Fall Letter Naming as a Predictor of End-of-Year Kindergarten Decoding Ability

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STATEMENT OF PROBLEM

A. PREVIOUS RESEARCH

- Children from low-income families enter school already behind their higher-income peers on measures of important literacy skills; with intervention, can enter more on par with peers (NELP, 2009)

- Alphabetic skills (letter names and letter sounds) are foundations of later ability to decode (NELP)

- Letter naming has emerged as a primary predictor of later decoding ability through facilitating learning of letter sounds (McBride-Chang, 1999; Treiman, et. al., 1998-2001)

- A simple to complex progression from letter naming, to initial sound fluency, to phoneme segmentation, to decoding, has been supported in K-1 research (Burke et al, 2009)

- There is little research on progressions within the Kindergarten year

B. PURPOSE

- Further understand how literacy develops and to replicate previous studies of relationships between/among alphabetic skills

C. RESEARCH QUESTION

> How do early phonological and alphabetic skills develop together across the kindergarten year as predictors of end-of-year nonsense-word decoding fluency?

SAMPLE

- 359 kindergarten children with parental consent (71% of total) from all 30 kindergarten classrooms located in 8 elementary schools in a small city; 340 children present for entire year

- Gender = 50.4% male; age = average 67.83 mos. (.73 s.d.) in fall; ethnicity = 45% Caucasian, 39% African-American, 9% Bi-Racial, 6% Hispanic, 1% Asian); lunch status = 78% reduced/free lunch (72% free); IEPs = 6%

DATA COLLECTION

- DIBELS (Good & Kaminski, 2002) results from district's kindergarten assessments

- District testing team (retired teachers trained by district)

- Sub-tests: Fall (letter-naming fluency, LNF; initial sound fluency, ISF; word use fluency, WUF); Winter (LNF, ISF, WUF; phoneme segmentation fluency, PSF; nonsense word fluency, NWF); Spring (LNF; PSF; WUF; nonsense-word fluency, NWF)

ANALYSES/RESULTS

A. PRELIMINARY ANALYSES (http://faculty.chass.ncsu.edu/garson; 4/15/10)

- Kurtosis - 7/9 variables corrected by recoding outliers (4-5 children per variable) to nearest scores within 3 sds of mean

- Skewness - ISF in fall (positive), LNF in spring (negative) - no longer significant after correction

- Correlation with age - few significant, none by end of year - not included

- Corrected scores - demonstrated same patterns as original scores

B. DESCRIPTIVE STATISTICS AND CORRELATIONS

- To examine relationships among variables

- To select possible predictor variables for path (high correlations; theoretical progression over time)

Table 1: Means, Standard Deviations, and Correlations of the Predictor and Outcome Variables

| Test	Variable	1	2	3	4	5	6	7	8	9
Fall	1. ISF1	-								
	2. LNF1	.387***	-							
Winter	3. ISF2	.383***	.279***	-						
	4. LNF2	.337***	.671***	.394***	-					
	5. PSF2	.307***	.260***	.500***	.437***	-				
	6. NWF2	.354***	.579***	.469***	.771***	.537***	-			
Spring	7. LNF3	.262***	.514***	.410***	.686***	.344***	.663***	-		
	8. PSF3	.169**	.172**	.350***	.312**	.406***	.371***	.393***	-	
	9. NWF3	.226***	.394***	.412***	.608***	.435***	.700***	.743***	.446***	-
	M	9.98	12.37	20.82	30.09	26.68	18.74	40.36	50.05	30.96
	SD	7.34	11.92	11.63	15.34	16.77	14.04	15.64	13.81	18.97
	n	357	357	358	358	358	358	341	341	341

*** $p < .001$, ** $p < .01$, * $p < .05$

Summary:

- Mean scores demonstrated growth in each of skill areas across time

- Correlations ranged from .11-.77, with all being significant

- Strongest correlations were in autocorrelations and between LNF and other variables (moderate to strong)

- Letter naming had the strongest correlations with NWF2 and NWF3

- Winter phonological measures (ISF2 and PSF2) were similar to one another as predictors (.41 and .44) of NWF3

C. PATH ANALYSIS

- Hypothesized path model for predictors to Spring NWF based on the correlations above and on research on directional relationships between letter naming, initial sound fluency, phonological segmentation fluency, and nonsense word fluency across the kindergarten year. *(Note: Spring PSF not included in the model due to curvilinear relationship with NWF3)*

Figure 1: Path Model
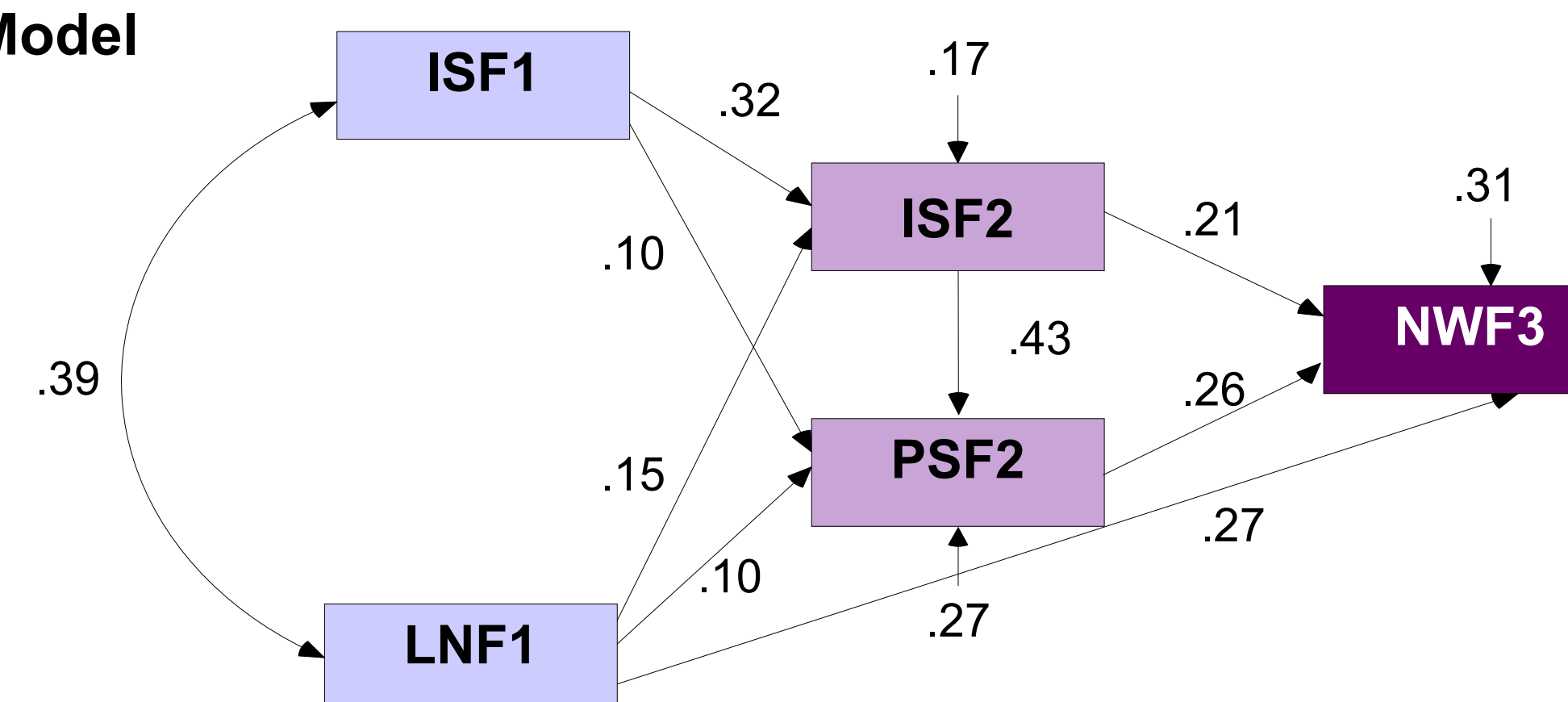
D. MEDIATIONAL ANALYSES (Muthen & Muthen, 2007; Preacher & Hayes, 2008)

Table 2: Mediational Paths

	Mediation Path	Z	p
ISF1 to NWF3	1. ISF1 → ISF2 → NWF3	5.132	.0000
	2. ISF1 → ISF2 → PSF2 → NWF3	5.828	.0000
	3. ISF1 → PSF2 → NWF3	4.646	.0000
LNF1 to NWF3	4. LNF1 → ISF2 → NWF3	4.070	.0000
	5. LNF1 → ISF2 → PSF2 → NWF3	4.698	.0000
	6. LNF1 → PSF2 → NWF3	3.897	.0001
ISF2 to NWF3	7. ISF2 → PSF2 → NWF3	4.972	.0000

Summary:

- Path analysis (AMOS) yielded good fit for the data ($X^2 = .939$, $p = .332$, GFI = .999, RMSEA = .000); (non-significant X^2 shows adequate model: model-implied matrix does not differ from the observed matrix. GFI of .999 = almost 100% of sample variance-covariance matrix was accounted for by the model, exceeding the .90 criterion for good model. (Bollen, 1989)

- Fall LNF (LNF1) showed direct path to NWF3, even after controlling for the effects of phonological variables and indirect paths

- Direct and indirect paths explained 30.5% of the variance in NWF3

- Predicted directional relationships were all significant

- Each of possible mediational paths was highly significant (Table 2)

DISCUSSION

- LNF was supported as a primary predictor of nonsense word fluency, with both direct and indirect effects (McBride-Chang, 1999; Share, 2004); ISF and PSF may become stronger predictors across time as children no longer have to figure out the sound for each letter

- A simple to complex progression from letter naming, to initial sound fluency, to phoneme segmentation, was supported as a likely path to decoding simple nonsense words (Burke et al, 2009)

- Learning in the skill areas measured may occur somewhat simultaneously, indicating multiple viable paths to nonsense word fluency; some children may gain insight into decoding without spending much time, or by-passing, some predicted steps

- Given that these alphabetic and phonological variables accounted for only 30.5% of the variance in nonsense word fluency, there may be other, unmeasured abilities that also influence nonsense word fluency in Kindergarten

- Need to further explore curvilinear relationship between PSF3 and NWF3; there is a possibility that PSF is facilitative only as children begin to understand decoding.

LIMITATIONS

- No measures beyond those available from district testing; could not explore other possible predictors of decoding

- No information available on which letters and which letter sounds children knew; not able to examine facilitative qualities of particular letters—may be important in understanding why only some children can decode nonsense words by the end of K
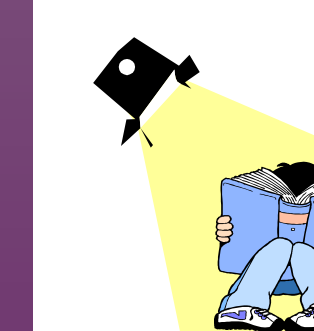
IMPLICATIONS FOR PRACTICE

- Identifying predictive relationships among earlier and later emergent literacy skills is important both for understanding how early literacy develops and for identifying crucial areas for early intervention prior to entry into kindergarten (e.g., Foy & Mann, 2006; Share, 2004).

- Early letter naming ability is a strong predictor of later emergent literacy skills, supporting its importance as a screening measure

- Results are consistent with intervention recommendations that:

  ◦ Children should be taught letter sounds by mapping them onto known letter names (McBride-Chang, 1999; Treiman, et.al., 1998-2001)

  ◦ Children should be taught to understand relationships among various skill areas (e.g., letter naming, initial sounds, sounds within words, decoding) as they emerge together and facilitate cross-skill learning (NELP, 2009)

Anita Lange, a DELL-D teacher, points out letters on a child's snack wrapper.