



# Measuring a Response to Intervention Model in Early Childhood: Examining Assessments for Identification, Decision Making and Progress Monitoring

Alisha Wackerle-Hollman, Tracy Bradfield, Scott McConnell & Trina D. Spencer



## Center for Early Education and Development: U of MN, The Ohio State University & The Center for Response to Intervention in Early Childhood

### Individual Growth and Development Indicators: Assessment Systems- Screening, Progress Monitoring and Decision Making Process

As response to intervention (RTI) is increasingly adopted within early childhood education programs, the need for robust assessments suited for use to identify/screen, evaluate and progress monitor student performance has become more and more salient. Psychometrically sound and logistically efficient measures will provide a basis to effectively identify preschool age students in need of intervention, to evaluate the level of intervention warranted (e.g. Tier 2 or Tier 3) and to monitor progress while receiving suggested level of intervention.

### Progress Monitoring within a Tier 2 Vocabulary and Comprehension Intervention: Assessment of Story Comprehension (ASC)

#### Screening/Identification Assessment (ID-IGDIs)

The Individual Growth and Development Indicators (IGDIs) are early literacy measures specifically designed for use within an RTI model. ID-IGDIs 2.0 were specifically designed to determine if a student's score on the measures is characteristic of Tier 2 or Tier 3 level performance. The measures were designed using IRT/Rasch analysis such that each item has a difficulty level associated with it. ID-IGDIs 2.0 are the first of their kind to produce an ability score for students in reference to an identified cut score between Tier 1 performance levels (performing adequately in the universal curriculum) and Tier 2/3 performance level (in need of supplemental intervention to be successful).

**Figure 1. Picture Naming Item Map With Cut Score**

**Figure 2. ID-IGDI 2.0 Screening Measures**

5 IGDIs pictures in Figure 2 (with the exception of First Sounds) are designed to capture seasonal performance across four early literacy domains: oral language, phonological awareness, alphabet knowledge and comprehension. The measures are designed to be 15 items long and are given in a specific sequence. Screening items are selected to represent performance at the cut-score location.

Seasonal cut scores are achieved using contrasting groups design such that student performance on IGDIs and criterion referenced assessments were contrasted with teacher ratings on performance level descriptors. Sensitivity and specificity were evaluated using ROC analysis, with sensitivity set at .70.

**Figure 3. Contrasting Groups Design**

Evidence of validity has been documented through criterion correlations with accepted measures of early literacy ( $r = .45-.80$ ). Reliability statistic alpha yielded .93-.95 across the 5 IGDIs measures.

#### Decision Making Framework (IGDI-DMF)

Cut scores that accompany the ID-IGDIs, distinguish between children demonstrating adequate levels of performance given the general classroom instruction (Tier One candidates) and those who would likely benefit from more intensive levels of instruction (Tier Two or Three). To further distinguish between those who would benefit from Tier two versus Tier Three instruction, a multiple-gating decision making framework has been developed and is currently being evaluated.

### Multiple Gating Model

This DMF starts with child score on IGDI as the first gate. Teachers are then asked to complete a teacher questionnaire that solicits additional information about child ability in the given domains to inform decision making at the successive gates.

#### Assessment of Story Comprehension (ASC)

The ASC was developed to measure treatment effects of a tier 2 vocabulary and comprehension intervention called Story Friends. It can also be used to monitor language development across the preschool year. The creation and validation of the ASC has followed an iterative process. As a curriculum-based measure, the ASC samples authentic child behaviors that reflect key outcomes, has standardized administration and scoring procedures, and is time efficient, economical, and easy to use. ASC validity, reliability, and sensitivity to growth are promising.

Children listen to a brief retellable story (e.g., breaking a toy, spilling paint, asking someone to play).

Examiner asks a mix of recall and inferential questions, which are consistent across forms.

Answers are recorded in real time. Then scored using a story specific scoring guide.

All 9 stories have the same story structure, linguistic complexity, length, and contextual support for a rare word.

One question asks for the definition of the rare word. If child cannot give definition a choice of 2 definitions is offered.

Administration takes about 3 minutes for 1 story (progress monitoring) or 8-10 minutes for 3 stories in a session (benchmark).

#### Progress Monitoring Assessment (IGDI-PM)

For those students selected to receive Tier 2 or Tier 3 intervention the IGDI progress monitoring set can be used to evaluate growth over time. The progress monitoring sets (2 parallel sets) are designed to include 30 items given at 3 week frequencies for each of 5 measures. Assessors or interventionists should only use the IGDI measures that match the content of the intervention being delivered (e.g., if an intervention in vocabulary is given, the Picture Naming IGDI should be used for progress monitoring).

Items used for progress monitoring are specifically selected from item locations (difficulties) representative of Tier 2 and Tier 3 performance (shaded in red in Figure 4). For each assessment Rasch ability scores are computed (rather than raw scores) to examine how student performance changes over brief periods of time based on the exact items the child can answer correctly. An example of tri-weekly output is provided in Figure 5.

**Figure 4. Picture Naming Item Map With Cut Score & Progress Monitoring Performance**

**Figure 5. Progress Monitoring Tri-weekly report**

In this simulated example the black circled items represent correct performance at Time 1 with a computed Rasch ability score at the green line. The yellow circled items represent correct performance at Tier 2 with a computed Rasch ability score at the blue line. This change in ability is detectable using a Rasch score, but would not be using a raw score as in both Times the raw score is 7.

#### Validation of the DMF model

Validation of the DMF model is occurring this academic year (2012-2013) in over 100 classrooms across 3 states serving Tier 1, Tier 2 and Tier 3 students. Preliminary results suggest the DMF model indicates high levels of reliability at alphas of range from .961 to .987

Evidence to support empirical standards of validity will be collected this year using the CELF-Preschool 2 for Oral Language in Fall and the TOPEL for Phonological Awareness in winter and spring.

Through analysis of children's score on the IGDI measures, in combination with the results of the teacher questionnaire, tier placement recommendations are made.

Students ID	Construct Domain to Target	IGDI Task	IGDI Score	TQ Result	Tier Assignment
1105001	Oral Language	PN	1	Did Not Pass	Tier 3
1105002	Comprehension	WCOB	4		Tier 1
1105002	Oral Language	PN	8	Pass	Tier 1
1105002	Comprehension	WCOB	10		Tier 1
1105003	Oral Language	PN	4	Pass	Tier 2
1105003	Comprehension	WCOB	13		Tier 2
1105004	Oral Language	PN	11	N/A	Tier 1
1105004	Comprehension	WCOB	14		Tier 1

#### ASC Iterative Development

DEVELOPMENT	STUDY 1	REVISIONS	STUDY 2
Created research-based framework. Wrote 9 stories and questions. Developed a single scoring guide.	36 preschoolers received 3 of the 9 ASC forms and criterion measures. Preliminary evidence of validity, inter-scoring reliability, and implementation of fidelity.	Rewrote 3 stories, eliminated 1 question, and developed story specific scoring guides.	20 preschoolers received all 9 forms and criterion measures. Additional evidence of validity, inter-scoring reliability, and implementation fidelity.
STUDY 3	STUDY 4		
76 preschoolers received all 9 forms and criterion measures. Validity coefficient with CELF SS is medium (.38). Fidelity of implementation is very high (97-100%). Scoring reliability is adequate (89%). Alternate form reliability is moderate (mean = .72)	18 preschoolers. The treatment group participated in the tier 2 vocabulary and comprehension intervention. ASC was administered pre-intervention, post-unit 1, post-unit 2, and post unit 3.		

**Study 4: sensitivity to change due to intervention**