



Using IGDIs to Identify Children for Tiered Intervention

Update on CRTIEC Measurement Research

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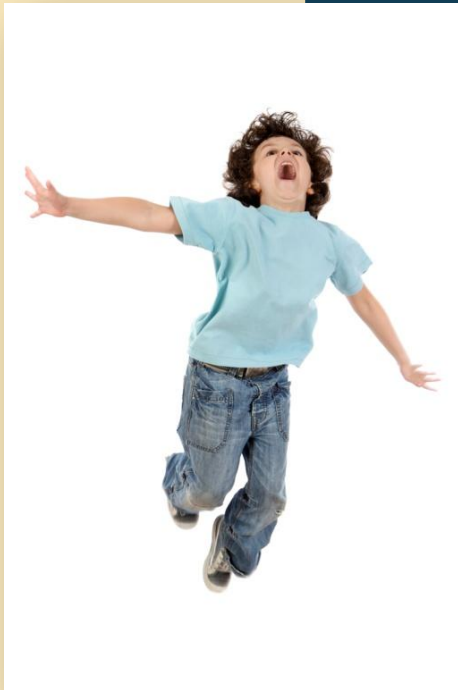
Center for Early Education and Development

COLLEGE OF EDUCATION
+ HUMAN DEVELOPMENT

UNIVERSITY OF MINNESOTA



CENTER FOR RESPONSE TO INTERVENTION IN EARLY CHILDHOOD



***For more info and these slides:
www.cehd.umn.edu/ceed/projects/crtiec***

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- New Horizon Academy
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Disclosure

- The work described in this presentation is subject of technology commercialization through an Internal Business Unit – Early Learning Labs – within the University of Minnesota, and may be the subject of future commercial development and sale. Drs. McConnell, Bradfield, and Wackerle-Hollman may be entitled to royalties through the University of Minnesota for products related to this research. This relationship has been reviewed and is being managed by the University in accordance with its conflict of interest policies.



Today's Presentation

Goal: to provide an update on one part of CRTIEC's IGDI research – the identification of children who might benefit from more intensive tiers of intervention.

- Overall scope of work
- Standard setting approach and questions
- Methods and results for phonological awareness, comprehension, oral language, and alphabet knowledge
- Emerging Decision-Making Framework and next steps in this research



Articulating Functions of Assessment in Early Childhood RTI

- Select children for more intensive tiers of intervention – **Identification or screening**
 - ▣ Universal assessment of classrooms or programs – typically seasonal
 - ▣ Standardized procedures/assessments
 - ▣ Comparison of individual child performance to cut-scores or standards
 - Possibility of multiple-gating approach
- Confirm success of current intervention condition – **Progress monitoring**
 - ▣ Assessment of selected children
 - ▣ Frequent and repeated assessment
 - ▣ Comparison to expected growth rates, “move vs. hold” decisions



Work to Date (2008 – 2010)

- Individual Growth & Development Indicators
 - Revision and expansion of original measures
 - Focus on P4 Language and Early Literacy
 - Oral language
 - Phonological awareness
 - Alphabet knowledge
 - Comprehension
- Adoption of Item Response Theory/Rasch Modeling and contemporary standard-setting methods
- Focus on item development and testing, scaling, overall psychometric evaluation



Today's Report

- Scale development and refinement
 - Locating new items
 - Evaluating quality of resulting scales
 - Determining initial cut scores for use in identification decision-making model
- Research questions
 - Where do newly developed items fit on the ability scale for the Picture Naming and Sound Identification IGDIs.
 - For newly developed Rhyming and Alliteration IGDIs, what is the concurrent criterion validity with the TOPEL and CELF?
 - Do the new Rhyming and Alliteration measures show better concurrent criterion validity than the originally developed Rhyming and Alliteration measures?
 - What are the item locations/ ability level of items for the newly developed Rhyming and Alliteration IGDIs?
 - Are the ability level of items for the newly developed Rhyming and Alliteration measures more in line with child ability level (i.e.: easier items)?



Methods

- IGDIs 2.0
 - ▣ Utilizing Rasch Modeling (IRT)
 - ▣ Contrasting Groups Design
 - PLD Surveys
 - IGD I 2.0 Scores
 - ▣ Identification Sets

Rasch Modeling

- Rasch modeling is designed to capture a person's **total ability** such that the entire construct (early literacy) can be characterized on a linear scale.
- Rasch is a significant improvement over CTT in that it is not sample dependent, and that students and items can be located on the same scale.



Rasch Modeling

- item level statistics
- estimates reliability by examining the internal consistency of each item within a measure
- Provides statistical support for selecting and reviewing item-relevant features
- This model provides information to accurately predict if a child will correctly respond to specific items



Methods: Contrasting Groups Design

- RTI is predicated on the availability of reliable and valid information to drive placement decisions – to identify individual children who will likely benefit from different tiers of intervention.
- Contrasting Groups design compares IGDI scores and teacher performance level descriptors and locates the point that maximally discriminates children at different levels of performance (Tier 1, Tier 2, Tier 3).



Methods: Contrasting Groups Design

- Performance Level Descriptors (PLDs)
 - The PLD survey is designed to provide a method for teachers to identify the early literacy performance of their students based on their knowledge. Teachers are asked to review an operational definition of the domain, reflect on individual students' current level of skills in that domain, and to identify those students that are successful in typical instruction (Tier 1), or need moderate (Tier 2), or significant (Tier 3) support.



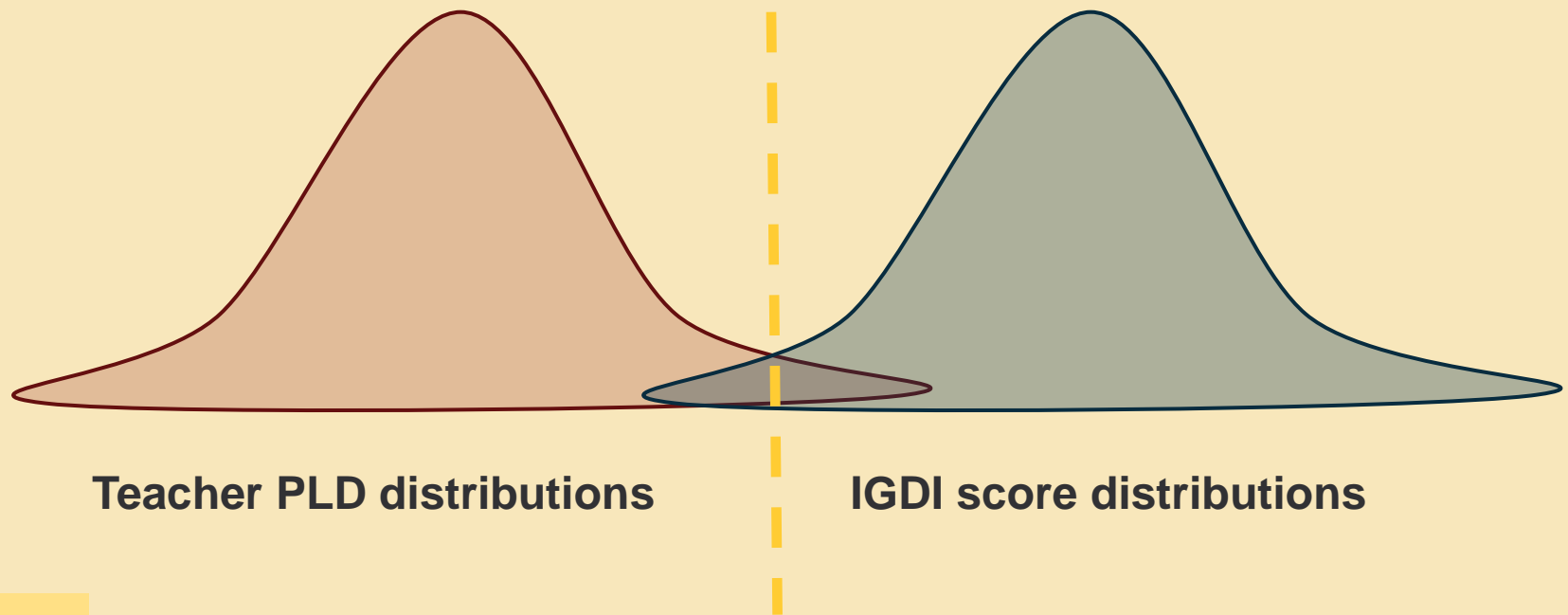
Methods: Contrasting Groups Design

- Once children's performance levels are specified, teacher judgments are compared to performance on associated IGDI and the point on the IGDI score scale that maximally discriminates children in different levels is defined as the **cut-range**.



Contrasting Groups Design

To find the point on the score scale that maximally discriminates among tiers (contrast between groups),
ROC analysis sensitivity .70, specificity .70.



Contrasting Groups Design: Extrapolation

- Cut range data is provided for Spring of the Pre-k year, however we need cut scores for fall and winter.
 - Extrapolating scores back to fall allowed for PRELIMINARY cut score locations.
 - Cut scores were then converted to card counts for meaningful interpretation by teachers.



Phonological Awareness: Alliteration



Phonological Awareness: Alliteration

4

tub

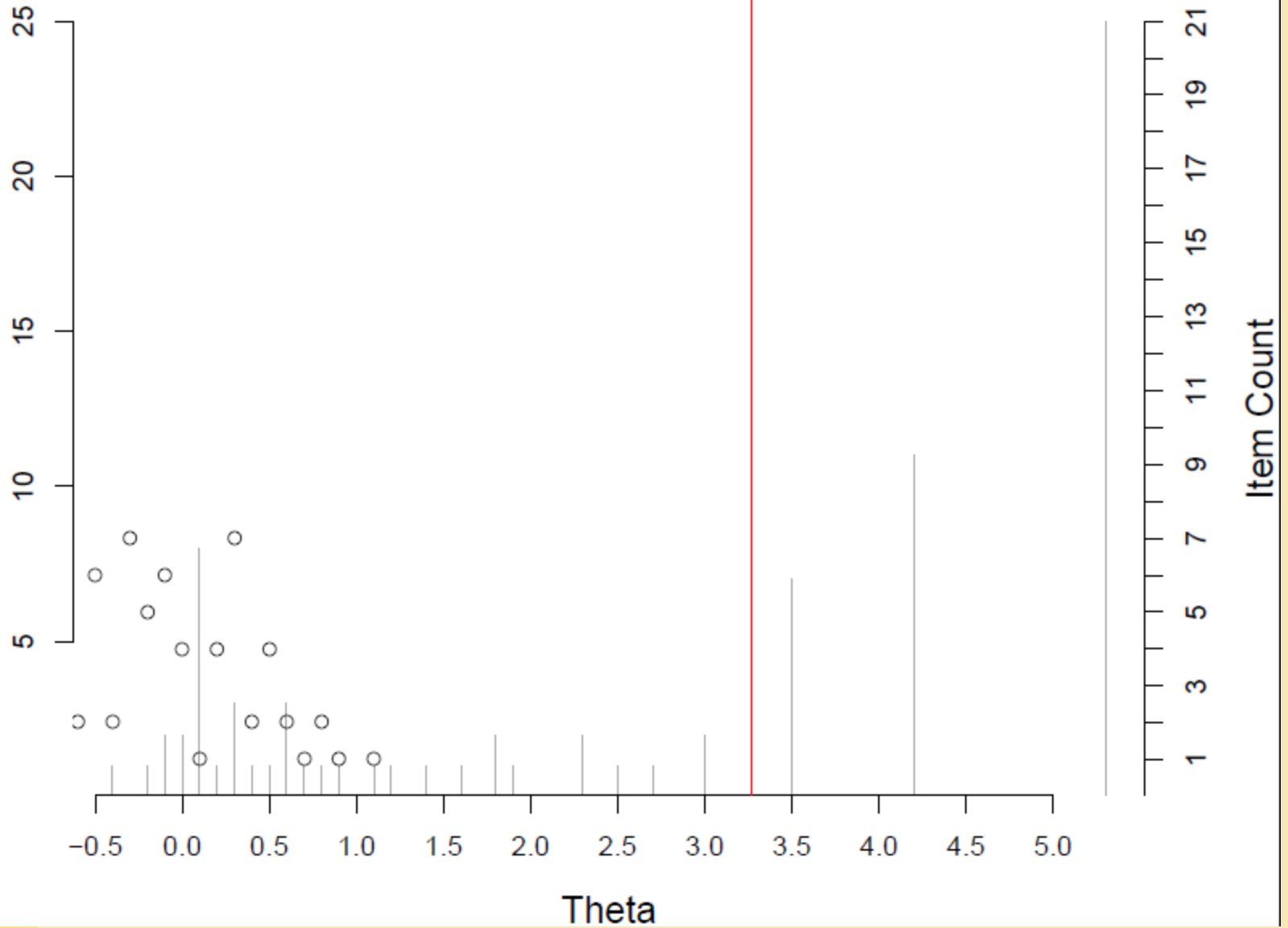
pie

/t/

Alliteration ID

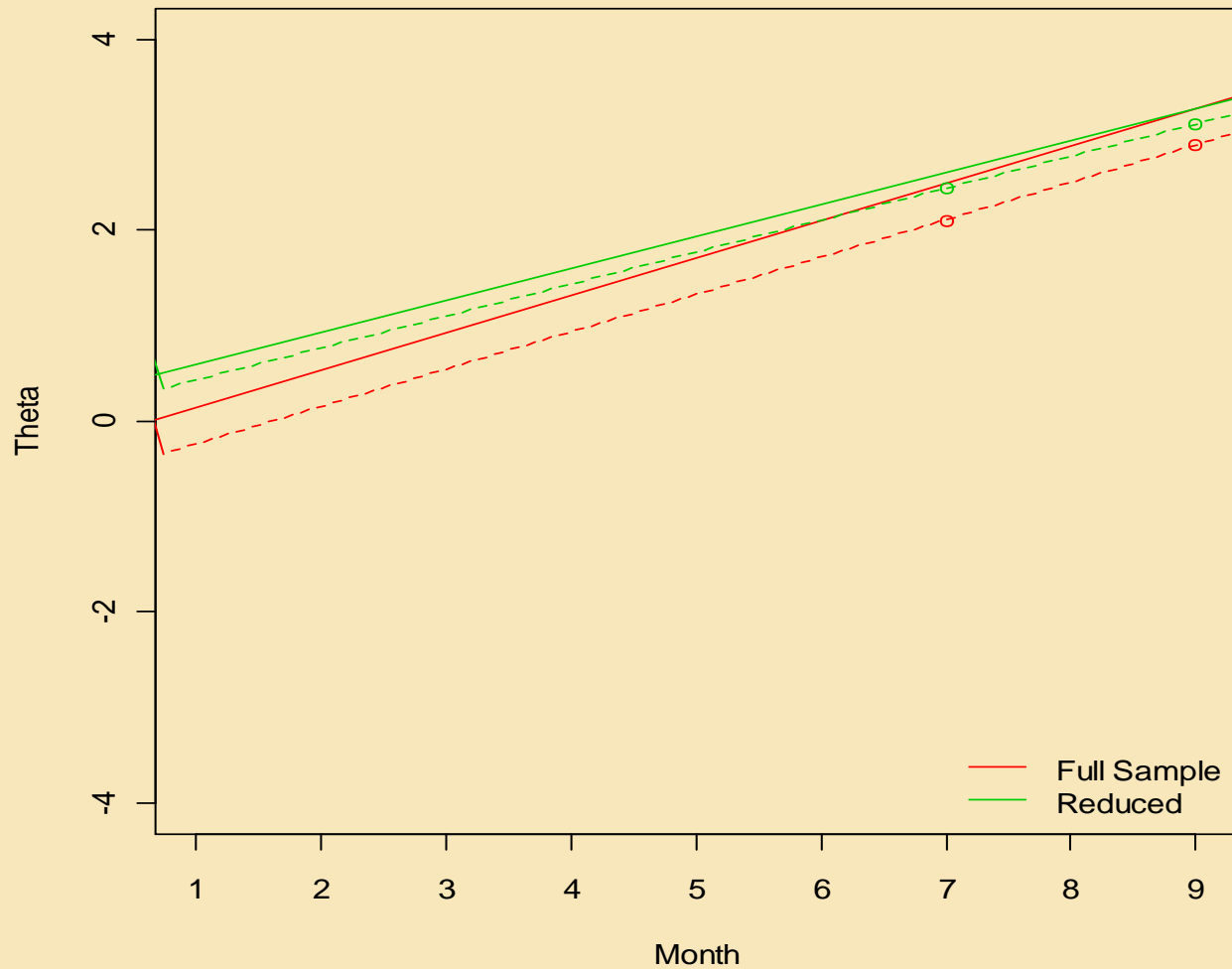


Allit Wave 7 Item-Person Map



Extrapolation

Allit

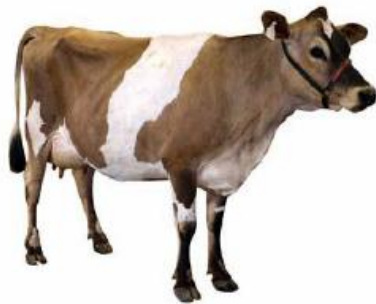


Research Questions

- Concurrent correlations:
 - TOPEL PA: .61, TOPEL PK: .71
- Does Alliteration show better concurrent criterion validity than the originally developed Rhyming and Alliteration measures?
 - Previous correlations: TOPEL Tier 1: PA .47, PK: .38
- What are the item locations/ ability level of items Alliteration?
- Are the ability level of items for the newly developed Alliteration measure more in line with child ability level (i.e.: easier items)?



Phonological Awareness: Rhyming



Phonological Awareness: Rhyming

4

Face

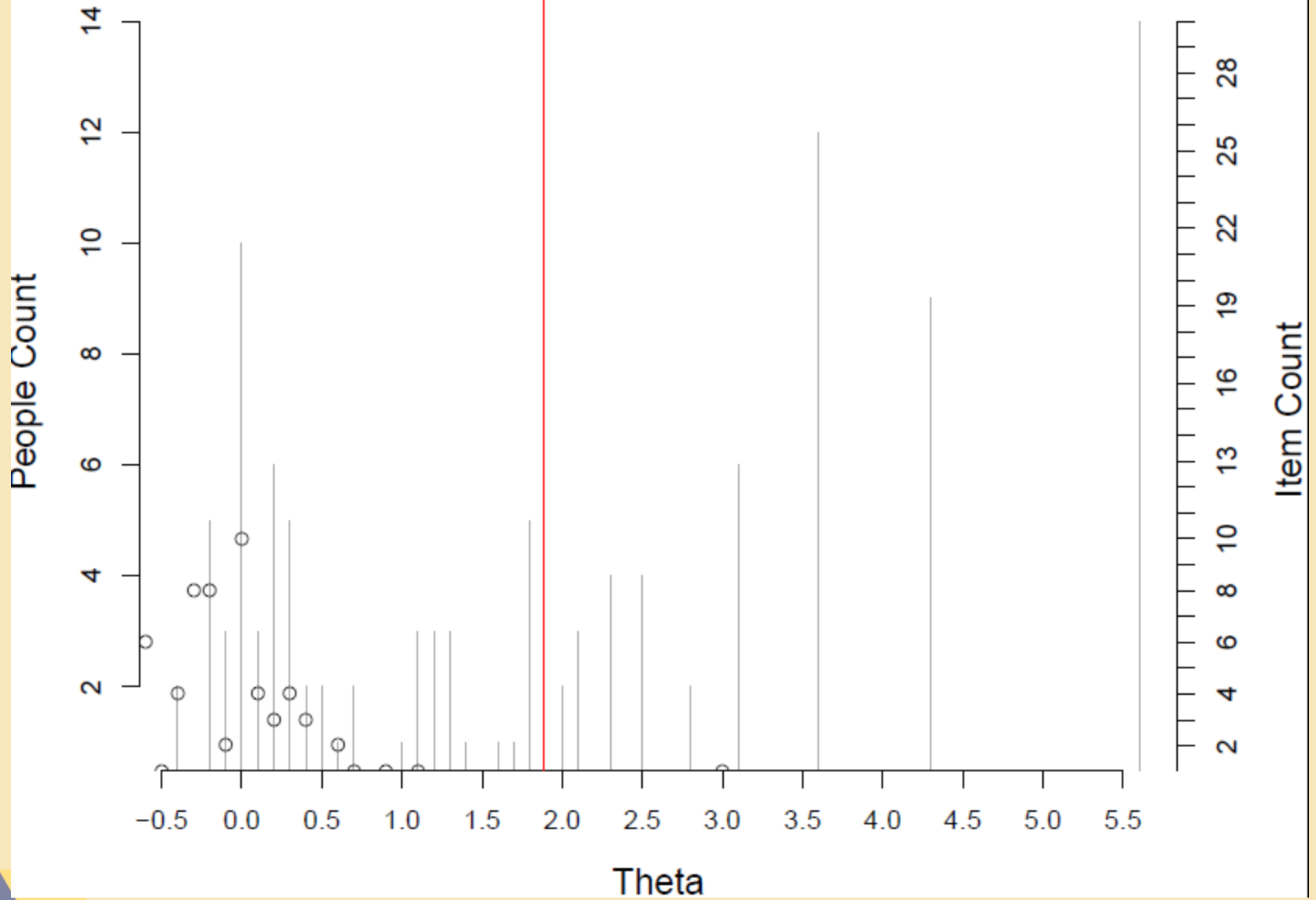
Vase

Cow

Rhyming ID

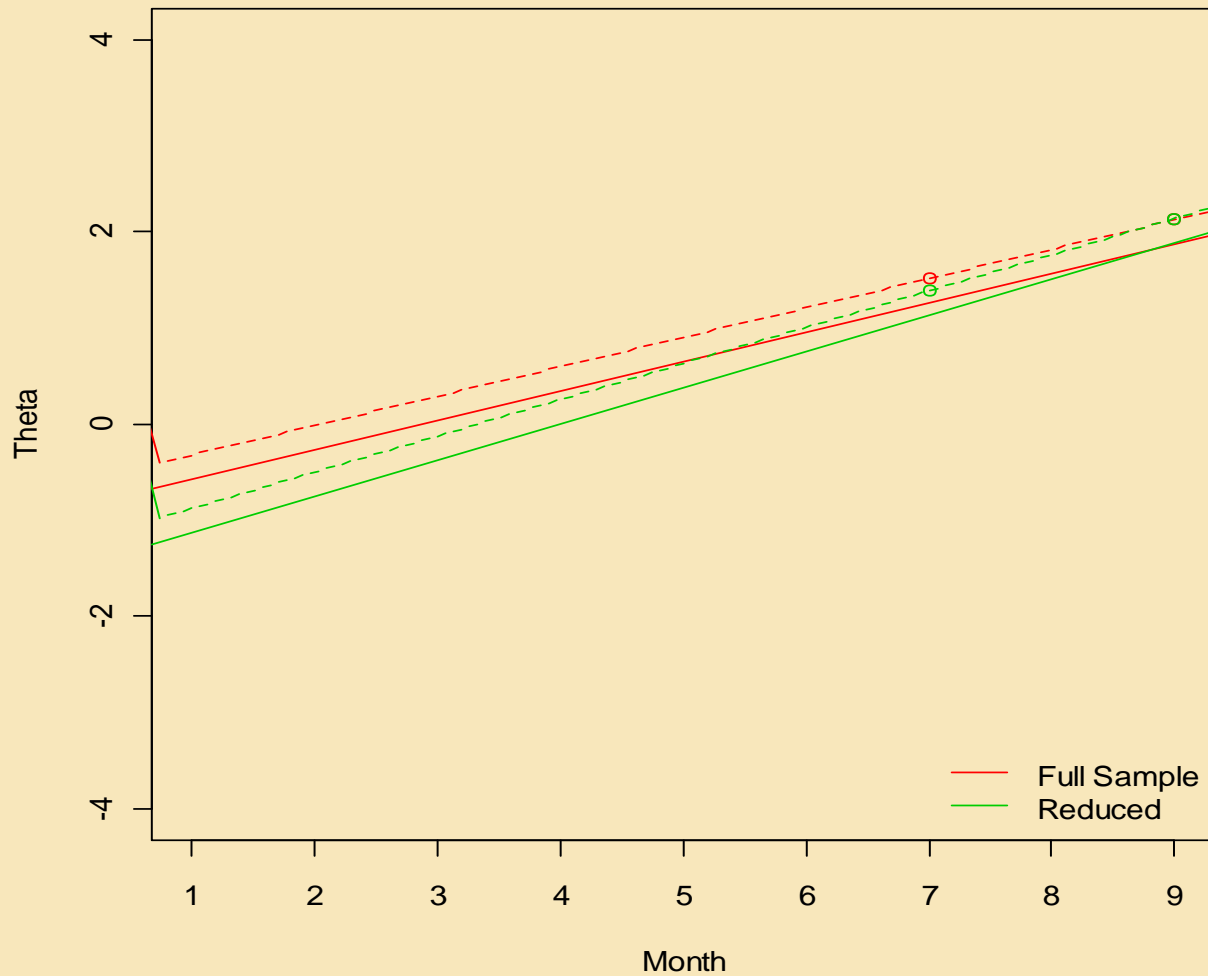


Rhyme Wave 7 Item-Person Map



Extrapolation

Rhyme



Research Questions

- ▣ Concurrent correlations:
 - TOPEL PA: .50
- ▣ Does Rhyming show better concurrent criterion validity than the originally developed Rhyming and Alliteration measures?
 - Previous correlations: TOPEL PA Tier 1 study: .45
- ▣ What are the item locations/ ability level of items Rhyming?
- ▣ Are the ability level of items for the newly developed Rhyming measure more in line with child ability level (i.e.: easier items)?



Comprehension: Which One Doesn't Belong



Comprehension: Which One Doesn't Belong

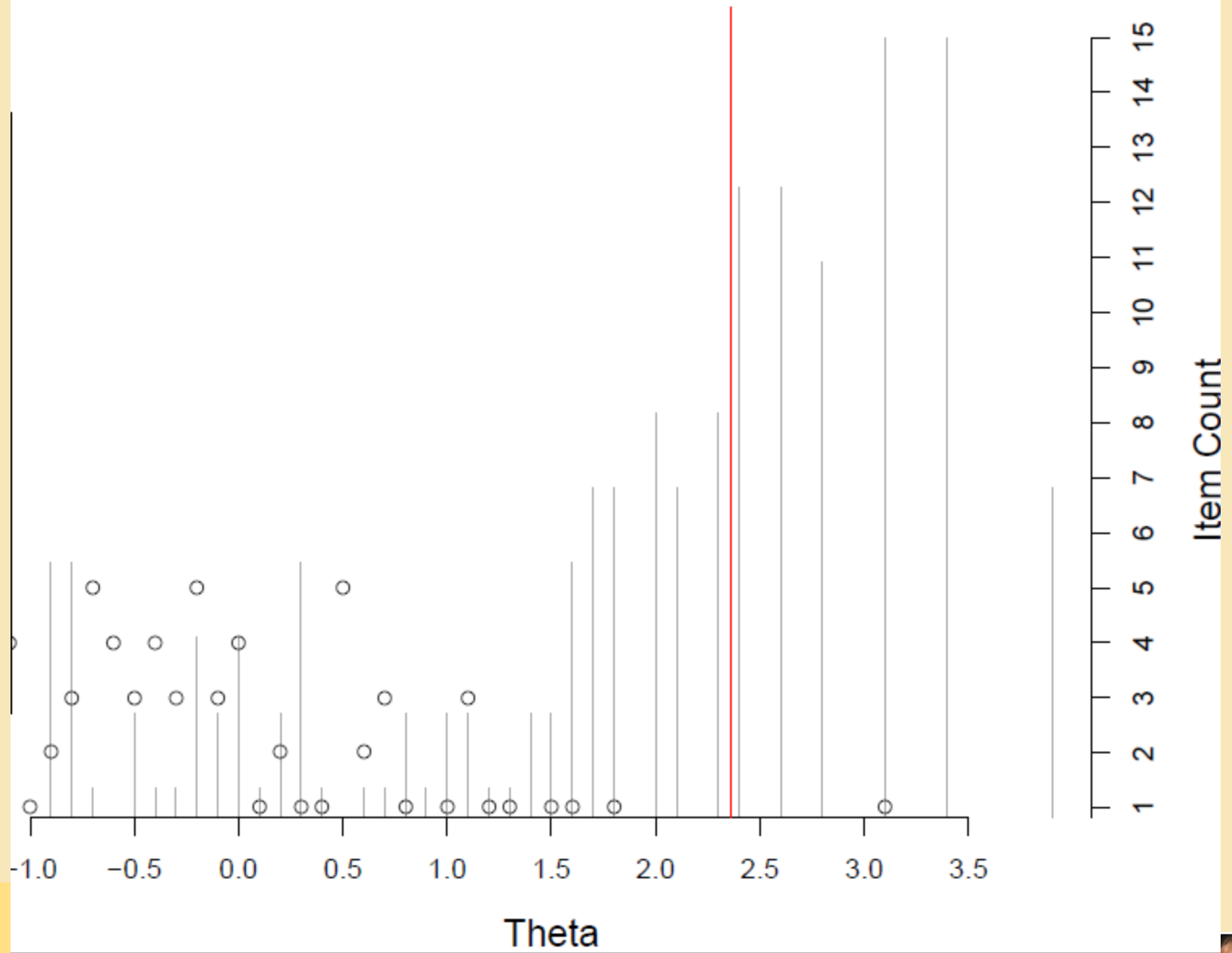
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sled wagon cat

Which one doesn't belong

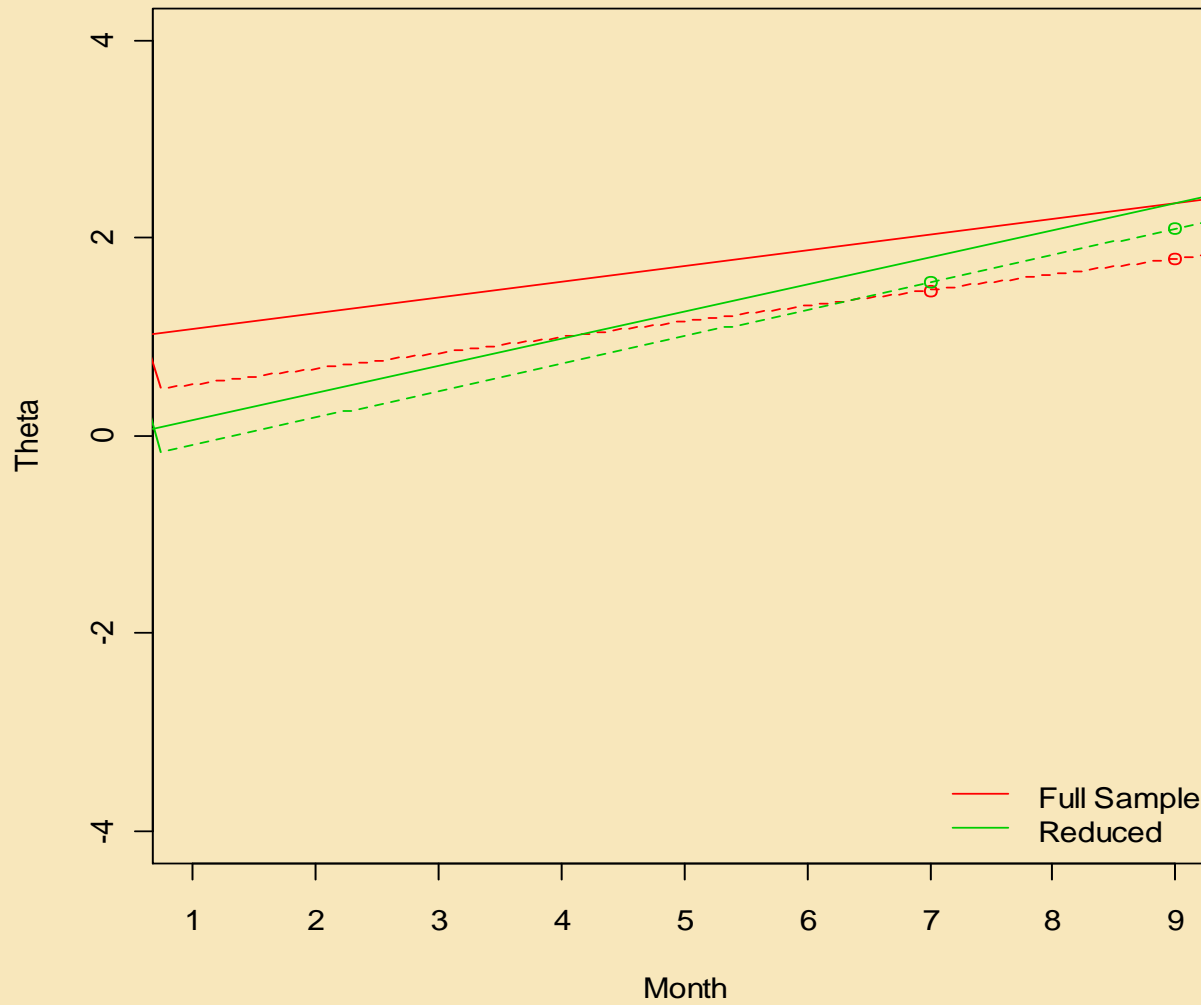


Which Wave 7 Item-Person Map



Extrapolation

Which



Research Questions

- ▣ Concurrent correlations:
 - CELF SS: .67 CELF WS: .68 CELF EV: .71
- ▣ What are the item locations/ ability level of items for WODB?

Oral Language: Picture Naming



I'm going to look at these cards and name these pictures.

Sample A

Apple

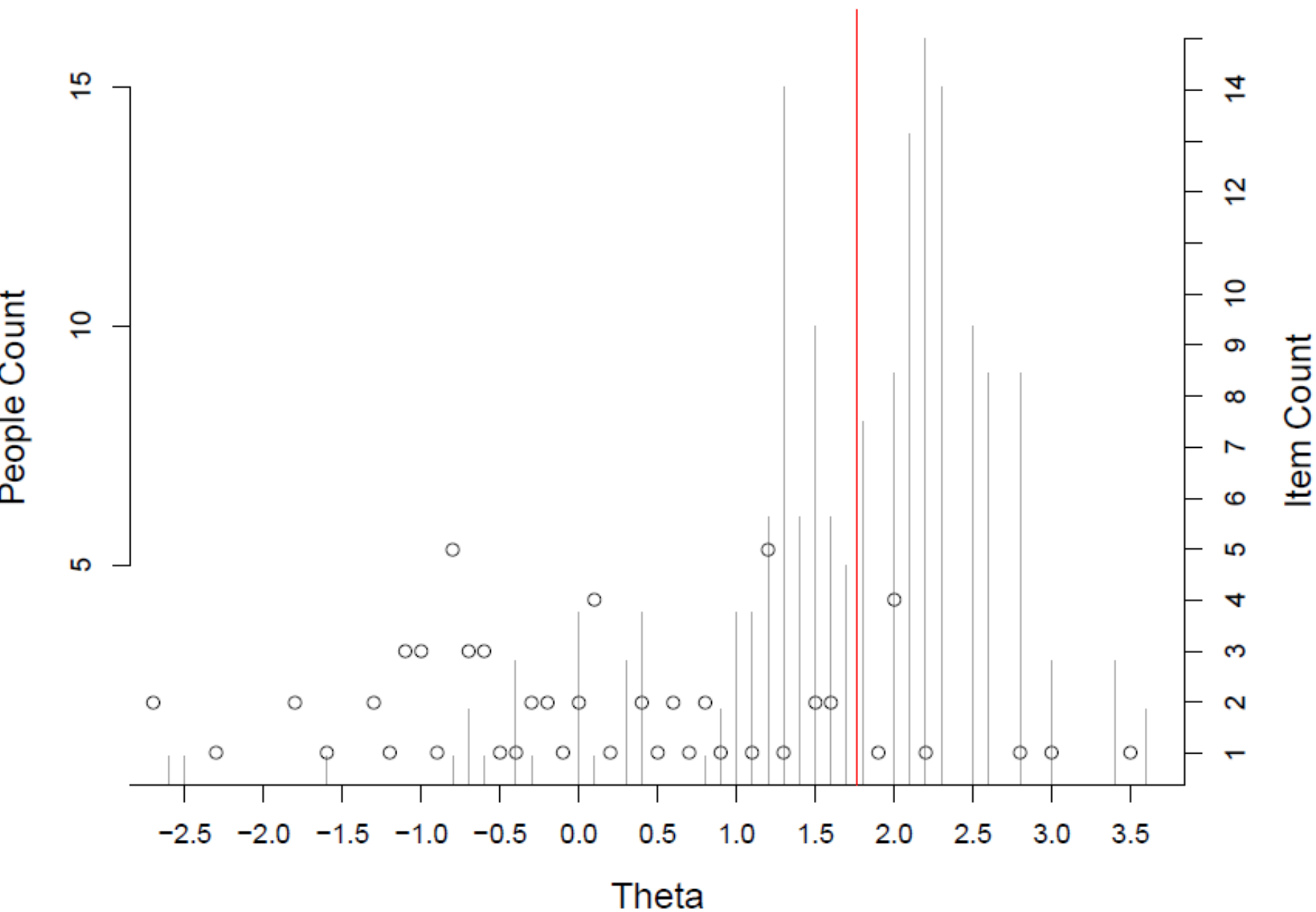
Picture Naming ID

Oral Language Research Questions

- Where do newly developed items fit on the ability scale for the Picture Naming IGDI?
- What is the concurrent criterion construct-related validity of the Picture Naming IGDI with the Peabody Picture Vocabulary Test – 4th Edition (PPVT-4) and the Clinical Evaluation Of Language Fundamentals – Preschool Expressive Vocabulary (CELF EV) sub test?

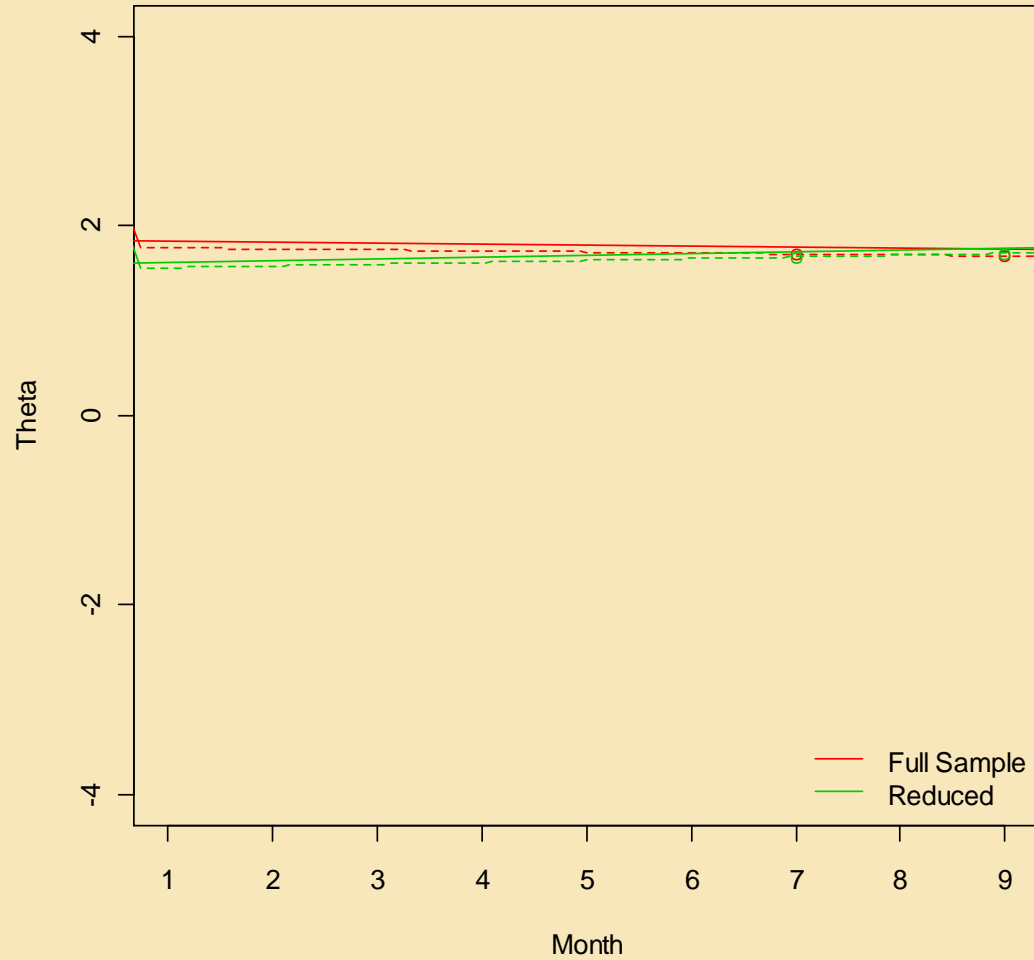


Picture Wave 7 Item–Person Map



Extrapolation

Picture



Concurrent Criterion Validity

- Picture Naming demonstrated a correlation of .68 with the PPVT-4.
- Picture Naming demonstrated a correlation of .77 with the CELF EV.
(n = 152).

Alphabet Knowledge

F A D



Alphabet Knowledge

Sample A

We're going to look at these cards and find the letter that makes the sound I say.

This card has 3 big letters on it (*point to each*).

Now I'm going to show you which letter makes the sound /f/.

This letter makes the sound /f/ (*point*).



/f/

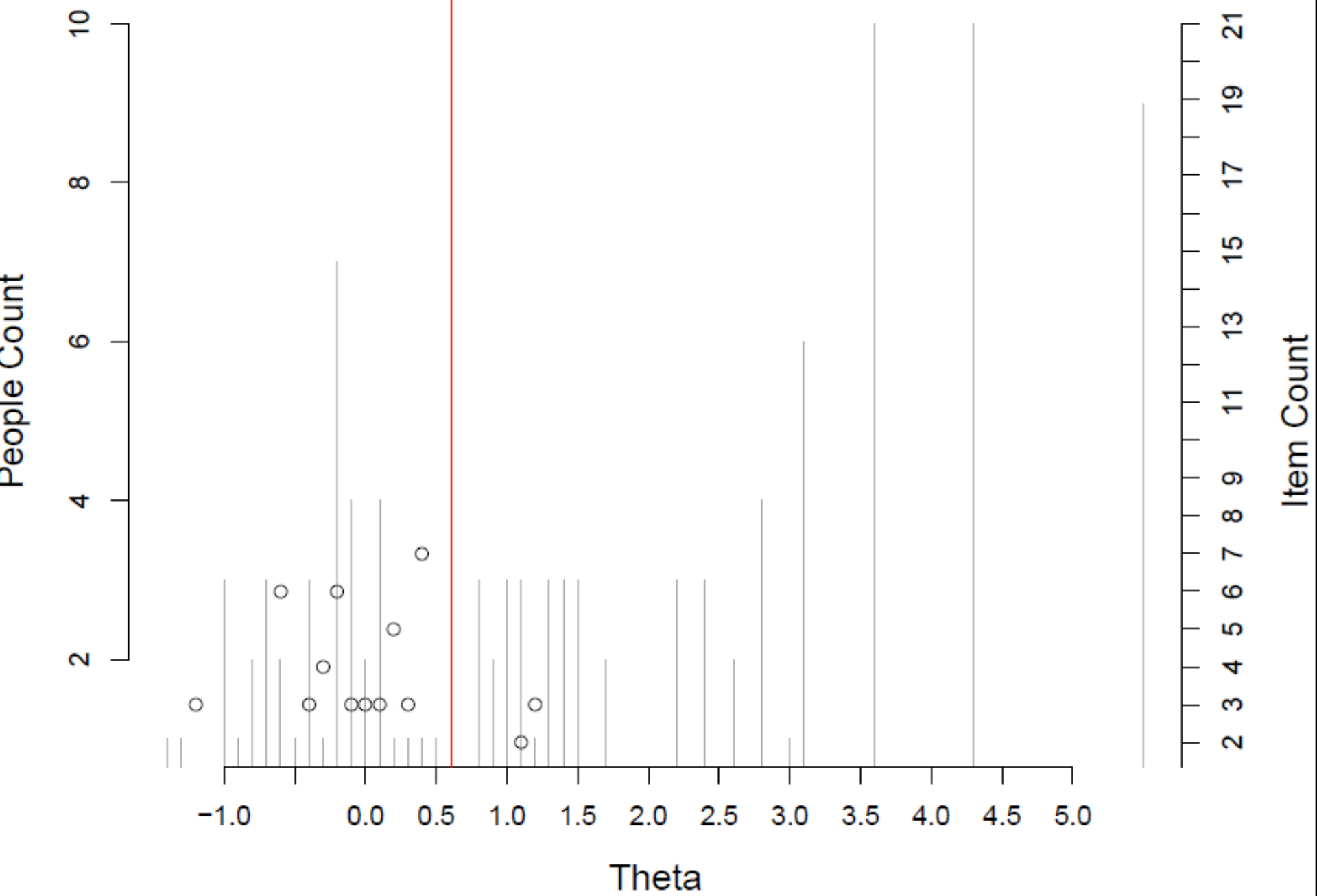
Alliteration ID

Alphabet Knowledge Research Questions

- Where do newly developed items fit on the ability scale for the Sound Identification IGDI?
- What is the concurrent criterion construct-related validity of the Sound Identification IGDI with the Test of Preschool Early Literacy – Print Knowledge (TOPEL PK) sub test?

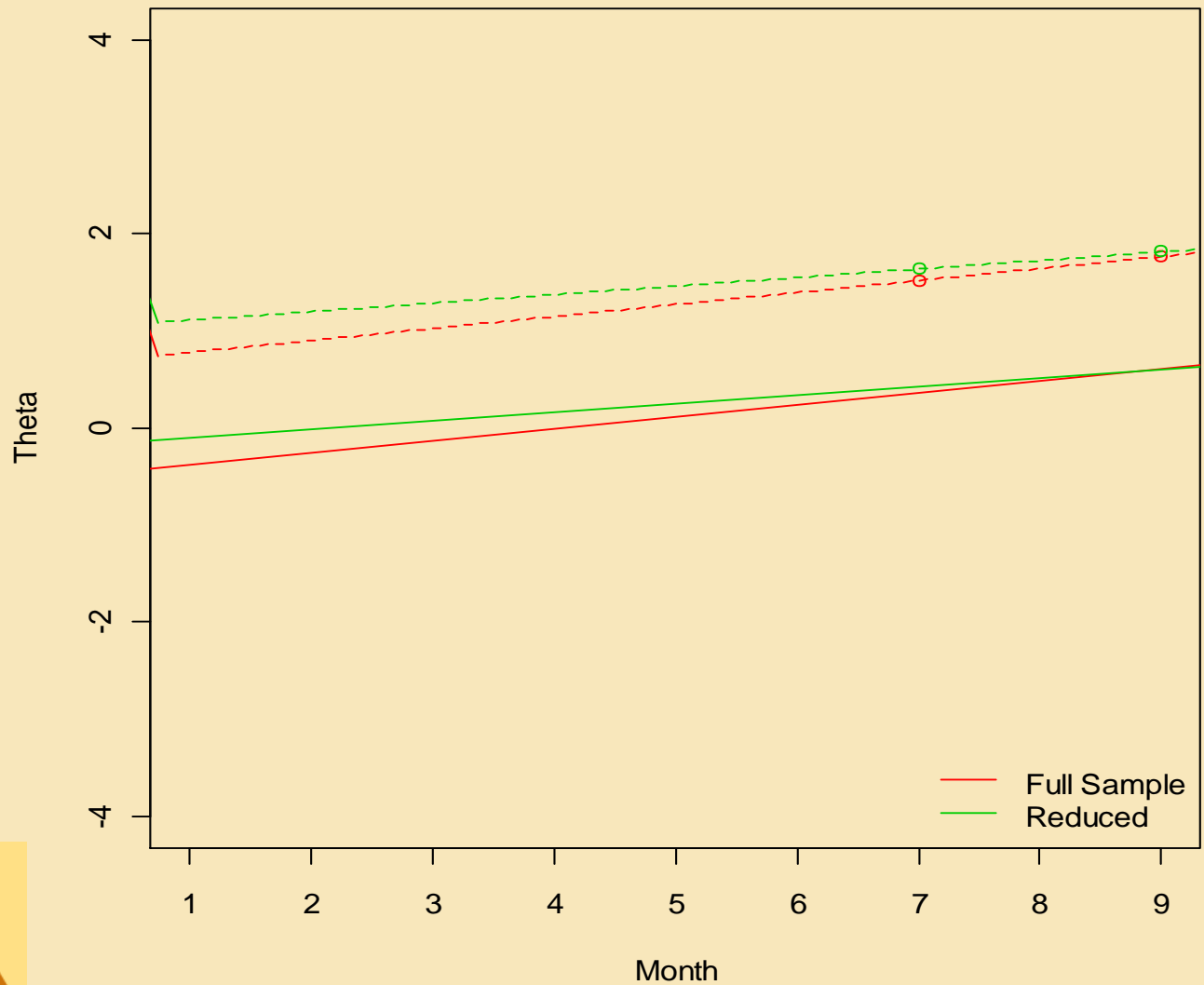


Sident Wave 7 Item-Person Map



Extrapolation

Sident



Concurrent Criterion Validity

- Sound Identification demonstrated a correlation of .71 with the TOPEL PK (n = 138).



Summary & Next Steps

- We have functioning scales with items located at children's ability levels for all 5 IGDIs.
- We have preliminary fall Identification sets for all early literacy domains, and more robust Id sets to be used at the winter and spring screening time points.
- We are currently conducting a study to validate the fall Identification cut points and will also confirm the winter and spring cut points with a more diverse sample.



Summary & Next Steps, cont.

- We are currently conducting research and field testing of up to 60 new items for each scale in an effort to move toward development of progress monitoring sets.
- We have established a decision making framework to be used in conjunction with the Identification IGDIs, to increase the accuracy of our decision making.
 - The data we are collecting this year will allow us to evaluate the validity of this framework.



Multiple Gating Decision Making Framework

□ Oral Language/ Comprehension

	Practice Elements	
Gate	Measure	Criterion
Gate 1	IGDIs <ul style="list-style-type: none"> • Picture Naming • WODB 	Above Cut: Tier One <ul style="list-style-type: none"> • Picture Naming: 11-15[#] • WODB: 12 – 15[#] Within Cut Range - : Gate 2 <ul style="list-style-type: none"> • Picture Naming: 6-10[#] • WODB: 6-11[#] Below Cut Range: Gate 3 <ul style="list-style-type: none"> • Picture Naming: 0-5[#] • WODB: 0-5[#]
Gate 2	Instruction and Learning Questions**	0 = Tier One 1+ = Gate 3
Gate 3	Behavior and Specific Content Questions**	0 = Tier Two 1+ = Tier Three

Teacher Questionnaire: Gate 2



Teacher Questionnaire

Directions: Consider the following statements as they relate to the specific child.
Make a check in the accompanying box if you feel the statement is **TRUE**.

Gate 2 Statements: Instruction and Learning

	Child 1	Child 2	Child 3	Child 4	Child 5	Child 6
(1) This child often needs extra time in order to learn new things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) This child often requires repeated instruction in order to learn a new skill.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) This child often needs to have activities simplified or modified in order to meaningfully participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) This child has trouble paying attention or staying engaged during large group activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) This child has limited communication skills (e.g. limited use of nouns, verbs, adjectives, and adverbs when talking to you).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Teacher Questionnaire: Gate 3

COMPLETE THIS SECTION IF YOU ANSWERED YES TO ANY OF THE QUESTIONS ABOVE.

Gate 3 Statements: Behavior and Specific Content

	Child 1	Child 2	Child 3	Child 4	Child 5	Child 6
(1) This child's behavior often interferes with his or her learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) This child is not able to participate independently at centers. He or she requires extensive supervision.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) This child does not know the names of common everyday objects places and things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



How will we evaluate this framework?

- Research component: Collecting standardized criterion measures on all children identified as candidates for tier 2 and tier 3 intervention, both pre- and post-intervention.
- Using this data, we can examine the relation between multiple-gating assigned tier and score on standardized criterion assessments for each domain, and relation between assigned tier and response to given intervention (growth from pre- to post-).



Conclusion

- Many studies are planned, many studies are underway...
- Questions?
- Thank you!

