America’s Reading Crisis: Recommendations from the Science of Behavior

Margaret Uwayo


KABAS
KALAMAZOO ACADEMY FOR BEHAVIORAL
& ACADEMIC SUCCESS


eliminating racism
empowering women
ywca

Agenda

- Importance of reading proficiency
- Contributions of science of behavior in Education
- Strategic Science of Teaching (SST)
- **Literacy assessments and interventions***

Illiteracy costs the U.S.= $300.8 billion in employment, business growth, health, crime, and welfare

Treat literacy as "a type of disease"

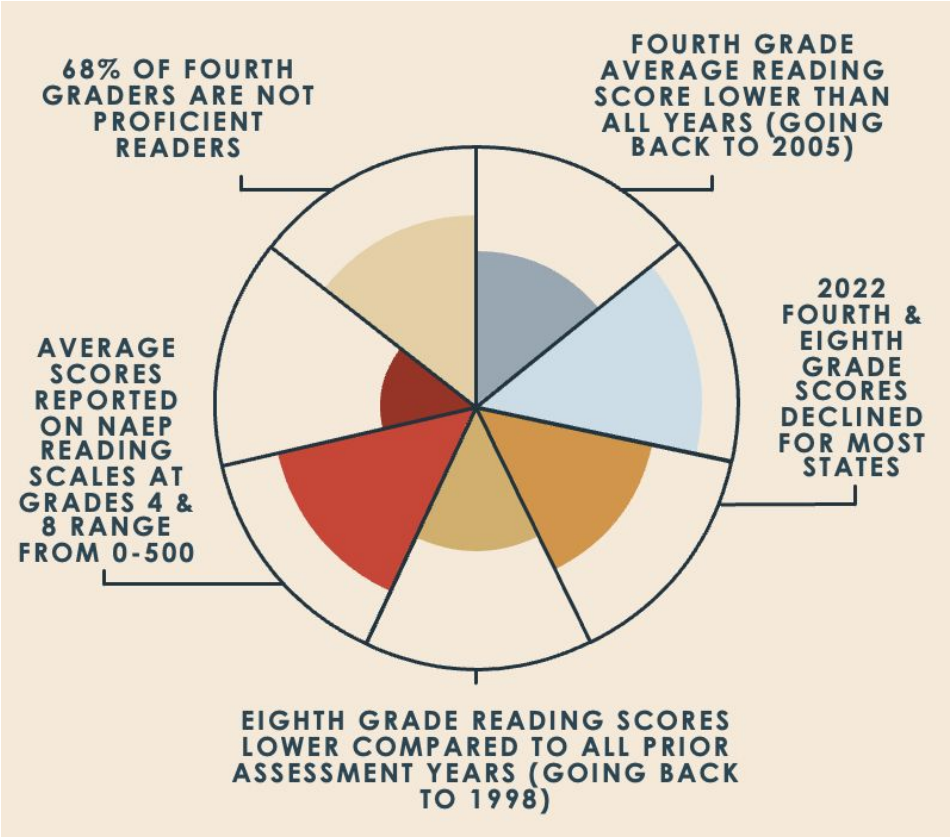
Global call of action to: "eradicate illiteracy in our society"

National Assessment of Education Progress (NAEP): 4 Levels of reading proficiency

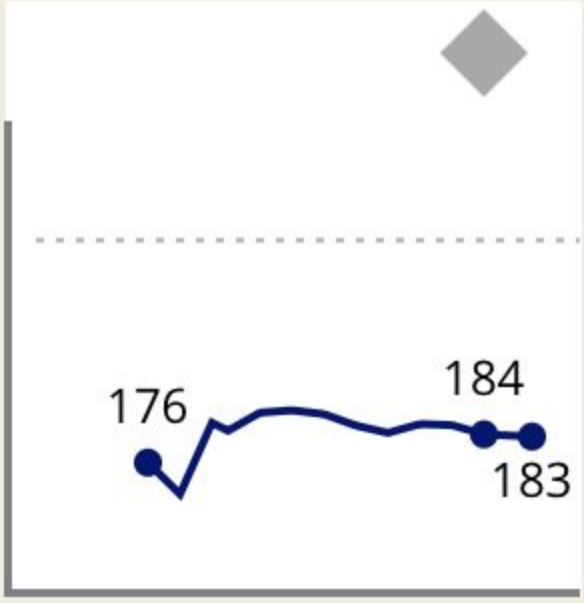
- Below basic
- Basic: Partial mastery of prerequisite knowledge and skills
- **Proficient: Mastery of grade level content**
- Advanced: Superior performance, beyond proficiency

NAEP Report

- 68% of 4th graders read below proficiency
- Most recent 4th and 8th grade reading scores are lower than previous years



Students with disabilities



Not students with disabilities

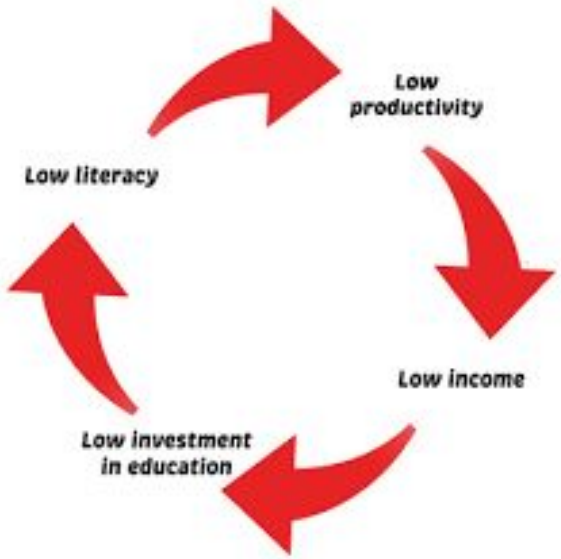
Why Early Reading Proficiency Matters

- Children who do NOT read proficiently by 3rd grade:
  - Are less likely to engage with texts independently
  - Are less likely to use complex strategies when reading challenging texts
  - Miss learning opportunities and fall further behind
  - Are more likely to have difficulty in other subjects that require comprehension
  - Are four times more likely to dropout of high school than proficient readers
  - For those who read at basic or below basic level, the rate is almost 6x greater
  - In the US, struggling readers makeup at least 30% of all students and represent 63% of those who eventually will drop out of school

Why Early Reading Proficiency Matters

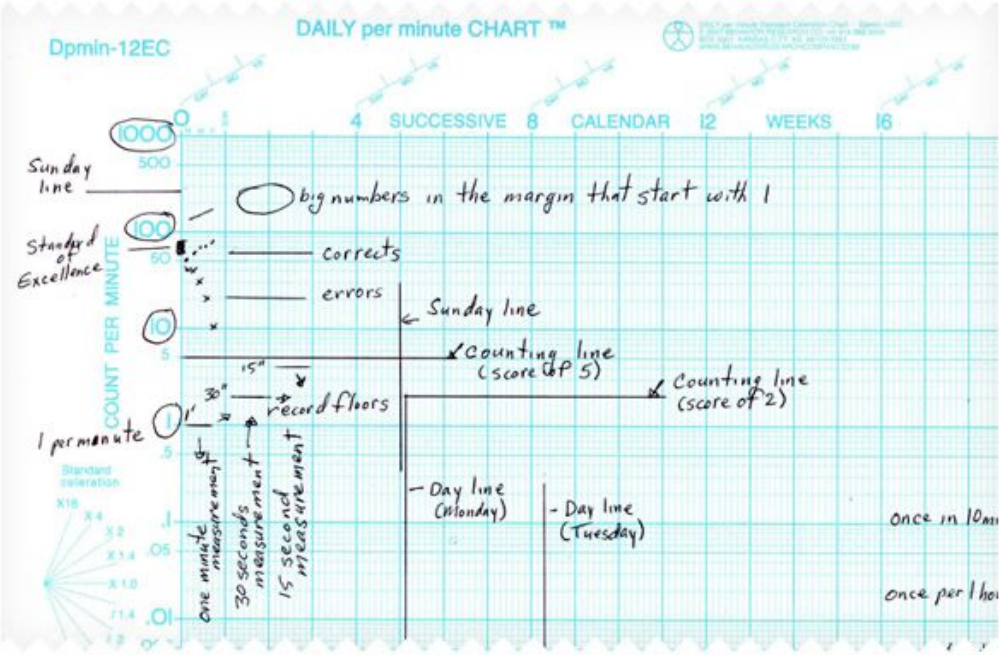
Children who live in poverty more likely to underperform;

- Live in neighborhoods with low performing schools
- Fall behind during the summers
- Have Less access to stimulating educational programs or regular meals
- Setting Events*

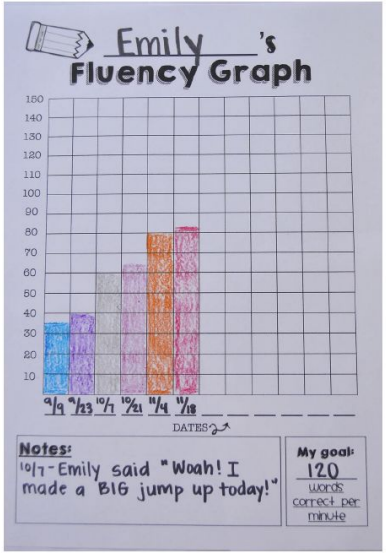


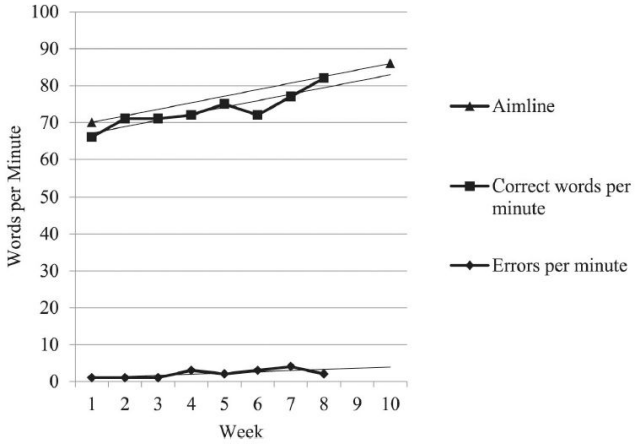
ABA Contributions in (Special) Education

Diagnostic assessments and precise measurement of student and teacher performance



Diagnostic assessments and precise measurement of student and teacher performance





Diagnostic assessments and precise measurement of student and teacher performance: TPRA

Teacher Performance Rate and Accuracy Scale

Date: 1/14/03 School: Kennedy Middle School

Teacher: L. Wilson Observer: K. Smith

Student: T. Washington Program: Reading Letters A-C

	Teacher Antecedent	Student Behavior	Teacher Consequence
1.	√	—	C
2.	√	—	C
3.	√	+	R
4.	√	+	R
5.	√	+	R
6.	√	—	C
7.	√	+	R
8.	√	+	R
9.	√	+	R
10.	√	+	R
Correct/ Incorrect:	9/1	7/3	9/1

Teacher Number Per Minute Correct: 8 correct learn units = 2.25 learn units/minute

Teacher Number Per Minute Incorrect: 2 correct learn units = .56 learn units/minute

Student Number Per Minute Correct: 7 correct learn units = 1.97 learn units/minute

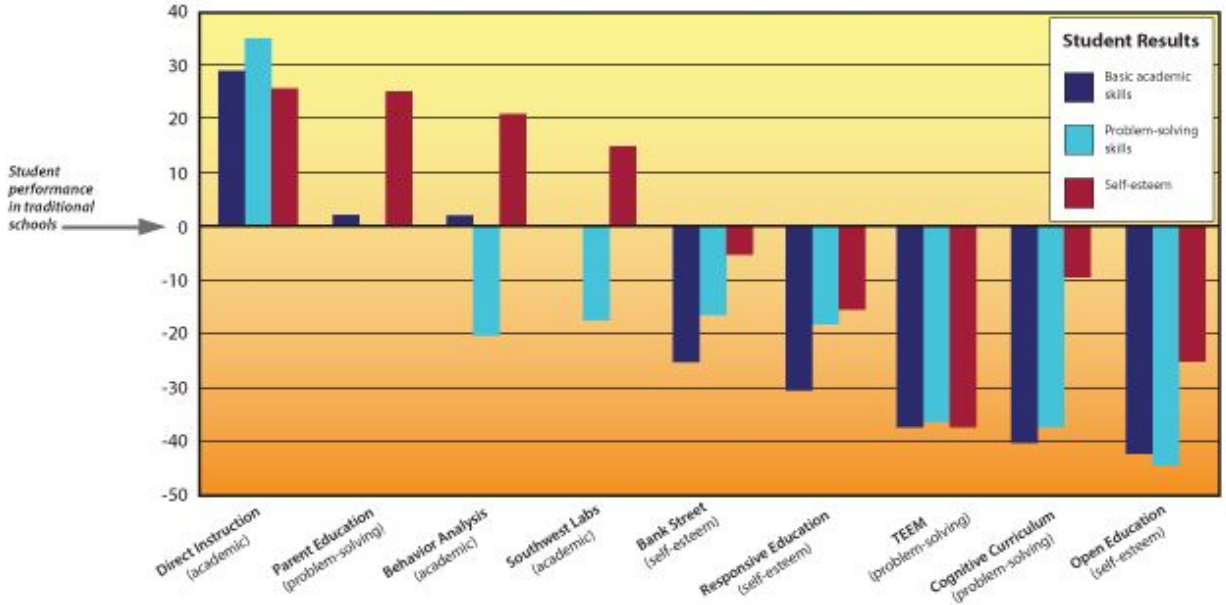
Student Number Per Minute Incorrect: 3 incorrect learn units = .85 learn units/minute

Converted Time: 3.55 min Actual Time: 3 min 33 sec

Figure 1. Example of a completed TPRA form.

Project Follow Through, 1967 - 1977

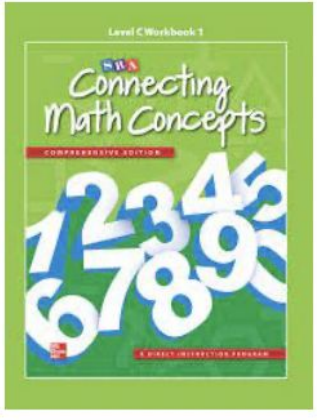
Nine models of teaching K-3 compared in history's largest educational experiment

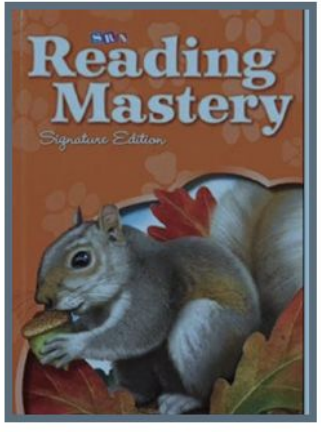


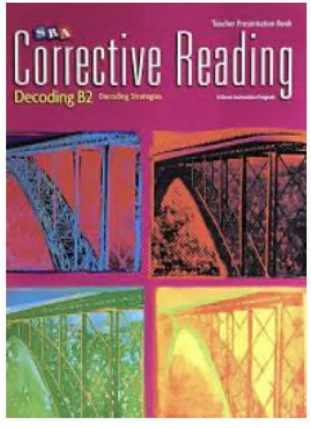
Findings:

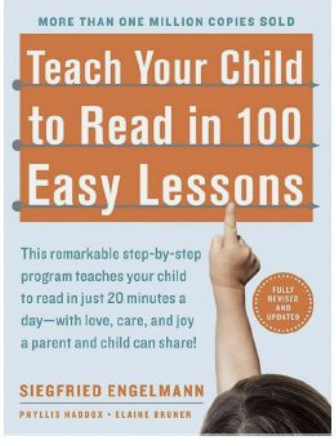
- Nine models grouped into 3 broad teaching approaches: Academic focus, problem solving focus, or self-esteem focus.
- Three categories of results were measured: Basic academic skills, problem-solving skills, and changes in self-esteem.
- Direct Instruction produced the best results in all areas: Basic skills, problem solving, & self-esteem.
- **Most other models were less effective than traditional schooling**, yet many remain in use today!

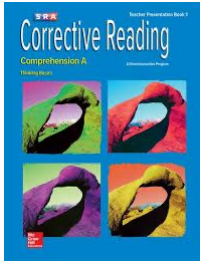
Highly Effective Scripted Curricula & Other Supplemental Programs

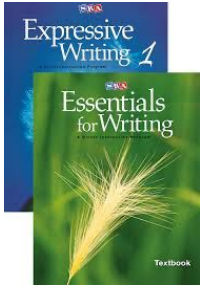


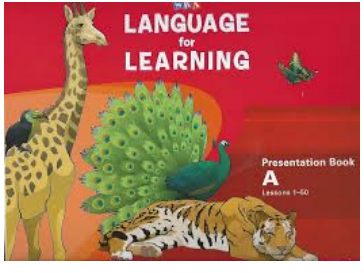


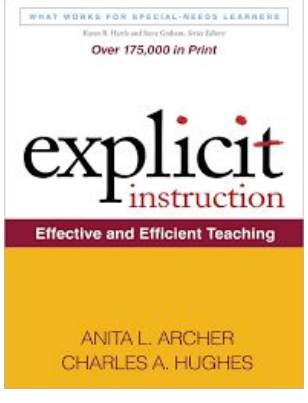












Curriculum Based Measures (CBMs)

- Formative assessment - diagnostic and progress monitoring
- Approach to measure academic growth
- Evaluating effectiveness of instruction
- Identifying at-risk students
- Making decisions about interventions

easyCBM®
Response to Intervention made easy

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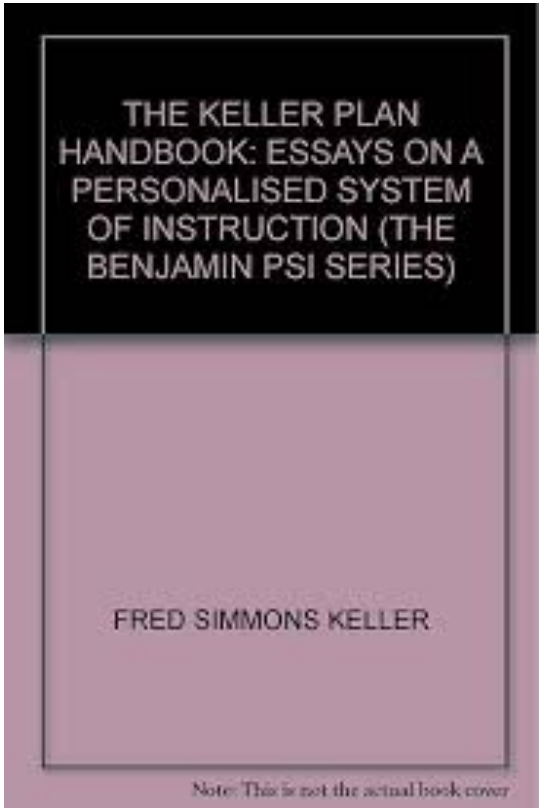
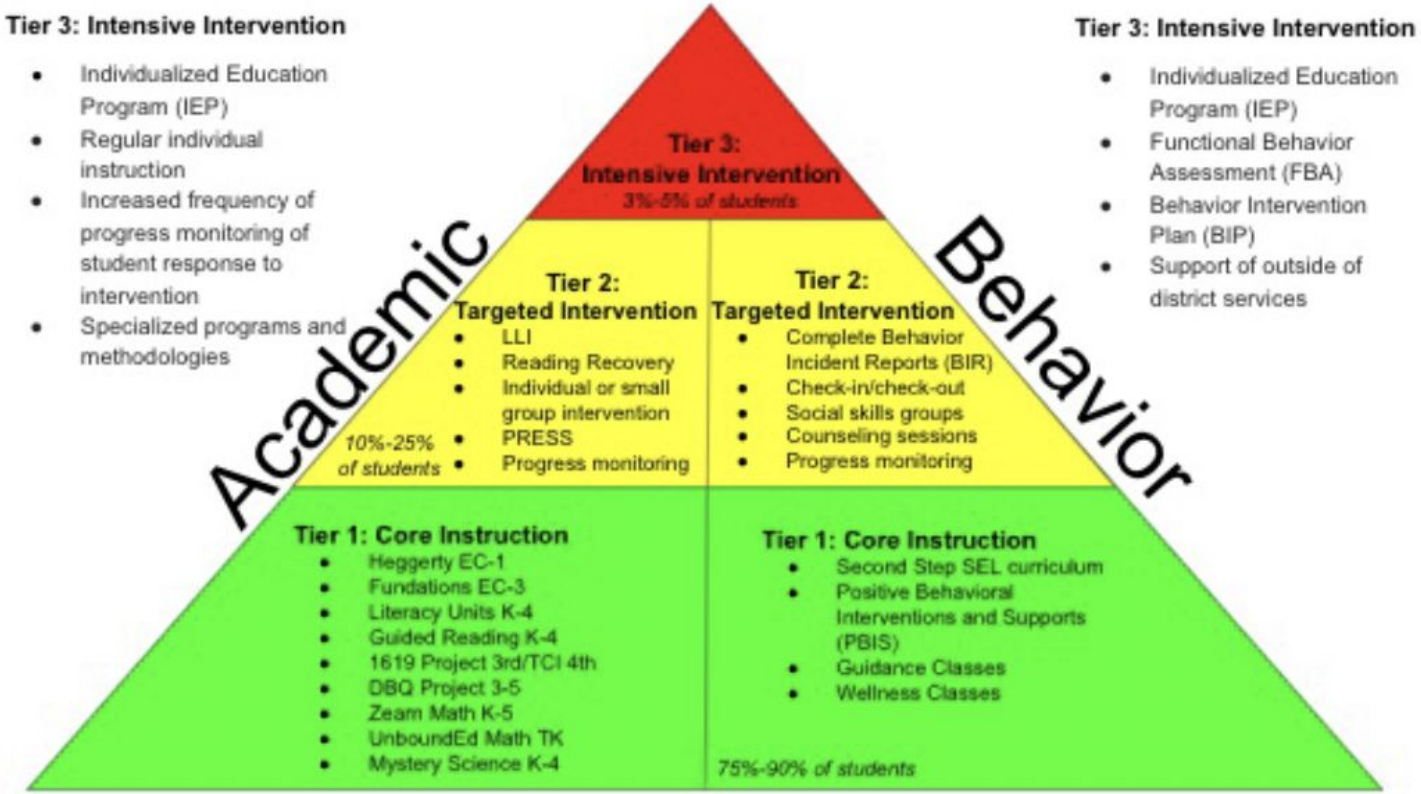
Personalized System of Instruction (PSI)

- Designed for college classrooms
- 5 defining features
  - Emphasizes the written word
  - Allows self-pacing
  - Requires mastery
  - Relies on proctors
  - Lectures for motivation or reinforcement



School-Wide Positive Behavioral Supports



Behavioral Cusps*

- "[A]ny behavior change that brings the organism's behavior into contact with new contingencies that have even more far-reaching consequences" (Rosales-Ruiz & Baer, 1997)
  - Bidirectional Naming (BiN)
  - Observational Learning

Strategic Science of Teaching (SST)

SST focuses on the application of the science of behavior and learning to instructional design, teaching practices, and the analysis of learning outcome (Greer, Webber, Sun, 2024; Ross & Greer, 2024).

Strategic Science of Teaching (SST)

Educators function as strategic scientists who:

1. engineer a learning environment on principles of behavior
2. design and deliver individualized instruction
3. use a data-based decision protocol to analyze and solve learning problems

The Teacher is a Scientist

- Applies science-based teaching procedures & curricula
- Creates a learning environment based on PoB
- Measures learner response to instruction
- Delivers individualized instruction - performance level
- Homogeneous grouping
- Mastery-based instruction*
- Personalized System of Instruction (PSI)
- Visual analysis of student progress - graphs
- Develop students* function of language

What is Reading?

READING

Textual Responding	Comprehension
Verbal operant under control of printed stimuli (Skinner, 1957).	• Literal comprehension • Inferential comprehension • Critical or evaluative comprehension

Reading Instruction Needs

	Early Readers	Older Struggling Readers
Seminal Study	National Reading Panel, 2000	Roberts et al., 2008
Areas of Need	• Phonemic awareness • Phonics • Fluency • Vocabulary • Comprehension	• Word study • Fluency • Vocabulary • Comprehension • **Motivation**

Pre-Reading Repertoires

- Pre-attending
  - Matching 2D and 3D stimuli
  - Listener literacy
  - Generalized matching
- Auditory discrimination
  - Vocal sounds, blends, words
  - Multiple exemplar instruction
- Visual Discrimination or Word-Picture Discrimination
  - words evoke textual responses, picture represents a visual image
- Conditioned reinforcement for books*
  - books as reinforcers through pairing and reinforcing consequences

Emerging/Early Readers

- Teach individual letter sounds using MEI
  - Sounds, not names
  - High frequency vowels (a) and consonants (m) or (t)
- Blending sounds consonant-vocal-consonant (CVC) words
  - Use CVC contained in the mastered sounds (m a t) with different stimuli
- High frequency words*
  - Non-transparent or sight words (e.g and, the, have)
- Short sentences
  - Combination of 1 CVC word with known letters/sound and 2 sight words
  - The dog and dad have cod
- Sentence fluency - CBM
  - 1-min fluency timings

Older Struggling Readers Face Unique Challenges

- Older students have longer and aversive learning histories
- Have received poor or inadequate reading instruction
- Continue to experience cycle of underperformance on assessments
- Need more intensive support for longer periods of to catch up

Reading Instruction Needs

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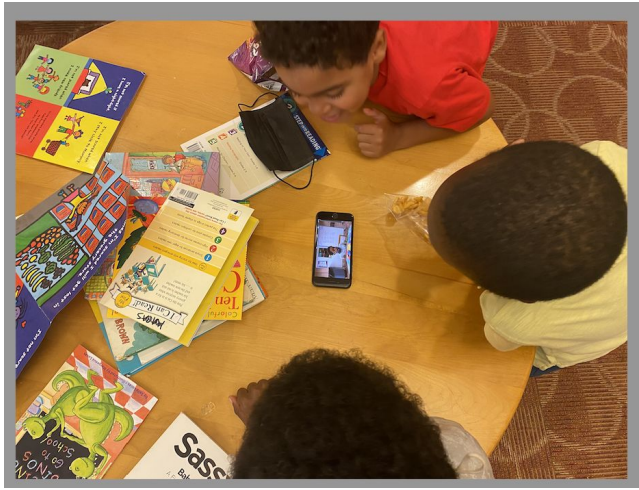
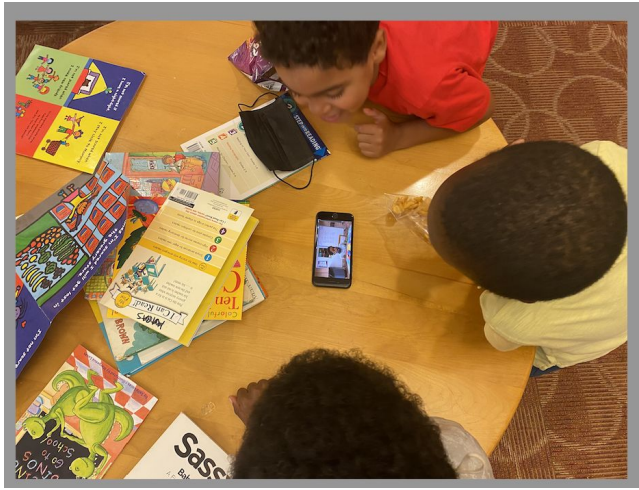
SST Addresses Those Challenges for Older Students

- Conditioning the learning environment
- Implement behavior management system
- Condition observing books and reading
- Assess reading repertories frequently
- Place students in appropriate curricula and groups



SST Addresses Those Challenges for Older Students

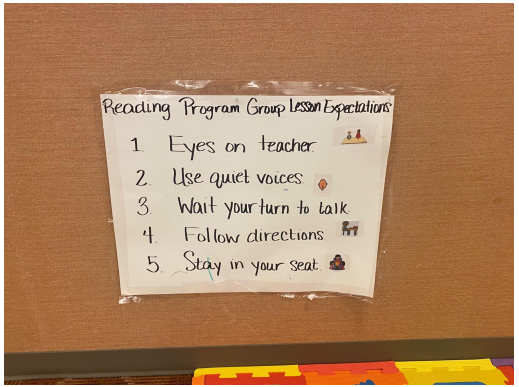
- Highly-individualized instruction
- Monitoring progress in the moment
- Ensure learn units are in place
- Measure instructor performance (TPRA)
- Make data-based decisions daily*

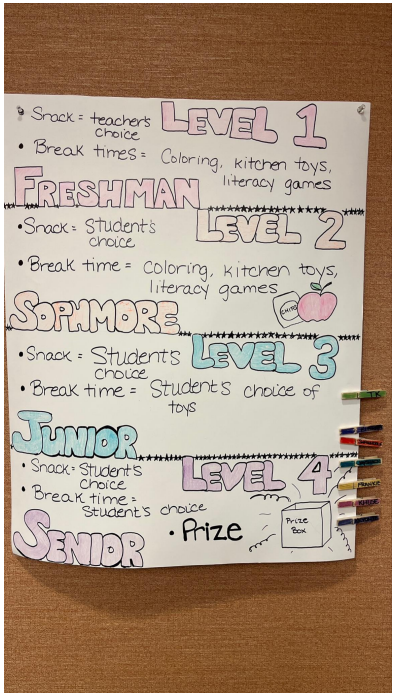


Teaching Older Students To Read: Behavior Management

WEEK 1-2

1. Classroom Behavior Management: PBIS
    a. Establish classroom rules
    b. Teach classroom expectations
    c. Ensure high rates of approvals vs. disapprovals (4:1)
    d. Effective reinforcers
    e. Leveled system of behavior management*

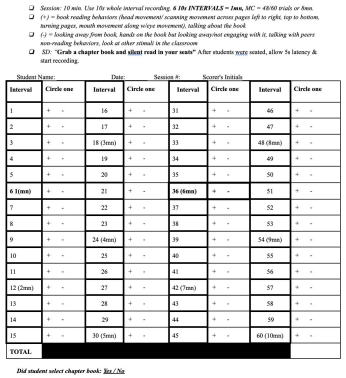




Teaching Older Students To Read: Assessments

WEEK 1-2

1. Administer Diagnostic Reading Assessments
   - **a. Standardized assessments (KTEA):**
     - i. General reading performance
     - ii. Target students who read below 25th percentile on phonics
   - **b. Informal Reading Inventories (SDQA):**
     - i. Reading levels
     - ii. Administer before, as ended during, and after intervention
   - **c. Phonics surveys** (McGraw Hill, phonics/syllabication survey)
     - i. Identify missing skills
     - ii. Administer before, during and after intervention
   - **d. Curriculum-based Measures (CBMs)**: Pre, post, and bi-weekly during intervention
     - i. Use school data if available
     - ii. Target students reading at or below 40th percentile
   - e. Curriculum placement assessment
     - i. Direct Instruction; before intervention
   - **f. Reading Motivation***
     - i. Target students who read less than 80% of observed time

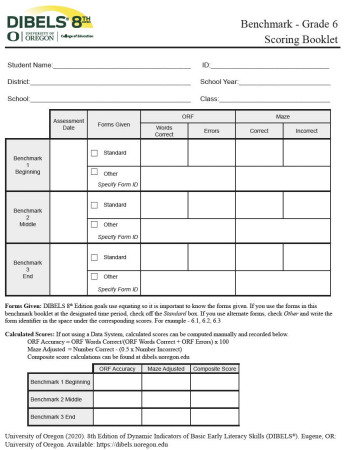


- *Session: 10 min. Use 10s whole interval recording.* ***6 10s INTERVALS = 1mn,*** *MC = 48/60 trials or 8mn.*
- *(+) = book reading behaviors (head movement/ scanning movement across pages left to right, top to bottom, turning pages, mouth movement along w/eye movement), talking about the book.*
- *(-) = looking away from book, hands on the book but looking away/not engaging with it, talking with peers non-reading behaviors, look at other stimuli in the classroom*
- *SD.* **"Grab a chapter book and silent read in your seats"** After students were seated, allow 5s latency & start recording.

Student Name: Date: Session #: Scorer's Initials

Interval	Circle one	Interval	Circle one	Interval	Circle one	Interval	Circle one
1	+ -	16	+ -	31	+ -	46	+ -
2	+ -	17	+ -	32	+ -	47	+ -
3	+ -	18 (3mn)	+ -	33	+ -	48 (8mn)	+ -
4	+ -	19	+ -	34	+ -	49	+ -
5	+ -	20	+ -	35	+ -	50	+ -
6 1(mn)	+ -	21	+ -	**36 (6mn)**	+ -	51	+ -
7	+ -	22	+ -	37	+ -	52	+ -
8	+ -	23	+ -	38	+ -	53	+ -
9	+ -	24 (4mn)	+ -	39	+ -	54 (9mn)	+ -
10	+ -	25	+ -	40	+ -	55	+ -
11	+ -	26	+ -	41	+ -	56	+ -
12 (2mn)	+ -	27	+ -	42 (7mn)	+ -	57	+ -
13	+ -	28	+ -	43	+ -	58	+ -
14	+ -	29	+ -	44	+ -	59	+ -
15	+ -	30 (5mn)	+ -	45	+ -	60 (10mn)	+ -
TOTAL							

Did student select chapter book: Yes / No



DIBELS 8th Edition — Benchmark - Grade 6 Scoring Booklet

Student Name: ID:

District: School Year:

School: Class:

	Assessment Date	Forms Given	ORF		Maze	
			Words Correct	Errors	Correct	Incorrect
Benchmark 1 Beginning		☐ Standard				
		☐ Other Specify Form ID				
Benchmark 2 Middle		☐ Standard				
		☐ Other Specify Form ID				
Benchmark 3 End		☐ Standard				
		☐ Other Specify Form ID				

Forms Given: DIBELS 8th Edition goals use equating so it is important to know the forms given. If you use the forms in this benchmark booklet at the designated time period, check off the *Standard* box. If you use alternate forms, check *Other* and write the form identifier in the space under the corresponding scores. For example - 6.1, 6.2, 6.3

Calculated Scores: If not using a Data System, calculated scores can be computed manually and recorded below.
ORF Accuracy = ORF Words Correct/(ORF Words Correct + ORF Errors) x 100
Maze Adjusted = Number Correct - (0.5 x Number Incorrect)
Composite score calculations can be found at dibels.uoregon.edu

	ORF Accuracy	Maze Adjusted	Composite Score
Benchmark 1 Beginning			
Benchmark 2 Middle			
Benchmark 3 End			

University of Oregon (2020). 8th Edition of Dynamic Indicators of Basic Early Literacy Skills (DIBELS®). Eugene, OR: University of Oregon. Available: https://dibels.uoregon.edu

Teaching Older Students To Read: Daily Operations

WEEK 1-2

1. Establish Daily Operations During Reading Instructions
    a. Establish schedule/routine for reading instruction (e.g. rotating between groups, storing materials)
    b. Determine students' individual schedules
    c. Duration of instruction
    d. Teacher training and supervision*
        i. Direct Instruction or explicit instruction curricula
        ii. PBIS Fidelity
        iii. Data collection and data-based decision making
        iv. Teacher Performance Rate & Accuracy Scale (TPRA)
    e. Personalized System of Instruction (PSI) worksheets or HeadSprout
        i. Instructional reading level

TIME	ACTIVITY
BLOCK 1 **3:30-3:35**	- Arrival - put coats/backpack away
BLOCK 2 **3:40-3:55**	- Book Club: Reciprocal Reading w/Teacher (Snack choice)
BLOCK 3 **4-4:25**	- Phonics & Word Study: B2 L4 - Repeated Reading
BLOCK 4 **4:30-4:50**	- Phonics: MEI Vowel Teams
BLOCK 5 **4:55-5:15**	- 1 episode of HeadSprout
BLOCK 6 **5:15-5:25** **CLEAN UP**	- Pick up after yourself (e.g., throw away trash, pushchairs in) - Do your classroom "job"
BLOCK 7 **5:25-5:30**	- **Check-out with teacher** - **Prize? Y/N**

Teaching Older Students To Read: Individualize Learning Plans

WEEK 1-2

1. Group students homogeneously based on assessment results (e.g.. instructional levels, curriculum placement, similar skill deficits in phonics)
2. Develop Individualized Learning Plans (ILPs)*
3. Begin instruction focused on 3 key areas:
    a. Reading Motivation
    b. Phonics/word study
    c. Fluency

Johnnie's Schedule

Arrival Time: 3:40 pm (M-THR) **Dismissal Time**: 5:30PM

Behavioral goals: 1) Follow directions the first time, 2) Complete work quickly, 3) Help clean up. **30 POINTS = SENIOR Level**

I'm working for: _____

TIME	ACTIVITY	# of Points I can earn	Followed instructions the first time? Y or N	Kept my hands to myself? Y/N	# of Points I actually earned
BLOCK 1 3:30-3:35	- Arrival - put coats/backpack away	2			
BLOCK 2 3:40-3:55	- Book Club: Reciprocal Reading w/Teacher (Snack choice)	5			
BLOCK 3 4-4:25	- Phonics & Word Study: B2 L4 - Repeated Reading	5			
BLOCK 4 4:30-4:50	- Phonics: MEI Vowel Teams	6			
BLOCK 5 4:55-5:15	- 1 episode of HeadSprout	5			
BLOCK 6 5:15-5:25 CLEAN UP	- Pick up after yourself (e.g., throw away trash, pushchairs in) - Do your classroom "job"	6			
BLOCK 7 5:25-5:30	- **Check-out with teacher** - **Prize? Y/N**	1			

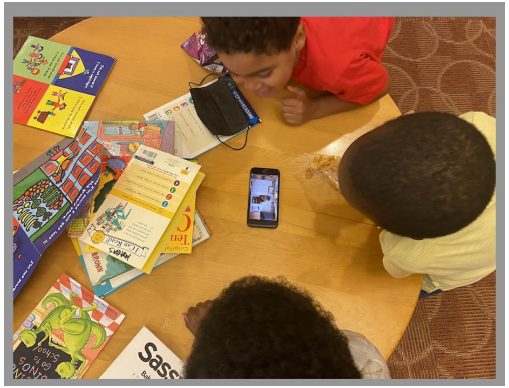
Reading Motivation

WEEK 3 and on

1. Reading Motivation: Book Club
    a. Conduct preference assessments for books
    b. Use reading motivation assessment data to determine the type of book conditioning intervention the students need
        i. Reciprocal Reading with Teacher - Less advanced students
        ii. Reciprocal Reading with Peers - Advanced students
        iii. Target behavior: 1) Textual responses, 2) observing responses
    c. Stimulus stimulus pairing: Highly preferred snacks
    d. Operant conditioning: Verbal feedback, points, snacks and "prizes"
    e. Use books at students' instructional or independent level
    f. Provide choice during reading(e.g., skip options)
    g. Peer yoked contingencies*

BOOK CLUB RULES

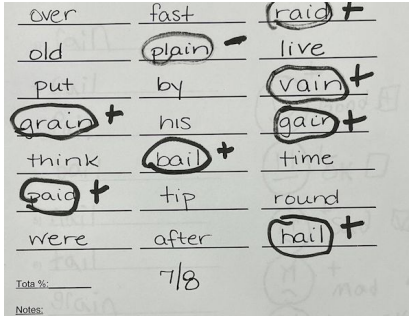
1. We will take turn reading for 1-min each
2. I will randomly call on you to read when it's your turn
3. You will earn a point for your team when you read
4. If you get stuck on a word, I will tell it to you
5. You can use your "pass card" one time each session
6. I will get a point if you choose to "pass," I will also get the point if you if you don't know where to start when it's your turn to read
7. The team with the most points wins at the end and gets to keep their prizes.
8. You can eat and drink while we're reading

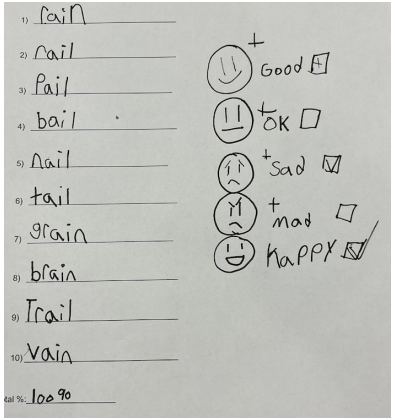


Phonics and Word Study Instruction

WEEK 3 and on

1. Phonics/word study: Teach how to respond to patterns
    a. Older students may have mastered sounds but struggling with blending and with word patterns
    b. Use scripted or structured curricula
        i. Direct Instruction: Corrective Reading
        ii. Orton-Gillingham Lessons
    c. Supplement curricula with individualized programs: MEI
        i. Choose target pattern - look for repeated errors in assessments
        ii. Separate patterns that sound or look the same (e.g. ai vs. ay)
        iii. Introduce the rule for the pattern and provide model
        iv. Target one pattern at a time with non-examples that are known to the learner as well as unknown
        v. Target response: Selection, textual response, written response
        vi. Textual responses - fluency timings with target pattern - use list of known and unknown list of words
    d. Word sort and connected text*

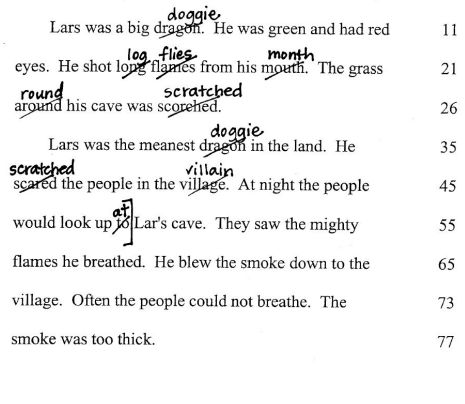




Fluency: Repeated Reading

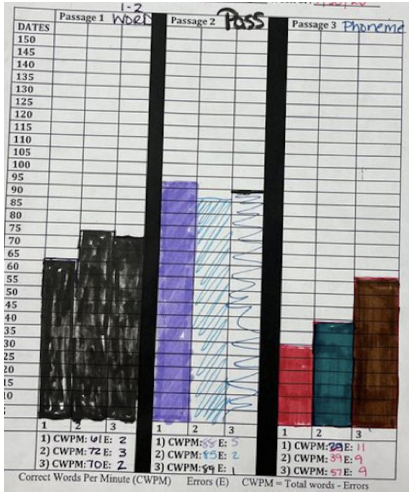
WEEK 3 and on

1. Hasbrouck & Tindal
   a. Use fluency norms to set goals for student
   b. Increasing number of words per minute
   c. 50th percentile or above
2. Repeated Reading
   a. Passage preview
   b. Passage reading with teacher or peer during classwide peer tutoring
   c. Students read passages, letter sounds, or words during 1 minute timed readings, 3 times each
   d. Provide feedback
   e. Students graph own data
   f. Generalization - novel text and progress on DIBELS benchmark



Lars was a big dragon. He was green and had red 11
eyes. He shot long flames from his mouth. The grass 21
around his cave was scorched. 26

Lars was the meanest dragon in the land. He 35
scared the people in the village. At night the people 45
would look up at Lar's cave. They saw the mighty 55
flames he breathed. He blew the smoke down to the 65
village. Often the people could not breathe. The 73
smoke was too thick. 77



Problem Solving Reading Instruction

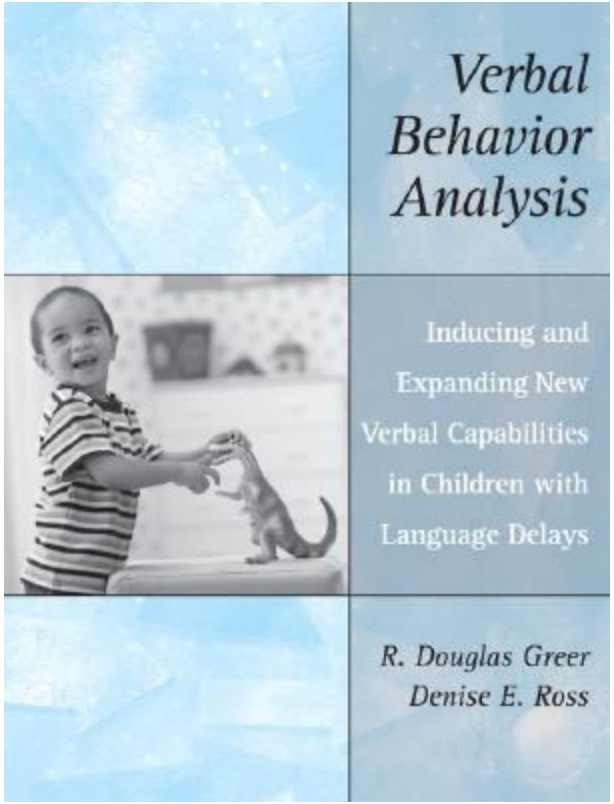
- Instructor specific
  - Is the antecedent accurate?
  - Did the Instructor provide a response opportunity?
  - Did the Instructor provide contingent consequences (corrections for incorrect responses and reinforcers for correct responses)?
  - Did the Instructor provide sufficient learn units?
- Learner Specific
  - Does the learner have prerequisite skills
  - Are motivational conditions present?
  - Did the student actively respond?

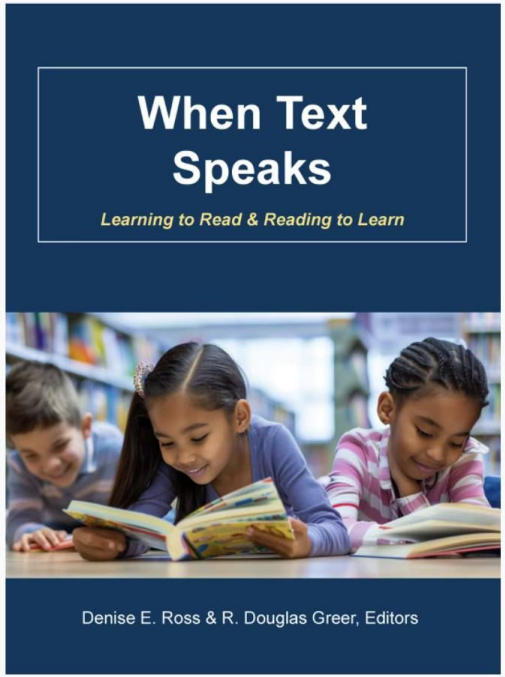
Older Students: Final Thoughts

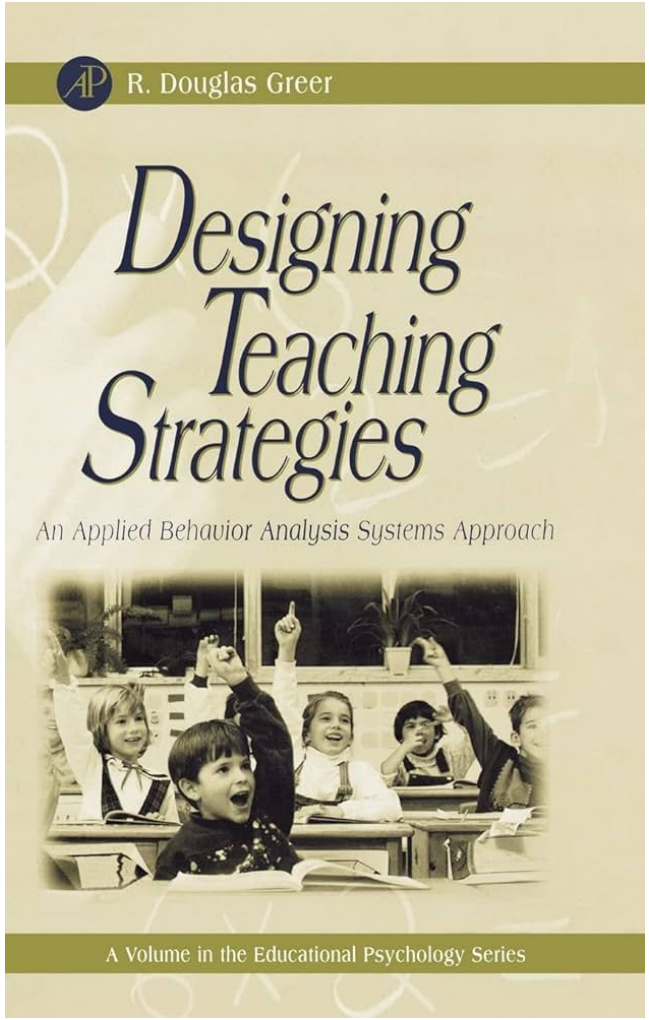
- Older students need more intensive and highly targeted instruction
- Homogeneous grouping makes implementation easy when possible
- Individualized Learning Plans are still needed
- Conditioned reinforcement for text is critical
- Instruction must focus on: Motivation, phonics, and fluency daily
- Data-based decision making and progress monitoring are key components of moving the student into more or less intensive tiers of support

Takeaways

1. The science of behavior may be a critical component of leveling the field through pedagogy and effective instructional practices for students
2. We must expand scope of competency for BAs to include literacy instruction
3. Impact of literacy on social, economic, and wellbeing of individuals should not be underestimated


Verbal Behavior Analysis
Inducing and Expanding New Verbal Capabilities in Children with Language Delays
R. Douglas Greer
Denise E. Ross


When Text Speaks
Learning to Read & Reading to Learn
Denise E. Ross & R. Douglas Greer, Editors


R. Douglas Greer
Designing Teaching Strategies
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