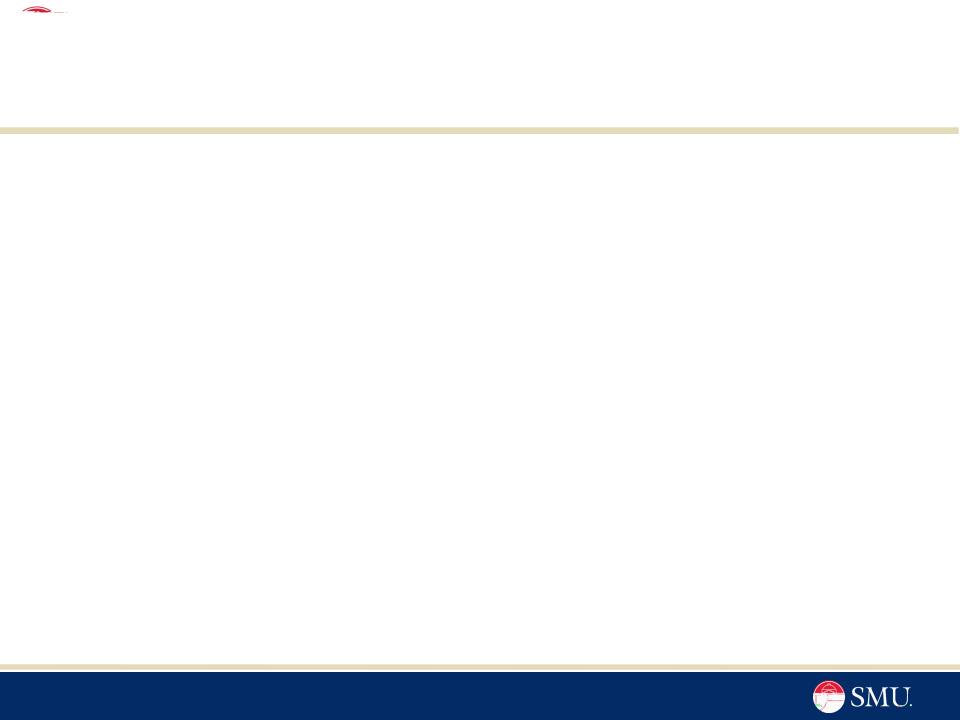


Establishing a Stopping Rule for an Instructionally Informative Diagnostic Assessment of Algebra Readiness!

Deni Basaraba, Paul Yovanoff, & Leanne Ketterlin-Geller!

Research in Mathematics Education!

Southern Methodist University!



Rationale for Diagnostic Assessment of Algebra Readiness!

- Recent student performance data indicate that 27% of 8th students are considered P c and only 9% are considered Ad a c d on the most recent NAEP (NCES, 2013)!
- More states, districts, and schools are implementing multi-tiered integrated models of instruction and assessment to help identify students who may struggle to reach grade-level proficiency standards!
- Successfully supporting these students requires access to theoretically-grounded, technically adequate diagnostic assessments to help teachers pinpoint students may struggle with the content!



Why are Stopping Rules Important?!

• Rationale for including a stopping rule in an assessment is fourfold!



How do you establish a stopping rule?!

- Our definition of a stopping rule!
 - The point at which administration of an assessment is discontinues that provides teachers with a reliable estimate of understanding about the assessed content a d sufficient information to help him/her target instruction to meet students' learning needs!



How do you establish a stopping rule?!

- Consider the type of information about student errors you wish to collect!
 - –" Slips: Random errors in students' procedural and declarative knowledge!
 - Focus on mastery of content within the domain!
 - Bugs: Persistent misconceptions about domain-specific knowledge or skills that consistently interfere with students' ability to demonstrate their understanding of the content!



How do you establish a stopping rule?!

Potential criteria to consider!





Structure of MSTAR Learning Progression!



Analyses!

• Two types of stopping rules are proposed!





Analyses!

• Efficiency!

- Use 2 PL item parameters to estimate (a) student ability and (b) probability that student will respond correctly to next item (conditional on the ability estimate and known item parameters)!
- Use logistic regression to treat correct responses on the next item as a dichotomous DV and number of sequential incorrect responses (e.g., 1, 2, 3) as IV!

Reliability!

Use 2 PL item parameters, estimate student ability and overall measurement reliability after each item response!



Results - Efficiency!

Probabilities of responding incorrectly to the next test item conditional on meeting a set percent proficiency criterion for all items in the Level (e.g., 80% of items within a Level correct)

Level	80% or higher	70% - 80%	60 – 70%	Less than 60%
4	0.31	0.40	0.37	0.47
5	0.31	0.40	0.34	0.44
6	0.21	0.26	0.36	0.27
7	0.68	0.48	0.51	0.54

For Levels 4, 5, and 6, probability of selecting an incorrect response was relatively low (~0.30) when students were held to an 80% proficiency criteria

As the percent proficiency decreases (e.g., 60%) the probability of selecting an incorrect response increases



