

**The Influence of Classroom Variables
on Early Literacy Development:
Assessment of Skills and
Preschool Environments**

Kristen Missall, Ph.D.

University of Minnesota

Center for Early Education and Development



Today's Presentation

- Literacy development overview
 - Research to practice
 - For diverse groups of children
- Introduce GOM and IGDIs
- I'PROMICE research study
 - Literacy development and...
 - Different groups of children
 - Preschool classroom environments

Processes Involved in Literacy Acquisition



- **Observation of literacy behaviors**
 - Child sees others read or write for business or pleasure
- **Collaboration**
 - Child interacts with another individual
- **Practice**
 - Child attempts alone what is learned with others
- **Performance**
 - Child shares what has been learned and seeks response



Skills Involved in Literacy Acquisition

- **Phonemic awareness**
 - Strong predictor of reading success
 - Necessary to acquire ability to use phonics
 - Hierarchical skills: rhyme, alliterate, blend phonemes and split syllables, segment and blend phonemes
- **Phonics knowledge**
 - Sound-symbol relations



Practices Involved in Literacy Acquisition

- Emergent literacy vs. reading-readiness
- Direct instruction vs. constructivist model
- Balance between theory and practice
 - Historical perspective
 - Current perspective: **BALANCE**



Research in Early Literacy I

- Home influences
 - Many reading and writing materials
 - Positive support and encouragement from adults
 - Family members model literacy activities
- Literacy-rich classroom environments
 - Learning centers
 - Printed words



Research in Early Literacy II

- Oral language
 - Frequent use of language
 - Imitation - functional words - reinforcement
- Writing development
 - Emerging skills are unconventional: pictures, scribbles, invented spelling
 - Builds off of reading skills



Research in Early Literacy III

- Knowledge about print
 - Learn functions of print
 - Words with meaning and purpose for child (e.g., family names, food labels, road signs)
 - “roots of literacy”
 - Learn forms of print
 - Details about sounds, configurations of letters and words
 - Learn conventions of print
 - Read left to write, punctuation serves specific purposes



Research in Early Literacy IV

- **Constructing meaning from text**
 - Observing and listening to storybook reading
 - Participating in reading events
 - “book talk”



Literacy Development for Different Groups of Children

- What do we know about literacy and...
 - Typically developing children?
 - Children with identified disabilities?
 - Children from low income families?
 - English Language Learners?



Assessing Literacy Skills of All Children

- When?
 - Before kindergarten
 - During and after kindergarten
- How?
 - Before kindergarten
 - During and after kindergarten
 - Typical measures
 - How are results used?
- Is this satisfactory?



What if.....

- There was a way to identify linkages between early development and later academic (or other important) outcomes?
- We could use these linkages to provide us with information to change the trajectory of a child's early skill development to enhance later achievement?
- We could measure the developmental progress of children with disabilities along a continuum from birth to eight?



A Different Approach to Progress Monitoring

Traditional

- Focus on children in different age groups (infant, toddler, preschool, elementary) without appreciating continuity across time

ECRI

- Focus on children across the *developmental spectrum* from birth through age eight, striving to maintain continuity across time



A Different Approach II

Traditional

- Measure development once or twice per year (e.g., pre- and post-tests)

ECRI

- Measure development more frequently, based on individual needs, to optimize *developmental trajectory*



A Different Approach ^{III}

Traditional

- Rely on *norm-referenced* measures of development using standardized test procedures

ECRI

- Track individual child's progress *idiographically* and normatively, as well as focus on behavior in *naturalistic* contexts to the greatest extent possible



A Different Approach ^{IV}

Traditional

- Measure development without specific links to programmatic or individualized *intervention*

ECRI

- Consider environmental or programmatic variables that can be influenced by families and teachers to change developmental trajectory



General Outcome Measurement (GOM)

- **Characterized by:**
 - Measurement in a particular domain with repeated, direct observation
 - Common metrics
 - Comparable stimulus materials
- **Allows for continuous measurement over time toward long-term goal**
 - Slopes of progress
 - Lends to intervention monitoring

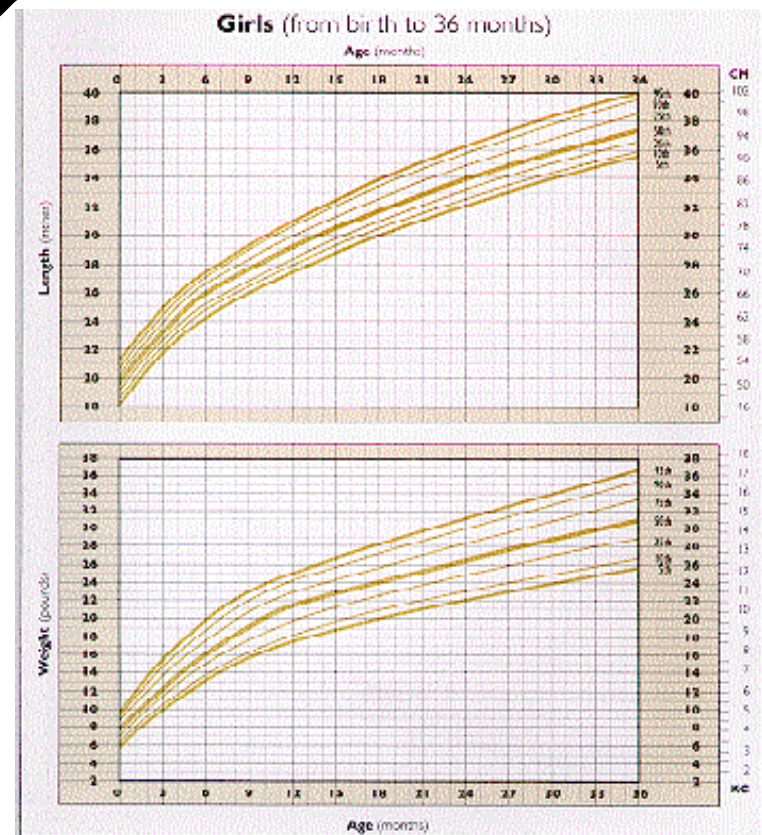
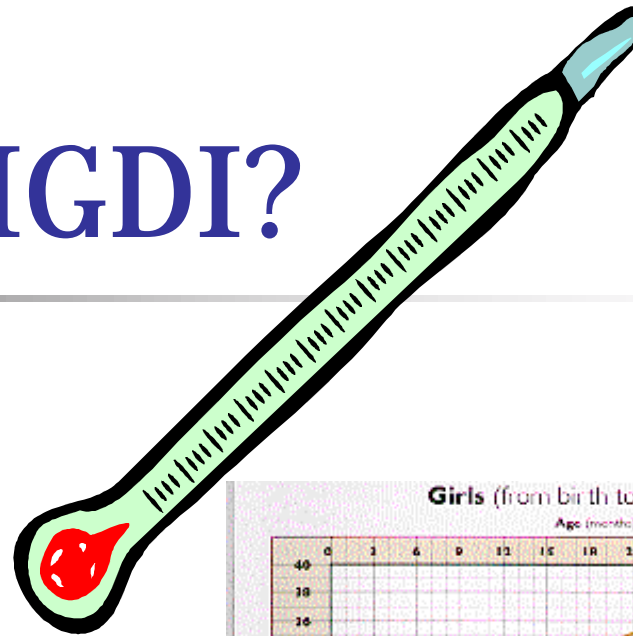


Essential Features of GOM

- Measure indicators related to important outcome(s) for children
- Efficient and economical administration and scoring
- Standardized and replicable
- Repeatable over time
- Reliable across occasions, administrators and stimulus materials
- Sensitive to growth over time
- Sensitive to effects of intervention

What is an IGDI?

- **Individual** (also can be combined across groups of children)
- **Growth and Development** (developmental *status* and *change* over time)
- **Indicator** (vital sign)

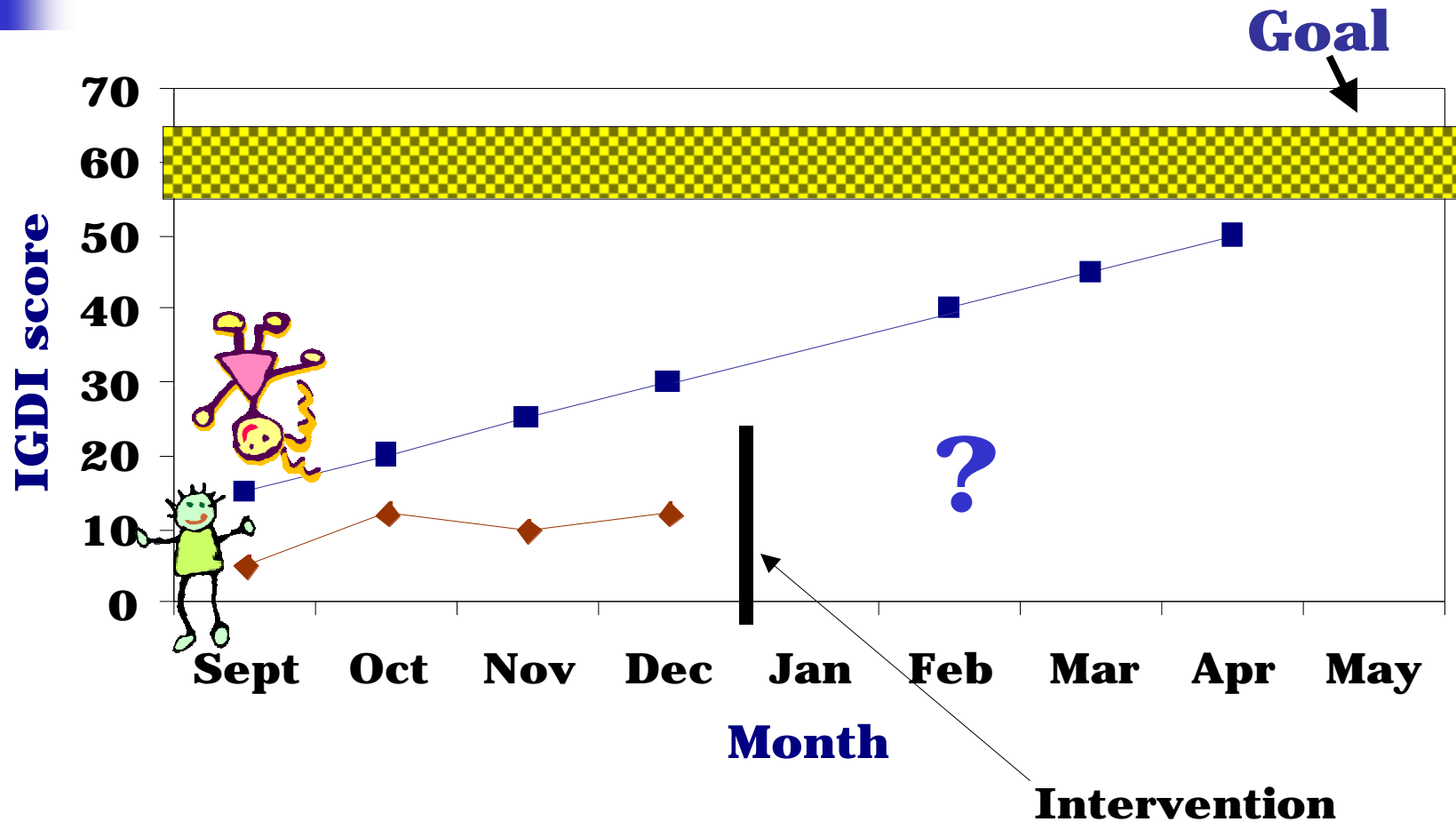


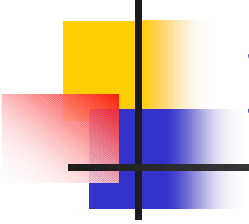


What makes a good IGDI?

- Tells us about an individual child's current status and progress toward an important long-term goal across time
- Inexpensive
- Easy to use repeatedly (efficient)
- Easy for different people to use well
- Engages children's attention
- Related strongly to other accurate measures of the long-term goal
- Sensitive to the effects of intervention

Link IGDIs to Intervention





Early Language and Literacy IGDIs for Preschoolers (McConnell et al., 1998; 2000; 2002)

- **Picture Naming**
- **Rhyming**
- **Alliteration**

Picture Naming

Format

- Present child with photos of common “objects,” one at a time, and ask child to name pictures as fast as possible
- 1 minute



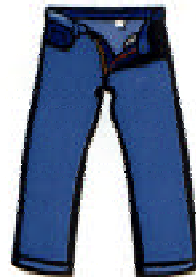
Measure

- Total number of pictures named correctly in 1 minute

Rhyming

Format

- *“Point to the picture that sounds the same as bees.”*
- 2 minutes



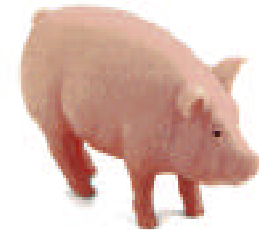
Measure

- Total number of pictures correctly identified in two minutes

Alliteration

Format

- *“Point to the picture that starts with the same sound as rain.”*
- 2 minutes







Measure

- Total number of pictures correctly identified in two minutes



I'PROMICE: General Goals

- Improving Preschoolers' Reading Outcomes through Measurement and Intervention in Classroom Environments (I'PROMICE)
- Goals:
 -  To better understand how preschool language and literacy IGDIs are related to similar measures in kindergarten and to reading measures in first grade
 -  To better understand language and literacy growth for preschool-aged children using IGDIs
 -  To understand relations between classroom ecologies and language and literacy growth for preschool-aged children
 -  To develop an intervention program for preschool programs based on results for Goal #3



I'PROMICE Study: Participants

- 2 cohorts recruited as preschoolers
 - **Cohort A in 2000 (N = 41)**
 - 56% Male, 44 % Female
 - 30% Hispanic, 25% Caucasian, 21% Black
 - 25% Low Income
 - 37% ECSE, 34% Head Start, 29% ECFE
 - **Cohort B in 2001 (N = 28)**
 - 64% Male, 36% Female
 - 21% Black, 18% Hispanic, 18% Caucasian
 - 29% Low Income
 - 39% ECSE, 36% ECFE, 25% Spanish-speaking



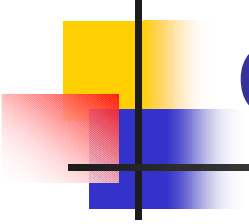
I'PROMICE Participants by Group

- **ECSE (N=26)**
 - 62% Male, 38% Female
 - 48% Caucasian, 38% Black, 14% Other
 - 12% Low Income
- **Head Start (N=12)**
 - 42% Male, 58% Female
 - 34% Black, 17% Caucasian, 17% Other
 - 33% Low Income
- **ECFE (N=12)**
 - 25% Black, 25% Caucasian, 42% Other
 - 42% Low Income
- **Spanish-speaking (N=19)**
 - 68% Male, 32% Female
 - 100% Hispanic
 - 37% Low Income



I'PROMICE Study: Measures

- 3 primary activities:
 - Direct assessment
 - IGDIs
 - Dibels
 - CBM
 - Classroom observation
 - ESCAPE
 - Survey
 - Demographic and literacy survey of careproviders



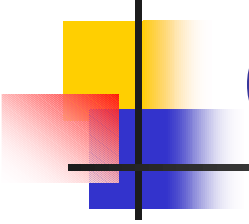
Dynamic Indicators of Basic Early Literacy Skills (Dibels) (Kaminski & Good, 1996; 1998)

- Kindergarten children
 - Letter Naming
 - Phonemic Segmentation Fluency (winter, spring only)
- First grade children
 - Letter Naming (fall only)
 - Phonemic Segmentation Fluency (fall only)
 - Nonsense Word Fluency



Curriculum Based Measurement (CBM)

- Oral reading fluency measures
- Read 3 grade-level passages for 1 minute each
- Score for each passage = total words read – incorrect words read
- Overall score is median score of 3 passages



Eco-behavioral System for Complex Assessments of School Environments (ESCAPE) (Greenwood et al., 1997)

- ESCAPE taxonomy
 - Student behaviors
 - Target behaviors
 - Competing behaviors
 - Verbal behaviors
 - Teacher behaviors
 - Teacher definition
 - Teacher behavior
 - Teacher focus
 - Classroom ecology
 - Designated activity
 - Activity initiator
 - Materials








I'PROMICE Study: Procedures

- Year 1 (preschool-aged)
 - Child removed from classroom and tested individually with IGDIs
 - for approximately 10 minutes
 - completed in winter and spring
 - classroom observation completed in spring
- Year 2 (preschool and kindergarten)
 - All children tested in fall, winter, spring with IGDIs and Dibels
 - Preschool children observed with ESCAPE
- Year 3 (kindergarten and first grade)
 - All children testing in fall, winter, spring with Dibels and CBM



Research Questions

-  What are the relations between preschool and kindergarten measures of language and literacy?
-  What are the relations between preschool measures of language and literacy and reading measures in first grade?
-  What does literacy growth look like for different groups of children in preschool?
-  What contributes to literacy growth for different groups of children in preschool?
-  What are the relations between classroom ecologies and language and literacy growth for preschool-aged children?



Significant Relations Between Preschool and Kindergarten Measures

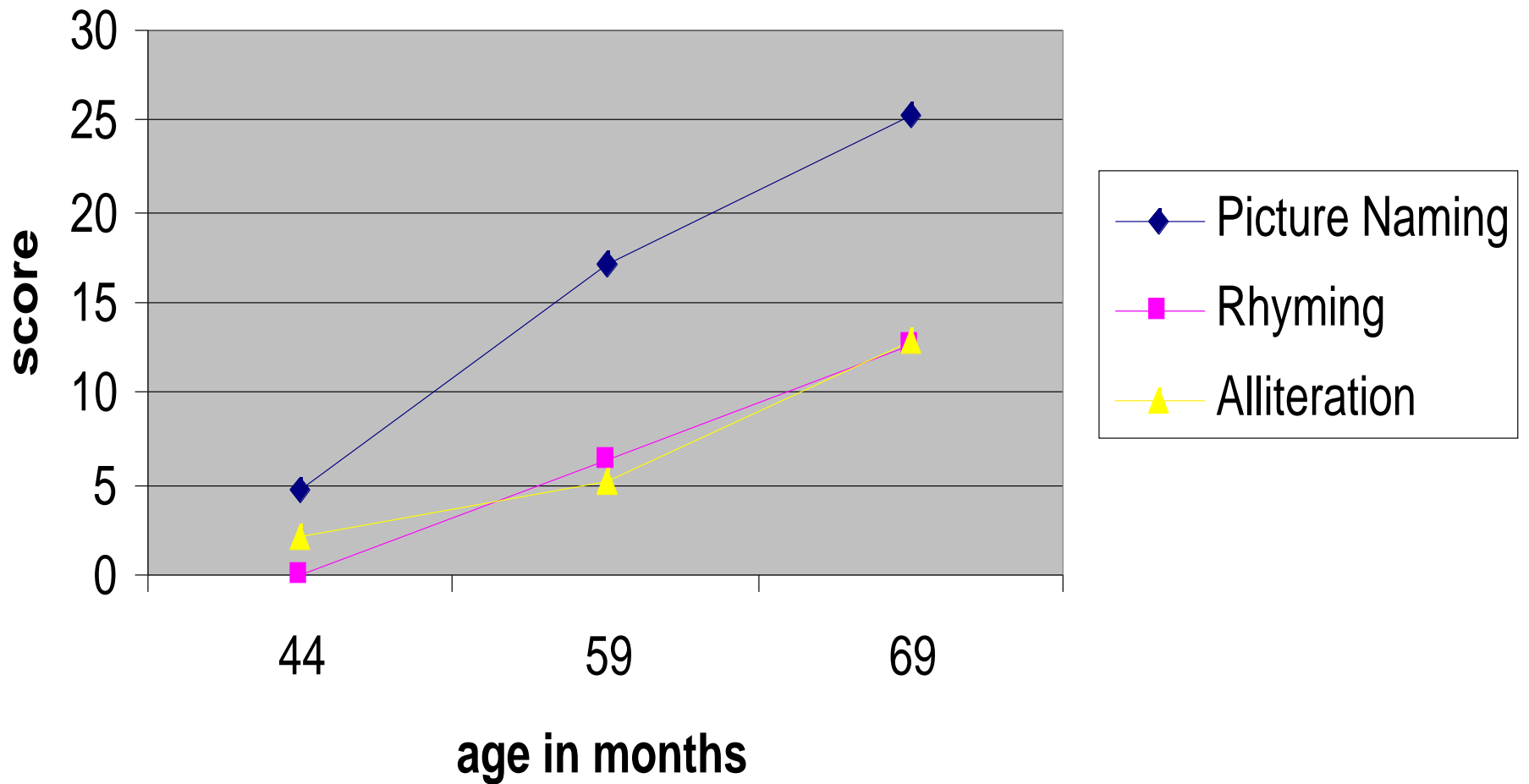
- Picture Naming and Letter Naming
($r = .6$, $p < .01$)
- Picture Naming and Picture Naming
($r = .8$, $p < .01$)
- Rhyming and Rhyming ($r = .6$, $p < .01$)
- Alliteration and Alliteration ($r = .6$, $p < .01$)



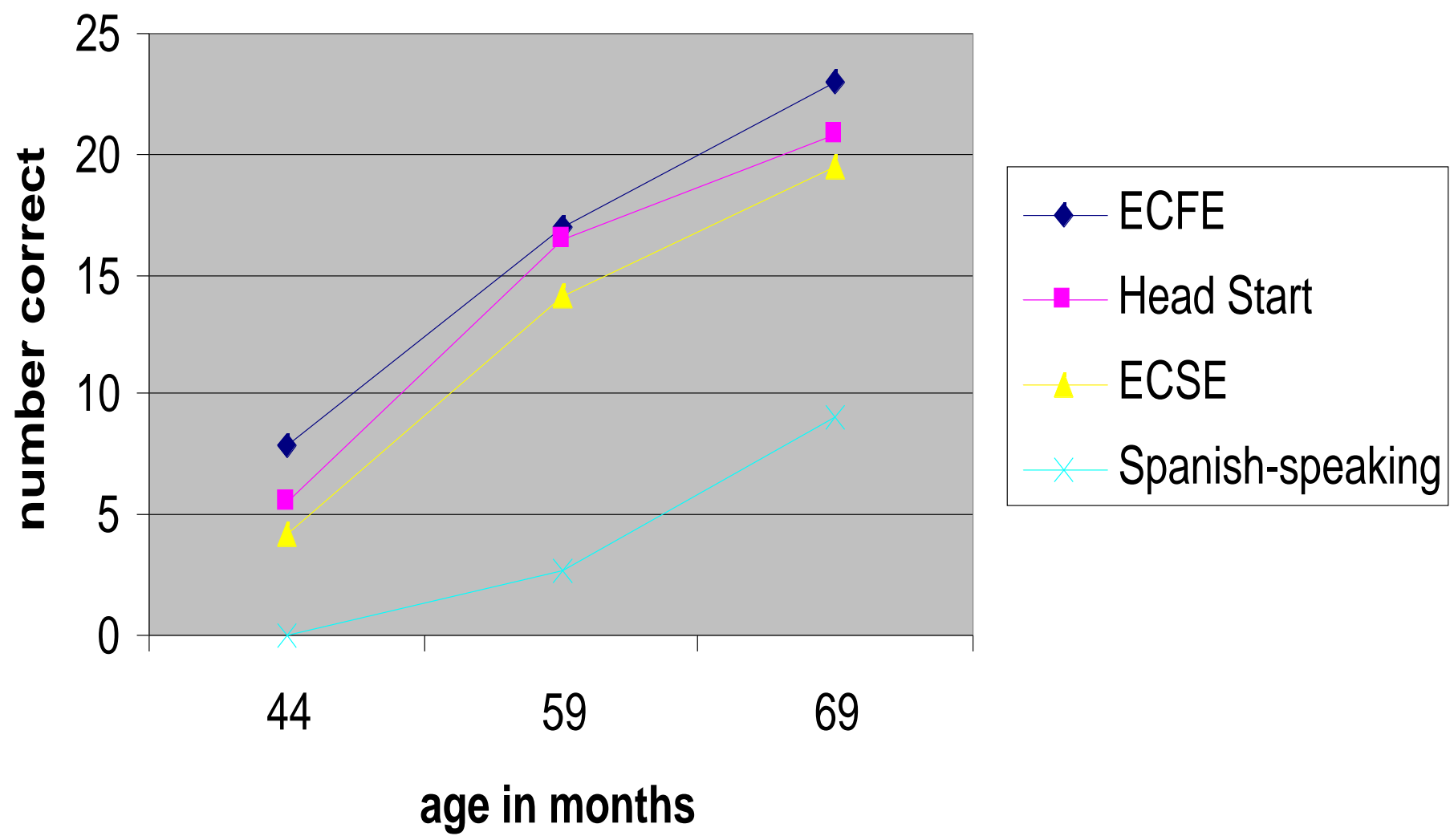
Significant Relations Between Preschool and First Grade Measures

- PN and LN ($r = .7, p < .01$)
- PN and CBM ($r = .6, p < .01$)
- Rhyming and PSF ($r = .5, p < .05$)
- Rhyming and NWF ($r = .5, p < .05$)
- Rhyming and CBM ($r = .6, p < .01$)

Growth on IGDIs for Full I'Promice Sample (All Groups)



Growth on Picture Naming by Group





Study Findings: Growth for Picture Naming by Group (using HLM)

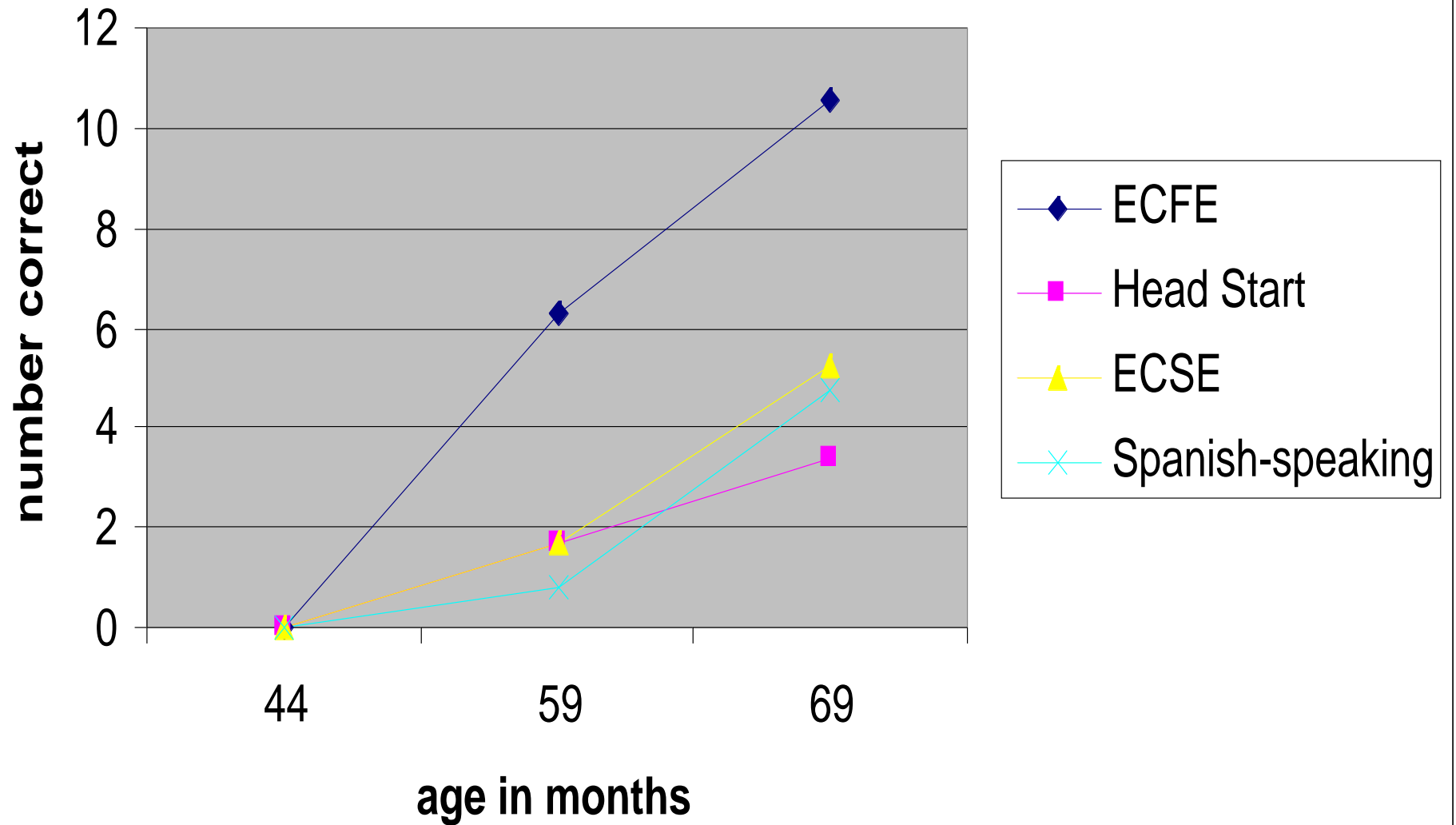
- All 4 groups grew significantly over preschool year; no significant difference between groups in growth
- Average PN score for ECFE child was 16.97
 - .46 lower for Head Start
 - 2.84 lower for ECSE
 - 14.33 lower for Spanish-speaking
- Statistically significant difference between ECFE and Spanish-speaking children on PN scores



Conclusions: Picture Naming Growth by Group

- Significantly different scores, but similar growth for groups
- Want groups with lower scores to be growing faster
- Similar ECSE and ECFE scores...
 - Usually a link between language and literacy skills
 - ECSE group children with speech-only services
- Spanish-speakers have low scores...
 - PN a measure of vocabulary
 - Logical results?

Growth on Rhyming by Group





Study Findings: Growth for Rhyming by Group (using HLM)

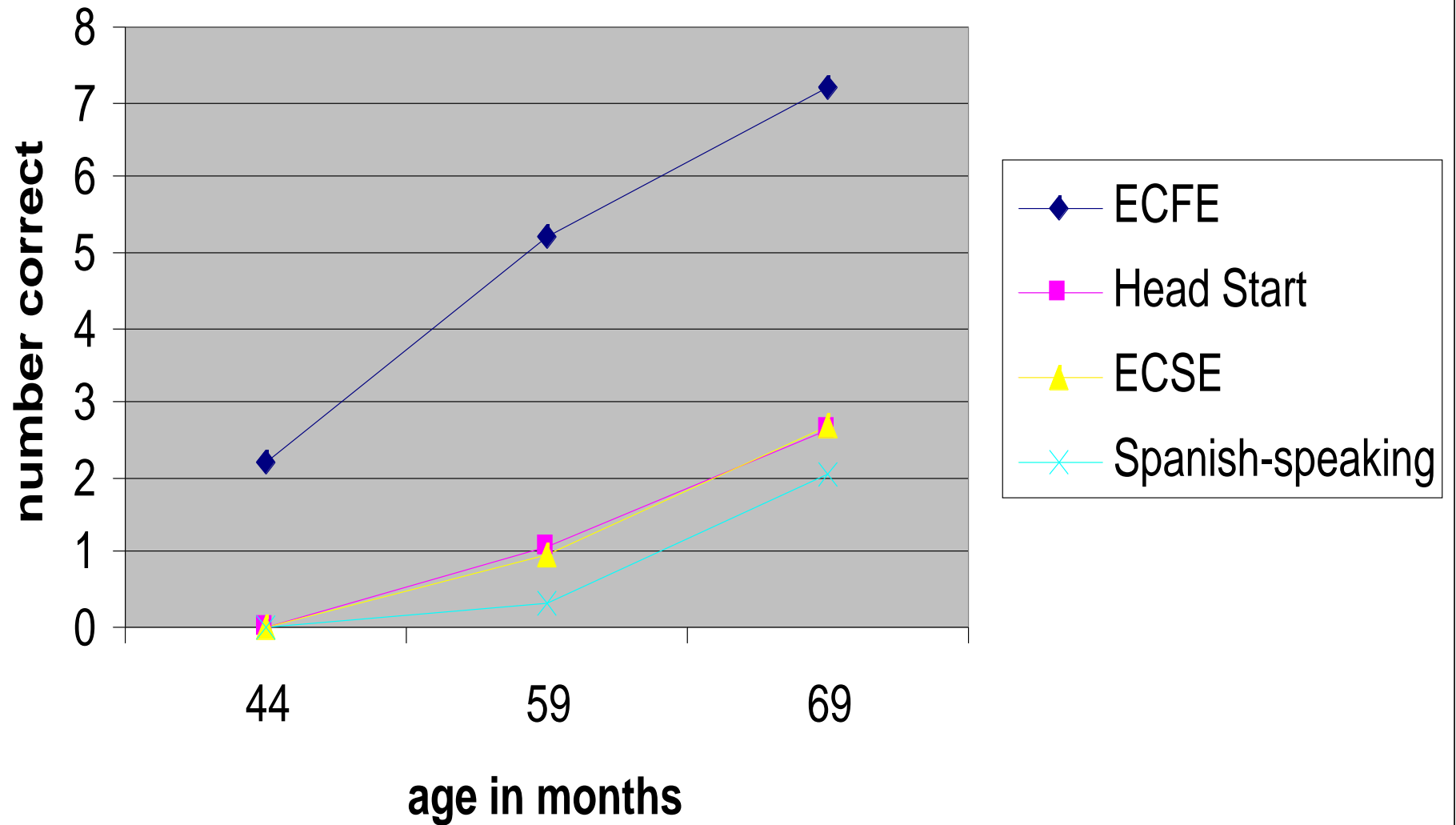
- All 4 groups growing significantly; Head Start and ECSE different from ECFE; no difference in growth between ECFE and Spanish-speaking
- Average rhyming score for ECFE child was 6.29
 - 4.63 lower for Head Start
 - 4.61 lower for ECSE
 - 5.50 lower for Spanish-speaking
- Scores for Head Start, ECSE and Spanish-speaking are statistically different from ECFE



Conclusions: Rhyming Growth by Group

- Spanish-speaking children suddenly learned to rhyme...slope not different from that of ECFE
 - Explanation in curriculum?
 - Developmental skill?
- Head Start and ECSE lower scores than ECFE and not growing as quickly
- Floor effects for measure?

Growth on Alliteration by Group





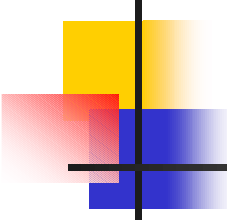
Study Findings: Growth for Alliteration by Group (using HLM)

- None of the groups are growing significantly
- Average alliteration score for ECFE child was 5.19
 - 4.10 lower for Head Start
 - 4.25 lower for ECSE
 - 4.88 lower for Spanish-speaking
- Scores for Head Start, ECSE and Spanish-speaking significantly different from ECFE



Conclusions: Alliteration Growth by Group

- **Measure concerns**
 - **Floor effects?**
 - Not much variance
 - Many zero scores
 - **Sensitive for preschool?**
 - **Sensitive for children in at-risk groups?**



Relations between Select Combined ESCAPE Variables (structured time) and Language/Literacy Growth

■ Head Start

- Moderate correlation ($r = .5$, $p < .07$) approaching significance between Picture Naming growth and time in Pre-academic Activities/Story Activities
- Moderate correlation ($r = .05$, $p < .06$) approaching significance between Picture Naming growth and time with Instructional Materials
- Moderate correlation ($r = .6$, $p < .05$) between Rhyming growth and Verbal Behavior to Peer

Relations between Select ESCAPE Variables (structured time) and/or Language/Literacy Growth

- Spanish-speaking children
 - Strong correlation ($r = .8$, $p < .01$) between Picture Naming growth and total Verbal Behavior (to teacher and to peer)
 - Moderate correlation ($r = .6$, $p < .01$) between observed time in literacy activities (pre-academic, story) and observed time with literacy materials (instructional, pretend toy, storybook)
 - Moderate correlation ($r = .5$, $p < .05$) between observed time in Play Activities and time in Pretend Play



Relations between Select ESCAPE Variables (structured time)

- ECFE

- Strong correlation ($r = .9$, $p < .01$) between observed time in literacy activities (pre-academic, story) and observed time with literacy materials (instructional, pretend toy, storybook)



Relations between Select ESCAPE Variables (structured time)

■ ECSE

- Strong correlation ($r = .8$, $p < .01$)
between time in Story Activities and time with Instructional Materials
- Moderate correlation ($r = .4$, $p < .05$)
between time in Pre-academic Activities and with Story Materials
- Moderate correlation ($r = .5$, $p < .05$)
between Verbal Behavior to Teacher and Art/Writing Materials



Implications from Project

- Relations between measures...
- Literacy growth within and between groups...
- Classroom variables that seem to matter...



What's Next?

- Upcoming year of data analysis
 - “The” intervention...
- CEC/DEC in October in Washington, DC
- More on CEED website as time goes on
 - <http://education.umn.edu/ceed/>