

Examining the Validity and Utility of an Assessment of Preschool Early Literacy Skills

Preschool Early Literacy Indicators (PELI)

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Dynamic Measurement Group



Overview



- Overview of PELI
- Overview of research on PELI
- Research results
- Preliminary benchmark goals and next steps

Acknowledgements: PELI Team



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The Issue



- Up to 40% of children enter kindergarten behind peers in emergent literacy skills that are foundations to school success (Bailet et al., 2009).
- Reading difficulties are easier to prevent than to remediate (Berninger et al., 2002; Coyne et al., 2004; Torgesen, 2002).
- Emergence of RTI model in early childhood shows promise for meeting needs of all children (Ball & Trammell, 2011; Greenwood et al., 2011)
- Need for reliable, valid measures of early literacy skills that are appropriate for preschool-age children that can be used for screening and progress monitoring.

Background What is the PELI?



- Screening and progress monitoring assessment of foundational early literacy skills for preschool children ages 3 – 6.
- Skills embedded in story-book format
 - Alphabet knowledge
 - Phonological awareness
 - Vocabulary and oral language
 - Comprehension

PELI Overview



- Book format
 - Assessor sits beside child and looks at book with child. Assessor gives directions and asks questions following standard prompts. Skills assessed through series of book-related activities.



Key Features of Stories



- Stories were written and illustrated to represent a broad range of scenarios and activities familiar to preschool students
- Characters have diverse identities (family structure, ethnicity, disability status)
- Average administration time about 11 minutes

Sections



- Alphabet knowledge
 - Name upper- and lower-case letters
- Comprehension
 - Answer questions about story
 - Make predictions and inferences
 - Recall details from story (CLOZE task)
- Phonological awareness
 - Identify first syllable in two-syllable words
 - Identify first sound in single-syllable words
- Vocabulary/oral language
 - Names pictures
 - Tells about pictures/words

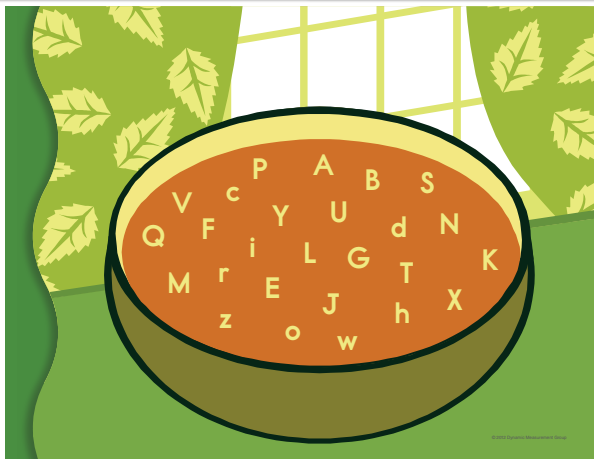
Current PELI Forms



Sample Book



Alphabet Knowledge



Alphabet Knowledge



AK1. Here is a bowl of alphabet soup with letters in it. Do you know any of these letters? Point to and tell me the names of all of the letters that you know. After the child has finished naming letters, prompt him/her to continue naming any additional letters by pointing to each letter and saying, **"Do you know what letter this is?" or "What is this letter?"**: Start by prompting the following letters if the child has not named them: O X A S
Continue prompting the child to name letters until he/she misses three consecutive letters.

Vocabulary and Oral Language



Vocabulary and Oral Language



V/OL 1. Here are some pictures of things you might see in the kitchen. I will point to a picture and you tell me its name.

Point to each picture and ask, **"What is this?"** or **"Do you know what this is?"**
If the child says a related word (i.e., "smoothie" for "blender" or "toast" for "toaster"), ask, **"What's another name for it?"**

V/OL 2. Now I want you to tell me everything you can about some words.
My turn first. I will tell you everything I can about a spoon (point to the spoon). **A spoon is something you use to eat and it is made out of metal.**
Now it is your turn.

If the child has not named the picture correctly, say, **"This is a _____"**
before asking him/her to tell you about it:

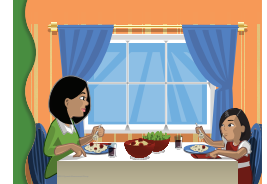
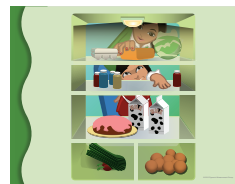
Vocabulary and Oral Language



- 1. Tell me everything you can about a cup.**
- 2. Tell me everything you can about a spatula.**
- 3. Tell me everything you can about a toaster.**
- 4. Tell me everything you can about a cabinet.**
- 5. Tell me everything you can about cauliflower.**

If the student does not respond or says, 'I don't know' when you ask him/her to tell you about a word, provide one prompt per word such as,
"What do you do with a _____?", **"What is a _____ for?"** or **"What does a _____ do?"**

Comprehension



Comprehension



Now I am going to read a story and ask you some questions.

Carla's mama came into her room and said, "I got off work late and couldn't get groceries. We will have to use whatever is in the house to make dinner. Can you help?"

C2. Carla gets to help make dinner. How do you think she feels?

Comprehension



- ***"Perfect!" said Carla. "And look—we even have meatballs!"***
- ***C3. Now that Carla and her mama have all the ingredients, what are they going to do?***

Comprehension



Carla and her mama sat down to eat a yummy dinner. "We won the Super Dinner Search game!" said Mama. "Yeah," said Carla, "and the prize is delicious!"

Let's see what you remember about the story.

C5. When did the story happen?

C6. Who helped mama make dinner?

C7. Why did Carla and her mama need to make dinner with only things they could find in the kitchen?

C8. Where did Carla find the cheese?

C9. What else did Carla find to make dinner?

Comprehension



Comprehension



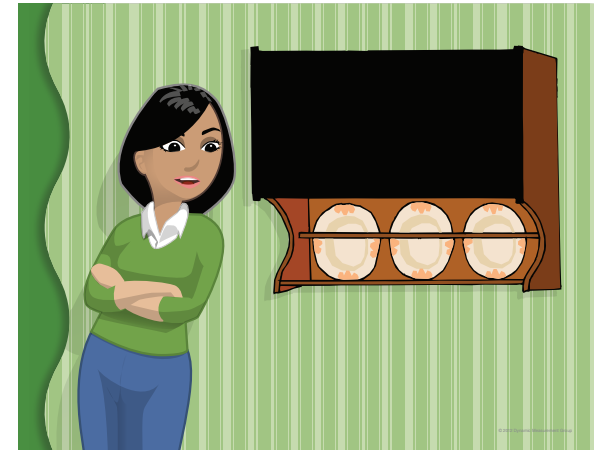
V/OL3. Here are some pictures from the story. I'm going to tell you the story again and I want you to help me. When I stop, you tell me the part that is missing. Read the text and pause prior to each item to wait for student response. If the student does not respond, say the underlined answer.

Mama came home from work and said, "Carla, can you help me (C10) make dinner?"

No response or incorrect response: **Mama said, "Carla, can you help me make dinner?"**

Sure! said, (C11) Carla. Carla and her mom needed to find something to put on noodles so Carla looked in the (C12) refrigerator. They found cheese in the refrigerator and then they found tomato sauce and meatballs. They were going to make (C13) spaghetti. Carla's mama said, "Yum! I am starting to feel (C14) hungry." So they made spaghetti and sat down to eat dinner.

Phonological Awareness



Phonological Awareness



Look! Here is a kitchen cupboard and here are some things (take out pictures) that go in the cupboard. We are going to play a game and help Carla's mama put the pictures away in the cupboard. (Show first picture).

I'm going to show you a picture and say the word and you tell me the first part of the word. Then you can put it in the cupboard.

My turn first. This is meatball. The first part of the word "meatball" is "meat". Meat. Meatball. I said the first part of the word meatball, "meat", so I will put this in the cupboard.

Your turn. (hold up picture of pancake) This is pancake. What is the first part of the word pancake?

Scoring Sheet



Child's ID: _____		Examiner: _____		Date: _____	
Alphabet Knowledge List letters in order: V C D A B S Q F I L O T K M E J G H X z o w		Phonological Awareness Phonological Awareness 1: Identifies DAA1. repeat /at/ /at/ 0 DAA2. segment /at/ /at/ 0 DAA3. blend /at/ /at/ 0 DAA4. delete /at/ /at/ 0 DAA5. erase /at/ /at/ 0 PAA 2 Score: _____			
Comprehension C10. make dinner 0 C11. Carla 0 C12. refrigerator 0 C13. spaghetti 0 C14. hungry 0 Total Score: Comprehension 0		Phonological Awareness 2: First Sound DAA6. bread /b/ /b/ 0 DAA7. fork /f/ /f/ 0 DAA8. meat /m/ /m/ 0 DAA9. jam /j/ /j/ 0 DAA10. dish /d/ /d/ 0 PAA 3 Score: _____			
Comprehension 1: Identifies and Produces C1. What is back about? 0 C2. How does Carla feel? 0 C3. What are they going to do? 0 C4. What will they do next? 0 Comprehension 1 Total: 0		Phonological Awareness 3: Rhyming DAA11. Names pictures DAA12. Names pictures DAA13. Names pictures DAA14. Names pictures DAA15. Names pictures PAA 4 Score: _____			
Comprehension 2: Recollection C5. When did the story happen? 0 C6. Who helped mama make dinner? 0 C7. Why make dinner with only things in kitchen? 0 C8. When did Carla find dinner? 0 C9. What else did Carla find? 0 Comprehension 2 Total: 0		Phonological Awareness 4: Syllables DAA16. Names pictures DAA17. Names pictures DAA18. Names pictures DAA19. Names pictures DAA20. Names pictures PAA 5 Score: _____			
Comprehension 3: Clues C10. make dinner 0 C11. Carla 0 C12. refrigerator 0 C13. spaghetti 0 C14. hungry 0 Total Score: Comprehension 3: 0		Phonological Awareness 5: Onset and Rhyme DAA21. Names pictures DAA22. Names pictures DAA23. Names pictures DAA24. Names pictures DAA25. Names pictures PAA 6 Score: _____			
Comprehension 4: Total C10. make dinner 0 C11. Carla 0 C12. refrigerator 0 C13. spaghetti 0 C14. hungry 0 Total Score: Comprehension 4: 0		Phonological Awareness 6: Total DAA26. Names pictures DAA27. Names pictures DAA28. Names pictures DAA29. Names pictures DAA30. Names pictures PAA 7 Score: _____			

Research on PELI



Study 1: $n = 90 - 130$

- Descriptive statistics
- Concurrent

Study 2 $n = 32$

- Reliability
 - Inter-rater
 - Alternate form
 - Test-retest

Study 3 $n = 165$

- Descriptive statistics
- Concurrent and predictive validity

Study 4 $n = 44$

- Comparison of versions

Study 5 $n = 136$

- Vocabulary study

Study 6 $n = 258$

- Preliminary benchmark goals

Study 1: Descriptive Statistics



PELI Subtest	Beginning of year			Middle of year			End of year		
	M	SD	N	M	SD	N	M	SD	N
Alphabet knowledge	10.00	14.36	131	17.45	17.77	115	20.22	18.42	107
Phonemic Awareness	6.86	1.88	131	7.50	1.83	115	8.11	1.90	107
Comprehension	8.89	4.58	131	10.24	4.36	114	9.14	3.90	107
Vocabulary/ Oral Language	17.04	5.17	131	19.13	5.93	114	18.74	5.23	107

Study 1: Concurrent Correlations with SNRTs



PELI	CELF Sentence Structure	CELF Word Structure	CELF Expressive Vocabulary	CELF Total	PPVT	TOPEL Print Knowledge	TOPEL Phonological Awareness
Alphabet knowledge	.03 † (74)	.21 † (74)	.22 † (74)	.19 † (74)	.47 (79)	.75 (85)	.34 *** (85)
Phonemic awareness	.63 (74)	.63 (74)	.47 (74)	.69 (74)	.39 (79)	.05 † (85)	.24 * (85)
Comprehension	.44 (74)	.67 (74)	.60 (74)	.69 (74)	.52 (79)	.44 (85)	.31 *** (85)
Vocabulary/ Oral Language	.46 (74)	.54 (74)	.72 (74)	.68 (74)	.54 (79)	.39 (85)	.35 *** (85)

Note. Correlations are based on subjects with pair-wise complete data. The number with pair-wise complete data is reported in parentheses. Unless otherwise noted, correlations are statistically significant at the $p < .001$ level.

*** $p < .005$

** $p < .01$

* $p < .05$

† Not significant.

Study 1: Concurrent Correlations with IGDIs and DIBELS LNF



PELI	Phonological Awareness			Vocabulary		DIBELS	
	Rhyming	Sound ID	Alliteration	Sound Blending	Vocab	Which one?	Picture Naming
Alphabet knowledge	.14 †	.41	.17 †	.19 †	.29	.19*	.20*
Phonemic awareness	.34	.28***	.03 †	.38	.29	.26***	.25***
Comprehension	.36	.21*	.15 †	.26*	.52	.43	.54
Vocabulary/ Oral Language	.28***	.27***	.18*	.21*	.56	.40	.58

Note. Correlations are based on subjects with pair-wise complete data. Sample sizes were between 104 and 131 for all correlations with the exception of Sound Blending which had a sample size between 84 and 96. Unless otherwise noted, correlations are statistically significant at the $p < .001$

*** $p < .005$

** $p < .01$

* $p < .05$

† Not significant.

Study 2: Alternate Form Reliability



Form	1	2	3	4	5
1	-	.91	.89	.92	.89
2	-	-	.94	.90	.91
3	-	-	-	.91	.91
4	-	-	-	-	.92
5	-	-	-	-	-

Note: Correlations are based on subjects with pair-wise complete data. All correlations are statistically significant at the $p < .01$ level. AK range = .96 - .99, PA range = .84 - .95; VOL range = .64 - .85; Comp range = .56 - .79. $N = 32$.

Study 2: Inter-rater Reliability



PELI Subtest	Form 1	Form 2	Form 3	Form 4	Form 5	Overall
AK	.99	.99	.99	.99	.99	.99
PA	.99	.99	.99	.96	.97	.99
VOL	.99	.98	.99	.97	.98	.98
Comp	.98	.99	.98	.98	.91	.98
Total	.99	.99	.99	.99	.99	.99

Note: All correlations are statistically significant at the $p < .001$ level.

PELI Research, 2010-2012: MI Site



- Descriptive data on PELI - BOY, MOY, EOY
- Concurrent correlations with CELF ELI, DIBELS LNF, FSF, DCS
- Predictive correlations with CELF ELI, DIBELS LNF, FSF, DCS

Study 3: Concurrent and Predictive Correlations with CELF and DIBELS



PELI subtest - time of year	CELF - end of year			DIBELS measures - end of year		
	Expressive Vocabulary	Recalling Sentences	ELI	LNF	FSF	DCS
Alphabet Knowledge - beg.	.35*	.47	.46	.53**	.44*	.54**
Alphabet Knowledge - mid.	.61	.68	.72	.84	.55**	.77
Alphabet Knowledge - end	.26†	.45	.41**	.83	.49**	.72
Comprehension total - beg.	.52	.58	.61	.31†	.51**	.46*
Comprehension total - mid.	.64	.30*	.47**	.31†	.33†	.36†
Comprehension total - end	.43**	.48	.51	.11†	.45*	.32†
Phonemic awareness total - beg.	.29*	.55	.50	.27†	.43*	.39*
Phonemic awareness total - mid.	.35*	.51	.49	.44*	.63	.60
Phonemic awareness total - end	.42**	.54	.55	.40*	.67	.61
Vocabulary/Oral Language total - beg.	.29**	.37*	.43**	.41*	.44*	.48**
Vocabulary/Oral Language total - mid.	.45**	.16†	.30†	.16†	.54**	.40*
Vocabulary/Oral Language total - end	.29*	.36**	.36**	.14†	.44*	.33†
PELI Composite Score - beg.	.52	.65	.66	.51**	.61	.63
PELI Composite Score - mid.	.73	.60	.71	.59	.69	.71
PELI Composite Score - end	.53	.67	.68	.45*	.64	.61

Note: Data was collected from one district during the 2011-12 school year. Unless otherwise noted, correlations are statistically significant at the $p < .001$ level. ** = $p < .01$; * = $p < .05$; † = not significant. Sample sizes for correlations with CELF measures range from 43 to 51. Sample sizes for correlations with DIBELS measures are 29.

Studies 4 and 5



- Version Study
 - Embedded phonemic awareness vs. phonological awareness game at end of story
 - Embedded comprehension questions versus questions at end of story
- Vocabulary Study
 - To enhance form equivalence and minimize floor/ceiling effects
 - 15 words per story selected based on word pool values and expert review
 - Examined child responses to 15 words for each story to select 10 “best” words

Study 6: Preliminary Benchmark Goals



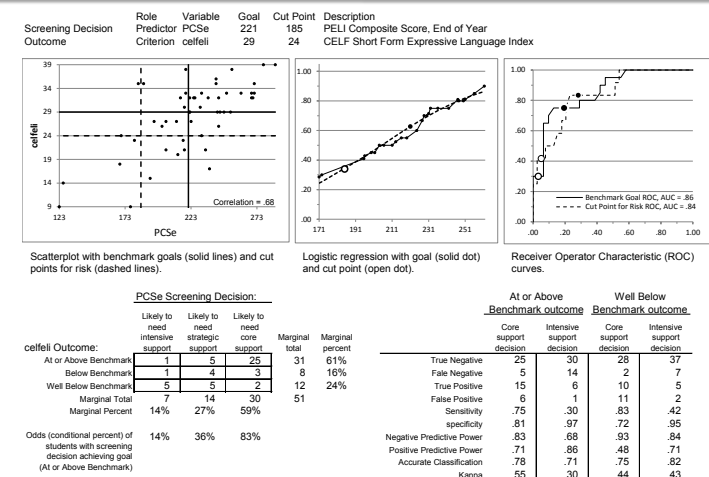
- Conditional probability of meeting goal on external criterion measure(s)
 - CELF PreK Expressive Language Index (40th %ile)
 - DIBELS Next Kindergarten BOY Composite Score
- Primary specification: Establish goals whereby odds are favorable (80-90%) of achieving outcome
- Secondary specification: Keep marginal percents consistent (e.g., 40%)

Study 6: Preliminary Benchmark Goals

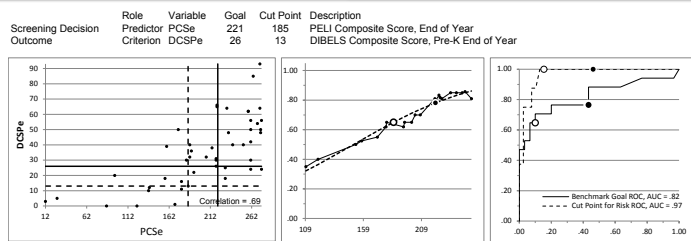


- Other considerations:
 - Logistic regression predicting odds
 - Pattern of student performance in scatterplot
 - Receiver Operator Characteristic (ROC) curve analysis
 - Metrics for decision utility: sensitivity, specificity, negative predictive power, positive predictive power, percent accurate classification, Kappa

Study 6: Preliminary Benchmark Goals



Study 6: Preliminary Benchmark Goals



PCSe Screening Decision:						At or Above		Well Below		
						Benchmark outcome		Benchmark outcome		
DCSPe Outcome:	Likely to need intensive support	Likely to need strategic support	Likely to need core support	Marginal total	Marginal percent	Core support decision	Intensive support decision	Core support decision	Intensive support decision	
	3	10	17	30	64%	17	27	21	33	
	Below Benchmark	3	2	4	9	19%	4	6	0	0
	Well Below Benchmark	8	0	0	8	17%	13	11	8	8
	Marginal Total	14	12	21	47		13	3	18	6
Marginal Percent	30%	26%	45%							
Odds (conditional percent) of students with screening decision achieving goal (At or Above Benchmark)						Negative Predictive Power		Negative Predictive Power		
						Sensitivity		Sensitivity		
						Specificity		Specificity		
						Positive Predictive Power		Positive Predictive Power		
						Accurate Classification		Accurate Classification		
						30		65		

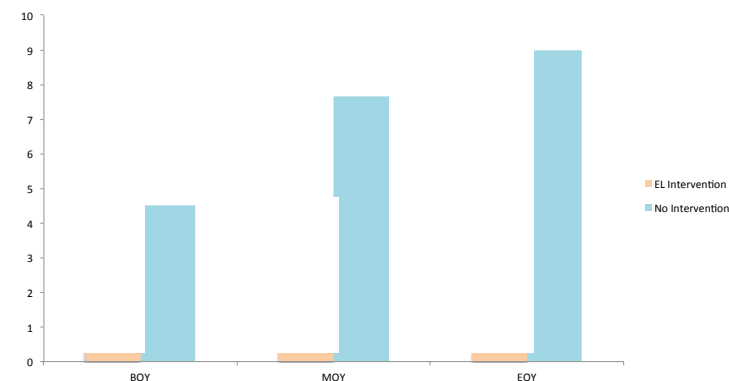
Preliminary Benchmark Goals

	BOY	MOY	EOY
Composite Score	157 123	191 157	221 185
Alphabet Knowledge	7 3	20 10	24 16
Comprehension	14 11	15 12	16 13
Phonological Awareness	4 1	9 6	13 9
Vocabulary	21 17	22 18	23 19

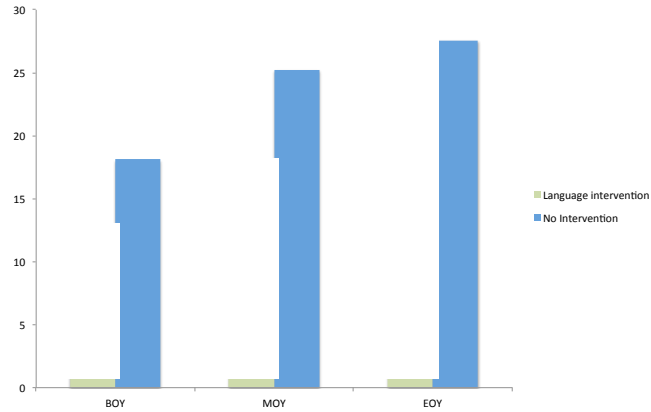
Benchmark Goal Study 2012-13

- Students
 - 276 3 yr olds
 - 674 4 yr olds
 - (additional 835 students in supplemental study)
- Sites
 - Approximately 70 classrooms
 - 5 states: IA, Ca, CT, MI, OR
 - (supplemental sites in MI, PA, IN, IA, LA, CA)

CRTIEC T3: PELI PA EL Intervention - Non-Intervention



CRTIEC T3: Language VOL Intervention – Non Intervention



Questions?



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