

Psychometric Characteristics of an Early-Literacy Screening Tool (ELST) for Children with Communication Disorders

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THE CRANE CENTER FOR
EARLY CHILDHOOD
RESEARCH AND POLICY



Today We Will Discuss:

- The importance of utilizing **screening** assessments as a means for addressing the diverse early-literacy needs of children with communication disorders
- The psychometric characteristics of the Early-Literacy Screening Tool (ELST)
- How to use information gleaned from the ELST in order to provide effective early-literacy intervention to children with communication disorders

Meeting Diverse Early-Literacy Needs

Think of 2 young children and make a chart to list their similarities and differences

	Similarities	Differences
Appearance		
Language Skills		
Literacy Skills		

Young Children: Meeting Diverse Early-Literacy Needs

- Young children are considerably **diverse** with respect to their language and literacy skills and competencies

– Cabell, Justice, Konold, & McGinty, 2009; Justice & Ezell, 2001

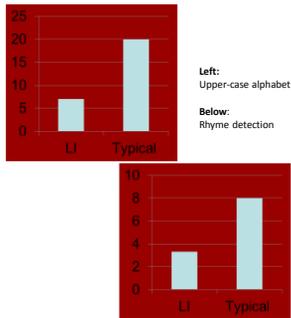
- This diversity is especially relevant today when more children come from low-income backgrounds, are second language-learners and experience a multitude of other **risk factors**

– Bowman, Donovan, & Burns, 2001

Risk Factor: Communication Disorders

Children with communication disorders are highly susceptible for reading difficulties

In particular - children with language impairment (LI) are **vulnerable** for lags in the development of **early literacy skills**

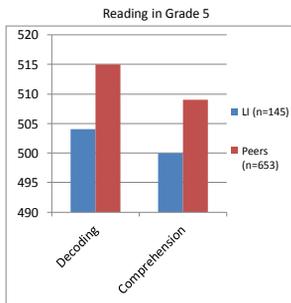


Cabell, Justice, Zucker, & McGinty, 2009

Variable-Centered Approach to Understanding Risk

Early risks are consequential to future reading achievement among children with communication disorders

Children's risks assumed based on **variable-centered** models



Skibbe, Grimm, Stanton-Chapman, Justice, Pence, & Bowles, 2008

Person-Centered Approach to Understanding Risk

Latent Profile Analysis

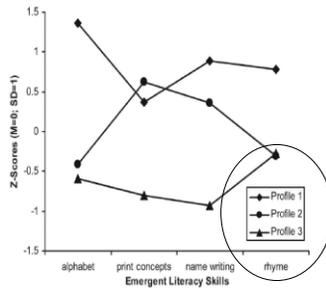
- Considers the relative performance of each person on a set of variables, independently
- Provides a way of capturing the variability within a person's scores

Logan & Pentimonti, 2013

Person-Centered Approach to Understanding Risk

62 children with Specific Language Impairment (SLI) on four measures of early-literacy skill

Prevalence:
Profile 1: 27%
Profile 2: 34%
Profile 3: 39%*

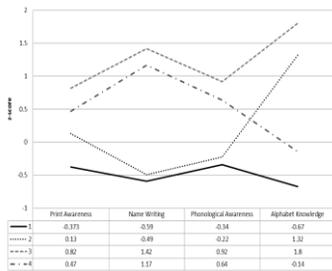


Cabell, Lomax, Justice et al., 2010

Person-Centered Approach to Understanding Risk

218 children with LI on four measures of early-literacy skill

Prevalence:
Profile 1: 55%
Profile 2: 14%
Profile 3: 11%*
Profile 4: 19%



Justice, Logan, Kaderavek, Schmitt, Tompkins, & Bartlett, 2013

Person-Centered Approach to Understanding Risk

- Person-centered analyses highlight the importance of understanding individual differences in early-literacy skills among children with communication disorders
- It is critical that researchers and clinicians focus on ***differentiated instruction*** to support those children who are **vulnerable** for lags in the development of **early-literacy skills**

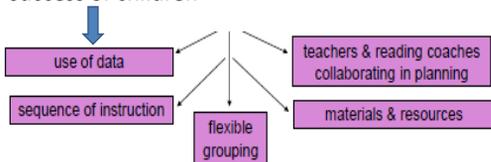
Keys to Differentiation in the Context of Intervention

- ✓ **Identify children who are a priority for intervention – and the specific early-literacy skills that require support**
- ✓ **Tailor interventions to children’s needs – and target specific early-literacy skills**

Differentiation provides clinicians with a chance to address ***individual differences*** between children

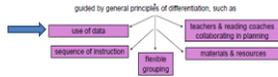
General Principles of Differentiation

Adhering to these principles facilitates the work of adults differentiating instruction and the success of children



(adapted from Tomlinson and Allan, 2000)

Use of Data



- When differentiating instruction, children's differences are **expected, appreciated, and studied** as a basis for instructional planning
- Bond between assessment and instruction
 - Assessment data enables adjustment of instruction and responsiveness to an individual child's needs

(adapted from Tomlinson and Allan, 2000)

Instruction without assessment
is like driving a car at night
without headlights

Effective Assessment

- Focuses on essential early-literacy skills
- Is instructionally relevant

- ➔
- **Screening**
 - *Diagnostic*
 - *Progress Monitoring*
 - *Outcome*

Screening Assessment

- To determine if children are above level, on level, or below level
 - Identify risk
 - Identify children's need for support in specific skills

Who needs additional instructional support?

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Screening Considerations for Children with Communication Disorders

- There is considerable interest in identifying ways to prevent reading difficulties among children with communication disorders
- One avenue for doing so is by **screening** young children with communication disorders for their attainment of early-literacy skills

Invernizzi, Justice, Landrum, & Booker, 2004; Justice, Invernizzi, & Meier, 2002

Importance of Screening Tools

- The success of screening efforts is contingent upon clinicians having access to **psychometrically sound** early-literacy screening tools
- Psychometrically sound
 - Reliable
 - Valid

Available Screening Tools

- Catts' Deletion Task
 - Phonological Awareness
- Preschool Word and Print Awareness (PWPA)
 - Print Knowledge

Limitations:

–Do not provide comprehensive coverage of the range of early-literacy skills that are predictors of later reading skills

Catts, Fey, Zhang, & Tomblin, 2001; Justice, Bowles, & Skibbe, 2006

Early-Literacy Screening Tool

A Canadian community agency providing clinical services to children with communication disorders recently developed an adaptation of the PWPA

Benefits:

– Provides broader coverage of the range of early-literacy skills that may signify risk for reading problems among young children

Early-Literacy Screening Tool (ELST)

- Designed to assess the early-literacy skills of four- to five-year-old children
 - Print awareness
 - Phonological awareness
 - Alphabet knowledge



Phonological Awareness



Sensitivity to the sound structures of spoken language

- Rhyme awareness
- Beginning sound awareness

Section 2: Phonological Awareness		
7. Rhyme Identification	Page 3-6: Look, there is Spot. Spot is a dog. The word dog rhymes with log. They sound almost the same at the end... dog - log. They both end with "og," so we say they rhyme. Spot is wearing a hat. Let's see if these words rhyme with hat? I'll say two words and you tell me if they rhyme. Ready? Item A: Hat - cat	Identifies each pair as rhyming (Items A and D) or not rhyming (Items B and C); score each item separately.

Alphabet Knowledge



Knowledge of the names of the individual letters comprising the written alphabet

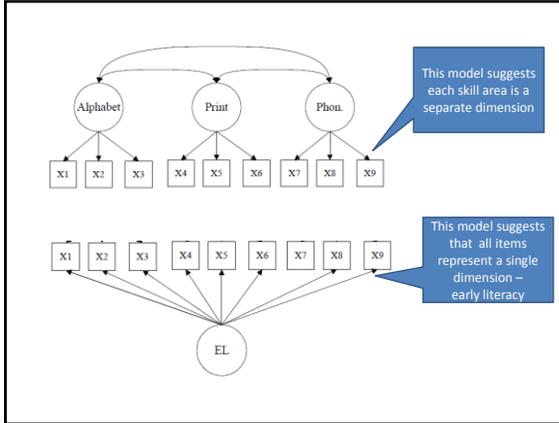
- Identification of upper- and lower-case letters
- Understanding of letter-sound correspondences

Section 3: Alphabet Knowledge		
13. Matching Identical Words	Page 17-18: This is a word (point to the word "table" in the book, but DO NOT SAY THE WORD). I wonder what it says? Now, here are three words on these cards: donut, balloon, table. (Show the 3 picture cards with the labels of donut, balloon, table - point to the words as you say them). Show me the word that is the same as the word in our book.	Matches the word "table" on the picture card to the word "table" in the book.
14. Matching Identical Letters	Page 17-18: This is a letter "t" (point to the "t" in "table"). Can you find another letter T on this page?	Points to a "t"

Dimensionality of Early-Literacy Skills



- The ELST provides information on different skill areas and assumes each of these different areas is a unified **dimension** of early-literacy development
- Is this true – or do these three skill areas represent a single dimension of 'early literacy'?



Investigating Dimensionality: Establishing Reliability

- It is important that all items reflecting a specific dimension map onto that dimension and that dimensions do not overlap substantially
- Informs how the tool is scored and interpreted
- **Multi-dimensional:**
 - Scores interpreted separately
- **Unidimensional:**
 - Single score interpreted

Investigations of dimensionality ensure the **reliability** of the ELST and ensures the tool is psychometrically sound

Investigating Constructs: Establishing Validity

Does the ELST actually represent the construct (early-literacy) being investigated?

- Need to examine the extent to which relationships between ELST scores and other measures of *similar constructs* reflect expected patterns
 - Do children who receive high scores on the ELST also receive high scores on measures of language?

Investigations of construct validity ensure the **validity** of the ELST and ensures the tool is psychometrically sound

Investigating the Psychometric Characteristics of the ELST



Study Aims

- To establish:
 - **Reliability (factor structure)**
 - Validity
- Ensures that the ELST is a psychometrically sound assessment tool

Study Sample



- 166 children
- Referred to a government-supported community agency (Speech Services Niagara) over an 18-month period
- Children administered ELST based upon 2 criteria:
 - Between 48 and 66 months of age
 - Did not have suspected or confirmed comorbid diagnoses

Measures



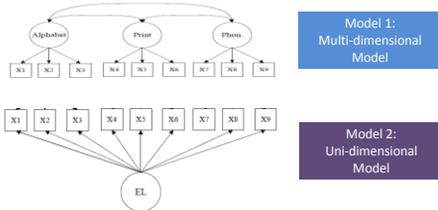
Children were administered:

- ELST
- Three subtests of the *Clinical Evaluations of Language Fundamentals-Preschool (CELF-P:2)*
 - Sentence Structure
 - Word Structure
 - Expressive Vocabulary

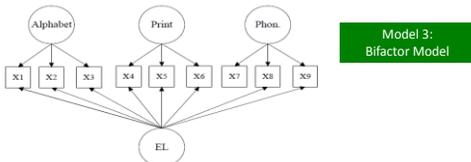
ELST Reliability Analyses



- Conducted to determine whether or not all items reflecting a specific dimension map onto that dimension and that dimensions do not overlap substantially
- Utilized Confirmatory Factor Analyses to compare the fit of 3 models:

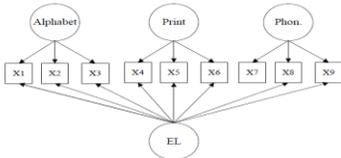


ELST Reliability Analyses A 3rd possible model



Do these skill areas represent separate dimensions as well as a reflection of an underlying early-literacy trait?

Reliability Results



Bifactor Model is the best 'fitting' model:
Suggests there is a *single dominant early-literacy dimension* on which all of the ELST items load, coupled with the existence of *subsets of ELST items that represent the three distinct dimensions* of early literacy included in the tool

Practical Implications from Investigations of Dimensionality

Finding:

Distinct dimensions of early literacy exist

Suggestion:

Clinicians should utilize and interpret scores from each of the three subtests when using the tool as a screening measure

Investigating the Psychometric Characteristics of the ELST



Study Aims

- To establish:
 - Reliability (factor structure)
 - **Validity**
- Ensures that the ELST is a psychometrically sound assessment tool

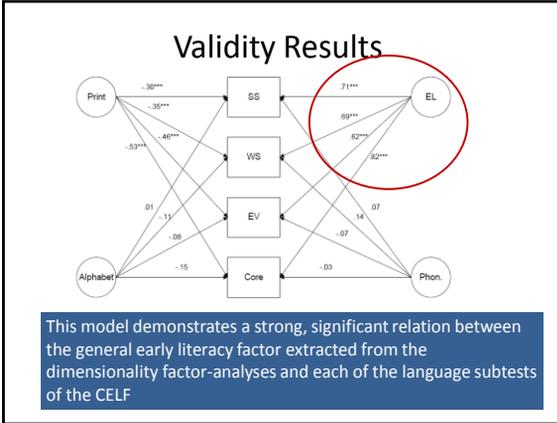
Validity Analyses



Conducted to determine whether or not the ELST actually represent the **construct** (early-literacy) being investigated

Investigated the extent to which relationships between ELST scores and other measures of *similar constructs* reflect expected patterns

Utilized a series of structural models to evaluate the relation between the factors from the ELST and children's concurrent performance on the CELF subtests



Practical Implications from Investigations of Construct Validity

Finding:
Strong relations between performance on the ELST and the CELF

Suggestion:
Clinicians can confidently use the ELST as a valid measure of early-literacy skills and trust in the inferences that can be made about children's skills from ELST outcomes

Conclusions Regarding the Use of the ELST

Given established reliability and validity the ELST can be used:

- To examine the early-literacy skills of children with communication disorders
- To identify children who may have needs across salient areas of early-literacy development

Additionally:
Knowing that the test protocol has been used within a clinical program by speech-language pathologists supports the **practical utility** of the tool

Applying the ELST to Practice



Keeping in mind the characteristics and benefits of the ELST, let's revisit the idea of using results from screening assessments (such as the ELST) to inform differentiated instruction within the context of intervention

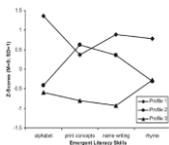
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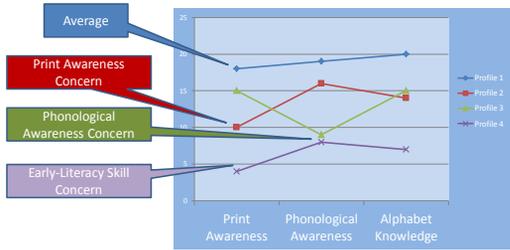
ELST provides ability to understand individual differences

- Provides reliable scores on 3 key dimensions of early-literacy
- Allows for person-centered analyses



Child	Phonological Awareness	Letter Knowledge	Letter-Word Recognition
Child A	0.8	0.2	0.5
Child B	0.2	0.5	0.8
Child C	0.5	0.8	0.2
Child D	0.2	0.8	0.5

Imagine investigations of ELST scores result in 4 profiles of children



Think, Pair, Share

How would you provide differentiated instruction to:

- Average group
- Print awareness concern group
- Phonological awareness concern group
- Early-literacy skills concern group

Some Instructional Suggestions

Empirically-validated practices from What Works Clearinghouse (WWC): <http://ies.ed.gov/ncee/wwc/>

The WWC:

- Aims to provide practitioners with the information they need to make **evidence-based** decisions
- Done through **systematic review** process
- Process applies **rigorous research standards** to identify high-quality research
- Findings are summarized



Specific Suggestions from the WWC



- Print Awareness/Alphabet Knowledge:
 - **Print Referencing**: encourages children to pay attention to print/letters within storybooks

http://ies.ed.gov/ncee/wwc/pdf/single_study_reviews/wwc_pspread_101612.pdf

- Phonological Awareness
 - **Sound Foundations**: focuses on phoneme identity

http://ies.ed.gov/ncee/wwc/pdf/intervention_reports/WWC_Sound_Foundations_043007.pdf

In Summary 3 Take-Away Points



- The ELST has been established as a **psychometrically sound** assessment tool (both reliable and valid)
- A strength of this tool is that it was developed by and is already in use within a clinical context, thus its potential use for **clinical purposes** is already established
- Children's performance on screening measures, such as the ELST, can provide clinicians with valuable information to enable them to design **effective, targeted early-literacy** interventions for children with communication disorders

THANK YOU! Questions?

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