Progress Monitoring & Data-Based Decision Making in the Context of RTI: Current Thinking and Possible Alternatives

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Purpose

- Present two promising alternatives or supplements to progress monitoring (PM) in an RTI framework:
  - Dynamic Assessment (DA)
  - Event-Related Potential (ERP)
Why?

- Operationalization of RTI isn’t fully agreed upon:
  - Which model is the best?
  - Which measures are the best?
  - How do we distinguish between students with and without reading disabilities?
Why?

- RTI can be thought of as a machine with many moving parts.
- Increased complexity = increased chance for error.
- RTI relies upon the use of intervention as ‘test’ (i.e., response depends upon best instruction possible), therefore there is a high need for fidelity of implementation.
Why?

- Many challenges to valid measurement in an RTI framework.
- Time of implementation as a disadvantage.
Two Examples

- Within an RTI framework, these are two futuristic, ‘out-of-the-box’ examples.
- Need to develop the concept of RTI.
- Imagine additional ways to index responsiveness and then rigorously investigate these.
Dynamic Assessment (DA)

- Series of carefully graded prompts. Usually moving from minimal help to much greater help.
- What level of prompting is needed for success?
- Improvement over traditional assessments that only assess failure or success.
- Less susceptible to ‘floor effects’
Dynamic Assessment (DA)

- An example of a DA measure developed by D. Fuchs, L.S. Fuchs, & D. Compton.
- 5 levels (no assistance to maximum assistance) for 3 tasks (CVC, CVC-e, Doubling Rule).
- Administered to K and 1st Grade students.
Dynamic Assessment (DA)

- Level 1: Reading to Child
  - “I’m going to read some words. These are nonsense words. Not real words. See if you can figure out what these nonsense words say. I’ll read them to you.”
  - “Bod... zod... bom... zom...”
  - “Now, read these nonsense words.”
  - fot, gop, vop, wot, jop, zot
  - If 5/6 correct, move to Task 2. If less, “That’s not quite right. We’re going to learn more about these words” and move to Level II.
Dynamic Assessment (DA)

- Level II: Teaching Onset
  
  “These words are also nonsense words. I’m going to read them and put them in two piles. Over here I’ll put the words that begin with the letter “z.” The letter “z” says /z/. Over here I’ll put the words that begin with the letter “b,” /b/. Watch me.”

  - Tester sorts, student sorts with assistance if needed.
  - fot, gop, vop, wot, jop, zot
  - 5/6 correct, next task. Less, next level.
Dynamic Assessment (DA)

- Level III: Teaching Rime
  - Repeat sort focusing on the last two letters.
  - Sort into “o-m” /om/ and “o-d” /od/ piles.
  - Tester demonstrates, child repeats.
  - fot, gop, vop, wot, jop, zot
  - 5/6 correct, next task. Less, next level.
Dynamic Assessment (DA)

- Level IV: Teaching Onset-Rime Blending I
  - One example, no student practice, no feedback.
  - “This letter is “b”, it says /b/. These two letters (“om”) say /om/. Together these sounds say /b/ /om/ /bom/.” Repeat with “zod”.
  - “It’s important that you look longer at each word. Please read each word to me.”
  - fot, gop, vop, wot, jop, zot
  - 5/6 correct, next task. Less, next level.
Dynamic Assessment (DA)

- Level V: Teaching Onset-Rime Blending II
  - Repeat of Level IV directions.
  - Then student plays role of ‘teacher’ and says directions to tester.
  - Then ‘Guess-my-word’.
    - Tester says words one at a time and student points.
    - Then students says and tester points.
  - fot, gop, vop, wot, jop, zot
  - 5/6 correct, next task. Less, next level.
Dynamic Assessment (DA)

- Task II: CVCE
  - zod... zode
  - bod... bode

- Task III: Doubling Rule
  - zoding... zodding
  - boding... bodding

- Scoring
  - One point for each level completed.
  - If level 5 for task one and no mastery, stop test.
  - Lowest score = 3. Highest score = 15.
DA Results

- Results from E. Caffrey (2006)
- Compared DA to PM as a predictor of end of year K and 1st grade reading achievement.
- PM using curriculum-based measurement (CBM) of word lists that were read in 1 minute.
- Calculated CBM intercept (starting point) and slope (rate of growth over 5 weeks).
DA Results

- Four outcome variables:
  - WRAT reading (letters and words, not timed)
  - Word Attack (nonsense words, not timed)
  - Fluency (oral passage reading, timed)
  - WIAT spelling

- Multiple regression analysis to compare the amount of variation accounted for by DA, CBM intercept, and CBM slope.

- Commonality analysis to determine unique variance for each predictor.
## DA Results

### Unique Variance Explained

All statistically significant (p<.05)

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<th>DA</th>
<th>CBM Intercept</th>
<th>CBM Slope</th>
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DA Results

- All 3 independent variables were consistent predictors of reading achievement.
  - DA best predictor for WRAT reading and word attack.
  - Both CBM intercept and DA same for spelling.
  - CBM intercept better for fluency.
Best predictor of nonresponse depends on the skill you are using to determine NR status.
- DA has value added as a predictor.
- DA could be more effective and more efficient than PM alone.
- Index of ability to learn?
- DA as a supplement to PM.
  - May assist in identifying students for Tier 2.
  - Part of a larger battery of tests.
  - May shorten time needed for PM.
  - Could DA reduce ‘false positive’ rate?
Event-Related Potentials (ERPs)

- A portion of the electroencephalogram (EEG)
- Time-locked to a stimulus (e.g., picture, sound, word)
- ERP is present even without behavioral response.
- See Molfese et al. (2006) for a review of ERP.
Can provide information regarding:
- The speed or timing of processing (latency),
- The amount of activity or *effort* (amplitude),
- And, some indication of the brain regions involved in processing.
Children wear a net with 128 electrodes which record their brainwaves as they complete tasks.

Piloted with 27 first grade students.

Standard achievement and ERPs collected before and after 14 weeks of general education instruction.
ERP Tasks

- **Task 1) Letter - Letter Sound Mismatch:**
  - Student sees a letter on the screen (‘k’) then hears a recording of a letter sound (/k/).

- **Task 2) Nonsense Word Visual Mismatch:**
  - Student sees a nonsense word on the computer screen (‘bip’) and then hears a recording of the word (/bip/).

- Student indicates match or mismatch by pushing a button (red/green).
ERP Results

- Evidence of processing differences in below-average, average, and above-average readers on both tasks.
- Differences in early and late discrimination on both tasks.
LL task: PRETEST

Time (ms)

µV

avg
ERP Results

- Poor readers focused on early, basic characteristics (e.g., initial sound). No engagement in more detailed processing as shown by lack of later discrimination effects.
ERP Results

- Average readers did more detailed processing (both early and late discrimination effects),
- Relied heavily upon memory and familiarity (reflected in activity over parietal and frontal sites).
- Suggests that the tasks were less automatic and required more controlled cognitive processing.
ERP Results

- Above-average readers processed tasks in the same amount of time as average.
- Relied more on auditory characteristics (reflected in activity over temporal and central sites).
- Suggests that these children formed an auditory representation of the visual stimuli and matched pairs based on sound.
ERP Results

- Pre-instruction ERPs also varied according to improvements in reading ability observed after 14 weeks of instruction.
- Predictive value seen most clearly in the Nonword Reading task. (See ‘bip’, Hear /biz/).
ERP Results

- Improvement = % change in WRAT.
- ERPs of children w/ greatest increase characterized by frontal discrimination effects during pretest (attention).
- Those who showed no change evidenced discrimination over temporal sites (forming auditory representations).
ERP Results

- In a sense, ERP can be seen as a biological parallel to DA.
- Processing can be predictive of responsiveness to interventions.
- Could ERP be used in the future as a quick, reliable screening measure?
- May assist in understanding ‘why’ students don’t respond and provide clues on ‘how’ to intervene.
- May be used as evidence for processing changes related to instruction.
Concluding Thoughts

- Additional work is needed to determine the best ways:
  - to index ‘responsiveness’
  - to determine ‘nonresponse’ and reasons for nonresponse
  - to distinguish between students with and without RD
- DA and ERP may prove useful in improving our abilities to identify and intervene with struggling students.
References


Thank you!

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