



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

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# Rationale for Diagnostic Assessment of Algebra Readiness!

- Recent student performance data indicate that 27% of 8<sup>th</sup> students are considered *P* and only 9% are considered *Ad* 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?!

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- 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 discontinued 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?!

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- Potential criteria to consider!

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# Structure of MSTAR Learning Progression!

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# Analyses!

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- Two types of stopping rules are proposed!

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# 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

