in English to assess English language and nonverbal skills:

- The *Primary Test of Nonverbal Intelligence* (P-TONI; Ehrlert & McGhee, 2008)
- The *Peabody Picture Vocabulary Test-4th Ed.* (PPVT-4; Dunn & Dunn, 2007)
- The Articulation Screener from the *Preschool Language Scale-5* (PLS-5, Artic; Zimmerman, I. Steiner, V. & BS, Pond, R., 2011)
- Student Oral Language Observation Matrix* (SOLOM; Robbins, Green, & Waltzman, 2004)
 - Teachers rated each child on the SOLOM, which rates a non-English-speaking child's proficiency in a second language on a 5-point scale across 5 communication domains that reflect both comprehension and expression.
- See Table 1.

Results

Table 1. Participant Characterization by Language Group

	English only (n = 24)	Bilingual (n = 26)
P-TONI (SD)	106.12 (7.80)	109.00 (11.28)
PPVT-4 (SD)	110.42 (11.14)	104.04 (11.96)
PLS-5, Artic. (SD)	20.46 (1.82)	18.58 (3.00)
SOLOM (SD)	23.17 (2.71)	21.81 (3.54)

Figure 1. Scores from Experimental Tasks

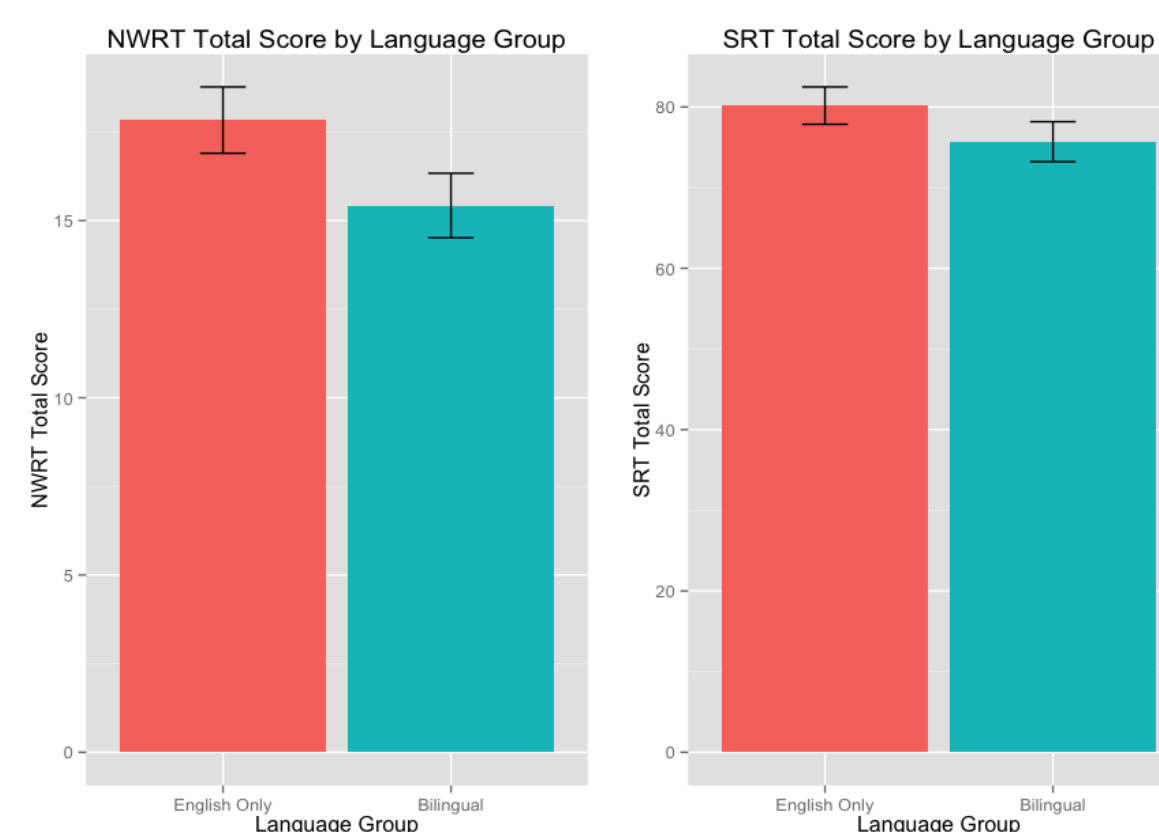
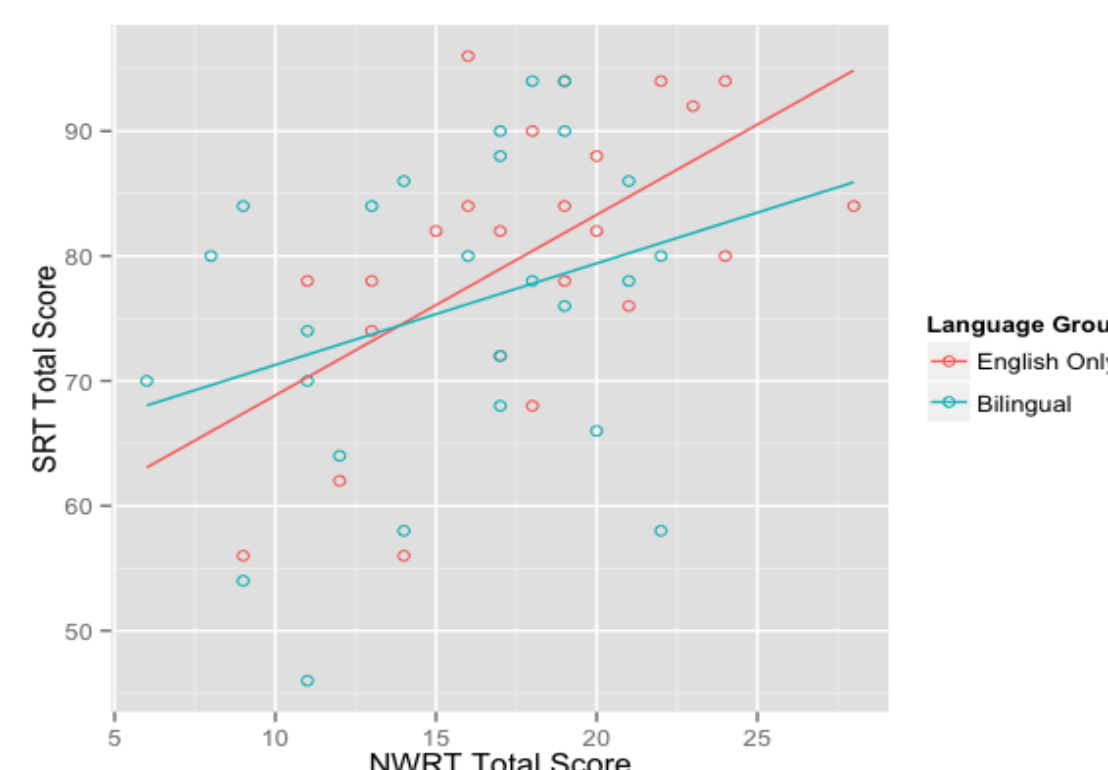


Figure 2. Relationship between NWRT and SRT Performance



Results

- No significant differences on experimental tasks between language groups (See Fig. 1 and 2; NWRT, $p = .07$; SRT, $p = .19$)
- Performance on NWRT and SRT were significantly related for the English Only group but not for the Bilingual group (See Table 2).
- Linear regression revealed that language group did NOT predict performance on either NWRT, $b = -2.41$, $t(48) = -1.85$, $p = .07$, or SRT, $b = -4.47$, $t(48) = -1.33$, $p = .20$.
- Articulation score predicted a significant portion of variance on NWRT ($R^2 = .25$, $F(1,48) = 15.6$, $p < .001$) but not SRT ($b = 1.25$, $t(48) = -1.97$, $p = .06$).

Table 2. Relationship between Task Performance and Nonverbal IQ by Language Group

	1	2	3
English Only			
SRT Total Score			
NWRT Total Score	0.58***		
P-TONI	0.22	0.13	
Bilingual			
SRT Total Score			
NWRT Total Score	0.30		
P-TONI	0.15	0.13	

$p < .001$

Conclusions

These low income 4 year olds, after one year of full-time preschool in English, perform within the average range on nonverbal and verbal (English) measures, even though half the group comes from bilingual homes.

- High quality English-language instruction is effective in minimizing language delays in both monolingual and bilingual low-income preschoolers.
- There was no significant difference between monolingual and bilingual groups on either measure of nonword repetition, and language group did not predict scores on the NWRT or SRT.
- Both the NWRT and the SRT appear to provide assessment of nonword repetition that is equally unbiased for bilingual preschoolers.
- Articulation scores are related to NWRT performance, but not to SRT performance.
- The greater number of consonants required by NWRT results in stronger relations to articulation performance.
- Performance on BOTH NWRT and SRT was independent of verbal IQ.
- Both nonword repetition measures provide an index of verbal ability that is relatively unaffected by nonverbal cognitive level.
- Both measures have potential for identifying both monolingual and bilingual preschoolers at risk for the language and literacy delays known to be associated with low performance on nonword repetition tasks.

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