

**Proficiency  
Interpretations of &  
Interventions for  
Below-Basic  
Adolescents on NAEP:  
*Do They Represent  
and Address  
Students' Strengths  
and Needs?***

Elfrieda H. Hiebert  
TextProject



# Foci of Presentation

- **Current:**

How are we interpreting “Below Basic”?

What instruction does that interpretation produce?

- **Alternative:**

What alternative interpretations are supported by evidence?

How does this evidence change what and how we teach?

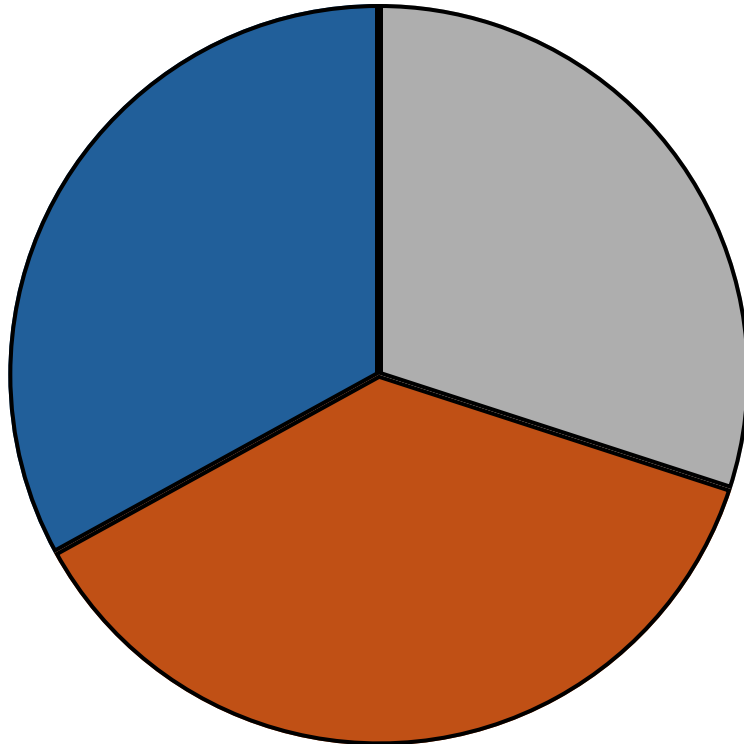


**How are we interpreting  
“Below Basic”?**



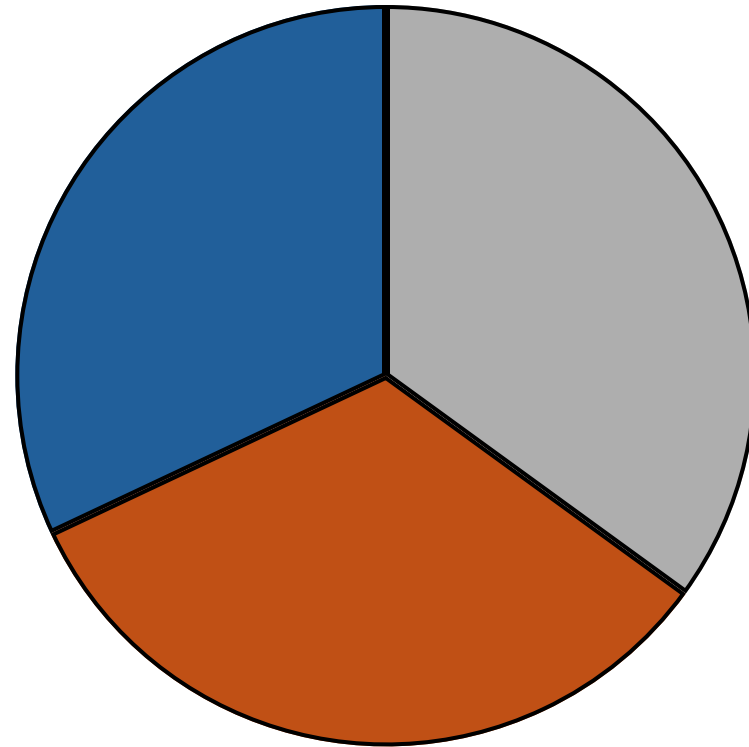
# National Assessment of Educational Progress (2024)

8th Grade



○ Proficient ○ Basic ○ Below Basic

12th Grade



○ Proficient+ ○ Basic ○ Below Basic



# Why 65 Percent of Fourth Graders Can't Really Read



Emily Hanford reveals how America's educators adapted a flawed system for teaching reading to kids—and, as a result, completely failed them.

By The Free Press

07.01.23 — Education

Education  
The current reading programs—flawed adaptations of 1950s-era methods—have failed to help students learn to read. [FOLLOW TWP »](#)

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07.11.23 — Education

Education

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02.11.23 — Education

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# “These results are sobering’: US high school seniors’ reading and math scores plummet

## Educators worry about absenteeism and smartphones as NAEP report shows scores at lowest levels in two decades

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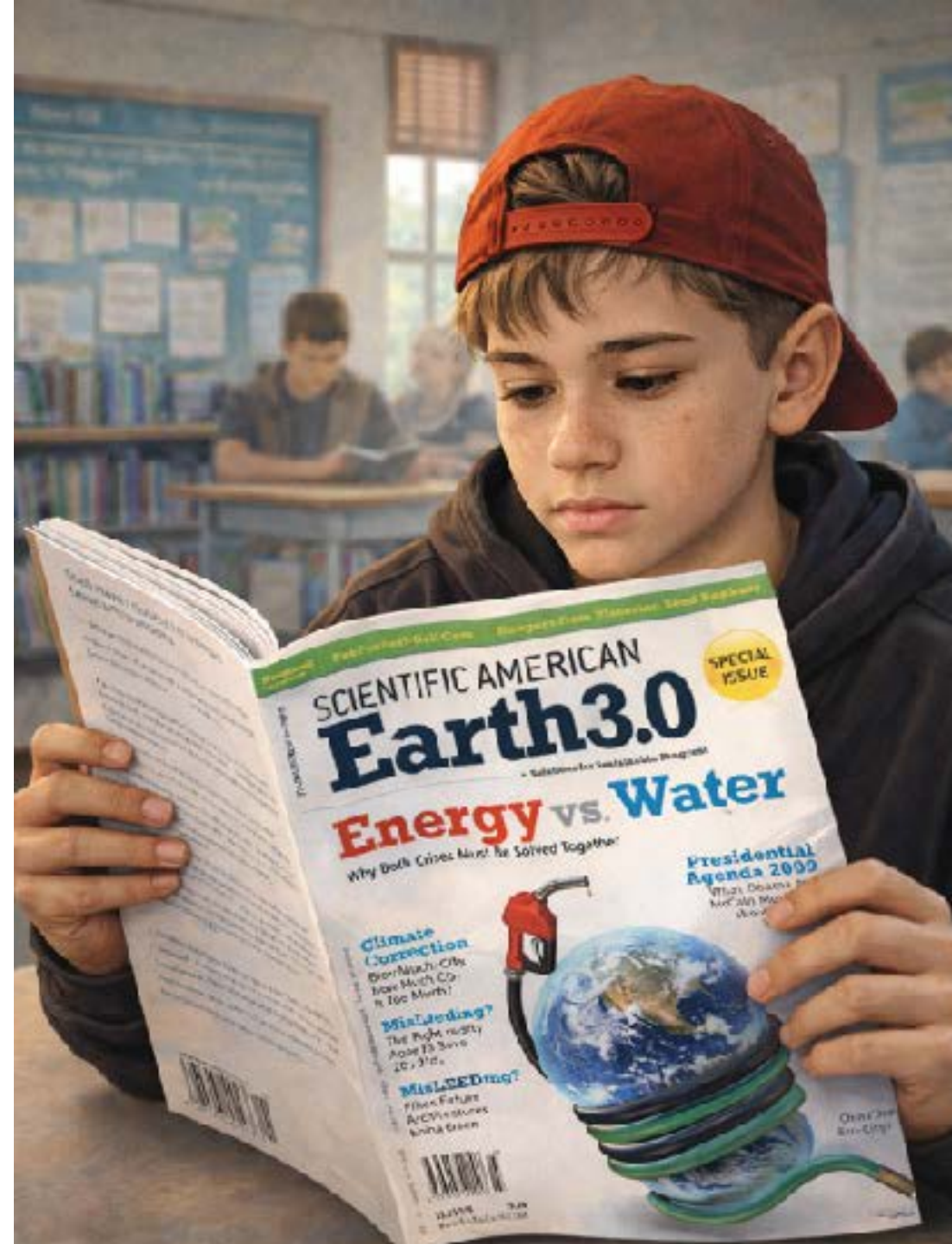
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# Aspirational by Design

NAEP panel's mandate: to "establish a vision (in the form of guidelines and **aspirational** goals) reflecting current issues within the educational context" (Forzani et al., 2022, p. 161).

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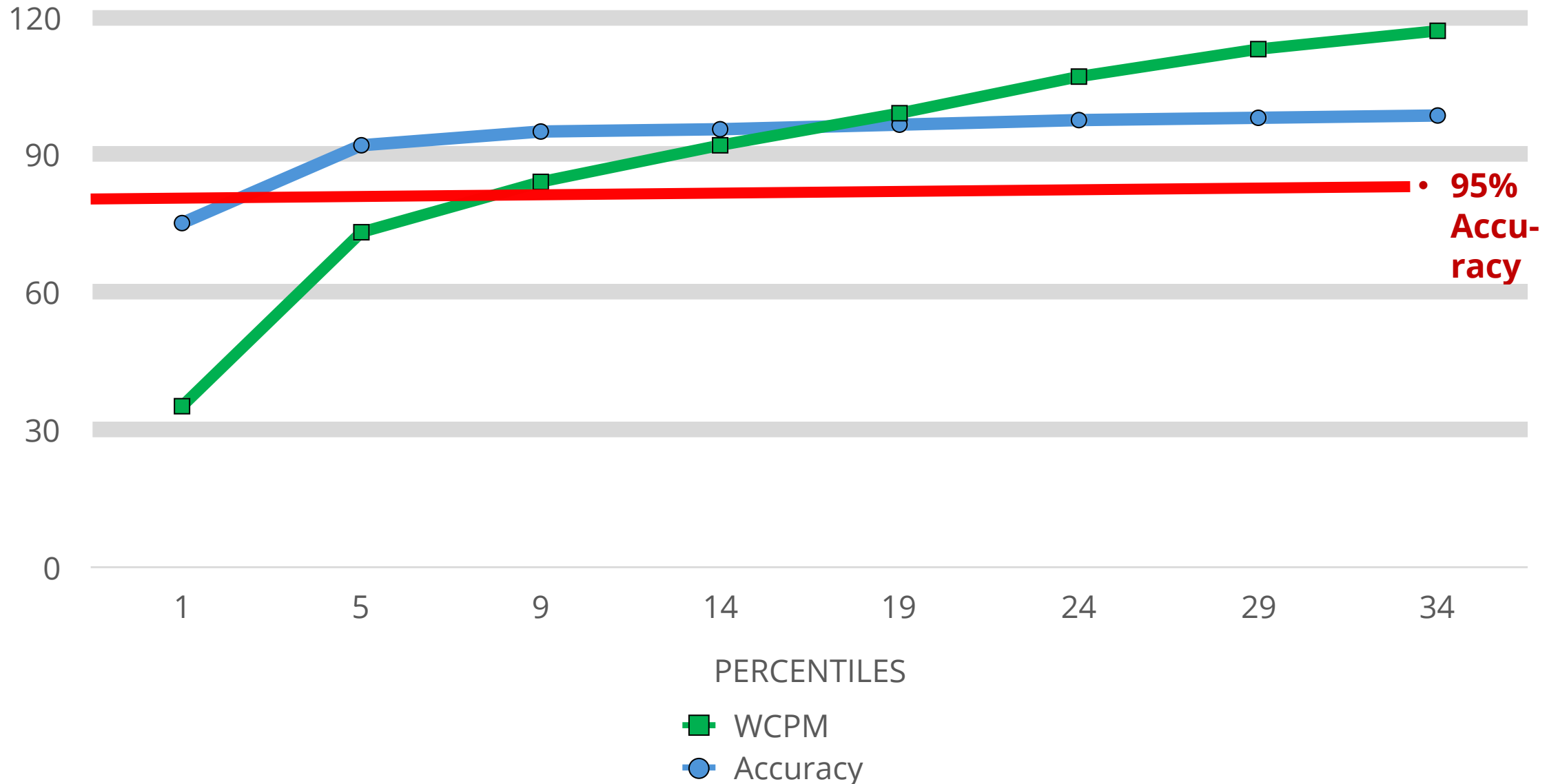


# Independent Evaluations of NAEP

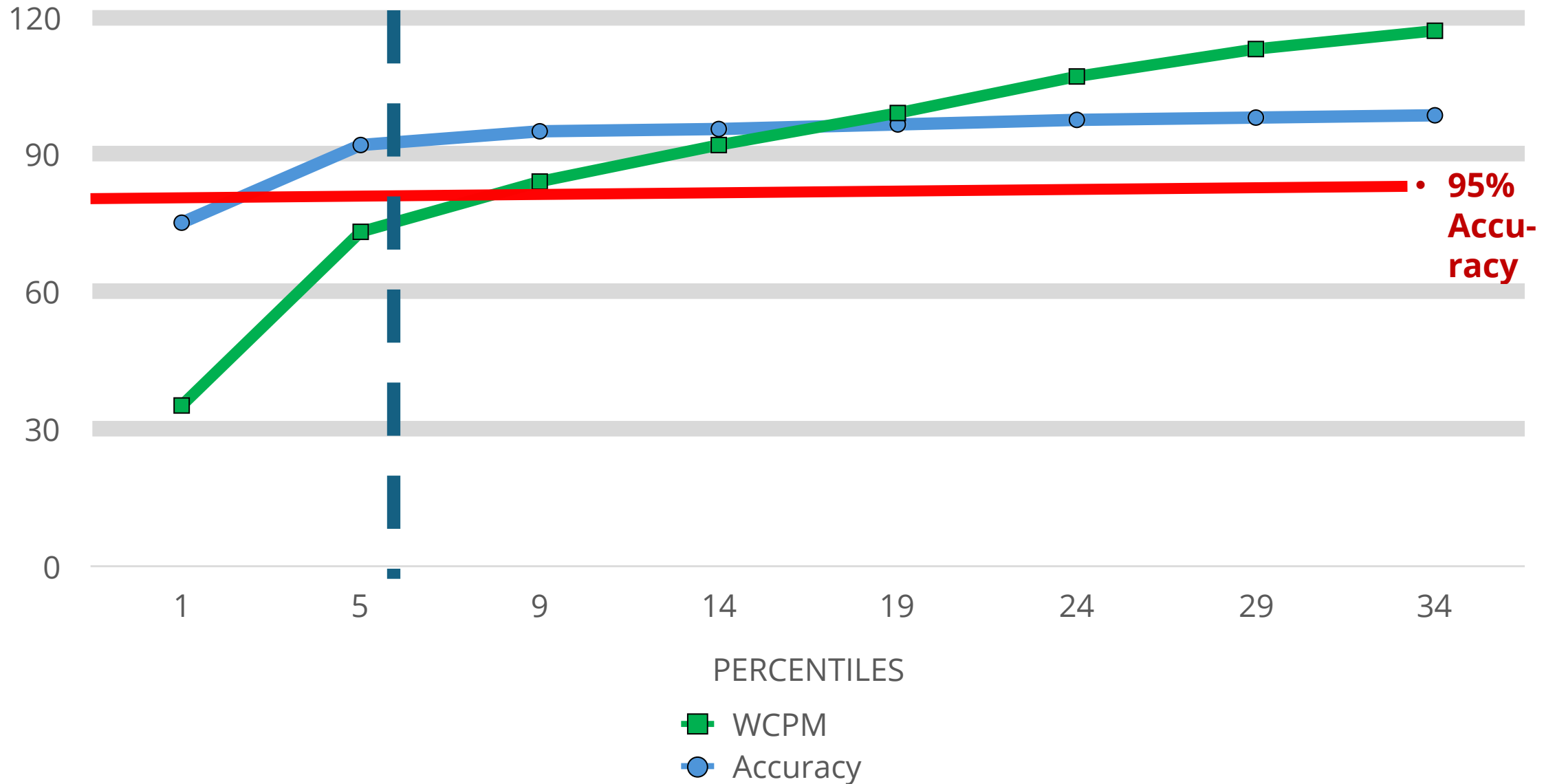
# Independent Evaluations of NAEP

- "NAEP achievement-level results do not appear to be reasonable compared with other external information about students' achievement" (p. 7). (Pellegrino et al., 1999)
- The National Academies of Science, Engineering, & Medicine questioned validity of achievement levels and called for evidence linking NAEP performance to real-world outcomes (Koenig & Edley, 2017)

# Variation Within the “Below-Basic Group”



# Variation Within the “Below-Basic Group”





**What instruction does this interpretation produce?**





This section is based on:

***From Research-Based Design  
to Demonstrated Effectiveness:  
Evaluating the Evidence Behind Commercial  
Adolescent Reading Interventions***

Sarah Lupo & Elfrieda H. Hiebert

## IDENTIFICATION & INTERVENTION

### **Enforceable mandates**

Virginia & Maryland: MTSS frameworks + required Student Reading Intervention Plans |  
Tennessee & South Carolina: screener-based flags and mandated support tiers in grades 4-8 |  
Indiana: MTSS identification, support plans in development

## PROFESSIONAL LEARNING

### **LETRS migrating into secondary — unevenly**

Ohio: SoR training required for ALL K-12 teachers | Florida: Reading Endorsement required for secondary intervention teachers; LETRS Vols. 1-2 accepted | California (SB 488): literacy competency now required for secondary credential

## INSTRUCTIONAL MATERIALS

### **Shifting from guidance toward prescription**

Virginia: state-approved adolescent list (Read 180, Lexia PowerUp, LANGUAGE! Live) | Ohio & Texas: HQIM lists with strong district adoption incentives | California: approved list for gr. 1-8 expected late 2026

## Vetted & Mandated Adolescent Instructional Materials (Grades 6–12)

| State      | Role of State List                  | Specific Secondary HQIM (Grades 6–12)                                 |
|------------|-------------------------------------|---|
| Virginia   | Prescribed (Required for VLA)       | Read 180, Lexia PowerUp, LANGUAGE! Live, SIPPS (6-8)                  |
| Ohio       | Prescribed (Required for funding)   | Lexia PowerUp, Reading Horizons Elevate, Wilson Just Words, REWARDS   |
| Florida    | Prescribed (Required for Intensive) | HMH Read 180, McGraw Hill StudySync, Perfection Learning Connections  |
| California | Scheduled Mandate (Late 2026)       | iLit, StudySync, Lexia PowerUp, Read 180 (HMH)                        |
| Texas      | Incentivized (HB 1605 Entitlements) | Amplify ELAR Texas, Bluebonnet Learning (OER), Take Flight (Dyslexia) |
| New Mexico | Incentivized (SB 37 Grants)         | Core Knowledge (CKLA), Imagine Learning, Achieve3000                  |
| New York   | Vetted & Recommended                | REWARDS, SIPPS, Great Minds Wit & Wisdom, i-Ready                     |

### Focus Programs of Lupu & Hiebert (2026)

| Program        |
|----------------|
| Achieve 3000   |
| i-Ready        |
| Lexia PowerUp  |
| Read 180       |
| Wilson Reading |
| LANGUAGE!Live  |
| REWARDS        |

# Distinction: Research-based Programs vs. Research-tested Interventions

| Purpose           | Program   | Research   |
|-------------------|---|--|
| Purpose           | Designed for adoption and implementation in schools       | Designed to test whether a specific instructional approach works |
| Evidence          | Often aligned with research principles                    | Supported by peer-reviewed empirical studies                     |
| Unit Studied      | A bundled package of materials, routines, and assessments | A specific instructional feature, practice, or intervention      |
| Rigor             | Evidence may vary in quality and independence             | Methods are typically more transparent and controlled            |
| What We Can Claim | May be promising and research-informed                    | Has demonstrated effects under studied conditions                |

# REWARDS: Research-Based

## Program

Archer, A. L., Gleason, M. M., & Vachon, V. (2000, 2014)

### Blending word parts into words (Oral)

Vowel combinations:  
Students say sounds for vowels (if box, then 2 sounds)

Listen and say: dis crim i nate

|   |       |    |    |       |    |
|---|-------|----|----|-------|----|
| 1 | au    | ca | oc | oy    | ai |
| 2 | ow    | ir | ou | or    | oo |
| 3 | a - e | oa | ea | i - e | ay |
| 4 | ea    | ee | ar | oo    | oi |

Vowel conversions: Say the sound and then the name.

|   |   |   |   |   |
|---|---|---|---|---|
| i | o | e | a | u |
|---|---|---|---|---|

Reading parts of real words (if box: two sounds; asterisk: say name) (16 parts in all)

|   |      |     |       |     |
|---|------|-----|-------|-----|
| 1 | mead | fa* | bread | sub |
|---|------|-----|-------|-----|

Underlining vowels in words (15 in all)

teammate                      bedroom                      peacetime

Correcting close approximations using context (Oral)

Pronounce each word incorrectly as shown, first by itself, and then in the sentence:

ǒ der āble. The kitten was eo ǒ der āble that we wanted to take it home.

**Prefixes & suffixes: Tell students word, then affix; students repeat & say affixes aloud (24 in all)**

**disturb** **ance:**            **ance**

**Circling prefixes & suffixes: Students circle, then read 1<sup>st</sup> part, then whole word. Next timed for number of words read in 10 sec. (21 words)**

|             |      |            |      |            |      |
|-------------|------|------------|------|------------|------|
| a           | con  | en         | pro  | mis        | re   |
| ity         | ance | ism        | ment | sive       | ence |
| competition |      | difference |      | powerfully |      |

**Meanings of prefixes & suffixes: Students read meanings of three affixes; then find meaning of word**

*dis = not, opposite of*  
*im = not, opposite of*  
*in = not, opposite of*

(Line 2) to do the **opposite of appear**; to become invisible or go out of your sight

**Spelling dictation (4 words): Students say word, write, & compare with prototype**

disappearance

**Academic vocabulary (Lessons 1-15):** Read word to self; Read explanation w/teacher. Teacher says: “I am thinking of a word: Someone makes something sound more important than it really is. Form the number of fingers on your desk.”

- 1 **influence**—When people or things **influence** a person or situation, they have an effect on that person’s behavior or that situation.
- 2 **immortal**—Someone or something that is **immortal** is famous and likely to be remembered for a long time.

**Review**

- 1 **exaggerates**
- 2 **incentive**
- 3 **permanent**
- 4 **dependent**

Lessons 16-20: Sentence reading replaces academic vocabulary reading

- 1 **The clown’s performance was so marvelous that the spectators stood up as they clapped.**
  - 2 **Mobility is important to kids of all ages so they can feel independent.**
2. Read Sentence 1 to yourself. When you can read all of the words in the sentence, put your thumb up. Pause and monitor.
3. When students can read the sentence, use one of the following options:
- a. Ask students to read the sentence together (i.e., choral reading).
  - b. Have students read the sentence to their partners. Then call on one student to read the sentence to the group.
  - c. Ask one student to read the sentence to the group.
4. **Optional** Ask a comprehension question about the sentence.

Lessons 20 to 25: Texts replace sentences

# Research Studies of REWARDS (after implementation)

## **Wanzek et al. (2011)**

- Comparison & Intervention groups (all LD)
- Entry WJ-III Word Attack: 19<sup>th</sup> percentile (both) Com & Inter);
- Entry TOWRE Sight Word: 13<sup>th</sup> (Inter); 10<sup>th</sup> (Com)
- Entry WJIII Comprehension: 9<sup>th</sup>
- Inter:: ≈ 135 hours
- Com:: Continued receiving usual special education & general education classes unchanged

## **Vaughn et al. (2010):**

- Rewards was part of Phases 1 and 2 3 phases
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Wanzek et al. (2011) — Immediate Posttest Effects

| Measure                            | d     | p    |
|------------------------------------|-------|------|
| TOWRE Sight Word Efficiency        | 0.48  | .011 |
| TOWRE Phonemic Decoding Efficiency | 0.27  | .143 |
| WJ-III Passage Comprehension       | 0.26  | ns   |
| WJ-III Letter Word Identification  | -0.00 | ns   |
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| Measure                            | d     | p    |
|------------------------------------|-------|------|
| Spelling                           | +0.22 | .013 |
| TAKS (state accountability)        | +0.18 | .167 |
| WJ-III Passage Comprehension       | +0.19 | .072 |
| TOWRE Phonemic Decoding Efficiency | +0.19 | .071 |
| TOWRE Sight Word Efficiency        | +0.30 | .166 |
| WJ-III Letter Word Identification  | -0.15 | .054 |
| WJ-III Word Attack                 | -0.15 | .009 |
| GRADE Reading Comprehension        | -0.06 | ns   |
| Passage Fluency                    | +0.24 | ns   |
| Sentence Reading Efficiency        | -0.13 | ns   |
| Word List Fluency                  | +0.14 | .124 |
| AIMSweb Mazes                      | +0.09 | ns   |

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# Research-Tested Intervention: Phast > Empower

(Lovett et al., 2021)

- 100–125 hours, delivered at 40–60 minutes daily, 3–5 times per week.
- 32% attrition: 50% completion for Hispanic students & 54% for African American students versus 87% for White students; 8th graders completed at 65%; 6th graders, 78%.
- Content of comparison groups: Locally developed and eclectic, including varying proportions of decoding, reading comprehension, and/or writing content; Directions to comparison teachers: “use their best methods to ‘beat out’ the research programs.”

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## Focus Strategies

Sound Review & introduction of new sound (e.g., kn); Spelling application (e.g., Tell me the sound “nnn”; spell the letter(s))

Rhyming : Bank of common words with high-frequency spelling patterns, which are used to figure out new words with same patterns (e.g., if I know *am*, *and zoo*, I can read *shampoo*)

Peeling off: Students are taught affixes and then how to remove or peel off affixes to decode the remaining root.

Vowel Alert: First try most common pronunciation of vowel; then try less common pronunciations

SPY: seek familiar parts in unfamiliar words: "I SPY the word \_\_\_\_\_ / I SPY the word \_\_\_\_\_ / The whole word is \_\_\_\_\_."

GAME PLAN: Learning to “orchestrate” appropriate decoding strategy

**Tasks closely resemble those of Rewards**

# Tasks closely resemble those of Rewards

## Task 1 Sound Review

kn oa tch u<sub>27</sub> au e<sub>27</sub> ur ew<sub>27</sub> ou

## Task 2 Spelling - Strategy Application

3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_

4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

7. \_\_\_\_\_ 8. \_\_\_\_\_

9. \_\_\_\_\_ 10. \_\_\_\_\_

## Task 3 Reading - Strategy Application

Use the Sounding Out Strategy. Blend the sounds and read the word.

twitch      swerve

Use the Rhyming Strategy. Do you see a spelling pattern?

leardrop      decoy

Use the Feeling Off Strategy. Do you see any beginnings or endings?

confusing      unlocked

Use the Vowel Alert Strategy. Stop and try both sounds for the first vowel.

major      rotate

Read the word.

•thought      •tough

# Tasks closely resemble those of Rewards

## Task 1 Sound Review

kn oa tch u<sub>27</sub> au e<sub>27</sub> ur ew<sub>27</sub> ou

"If I checkmark the vowel(s) \_\_\_\_\_, I'll underline the spelling pattern(s) \_\_\_\_\_  
 the keyword(s) is/are \_\_\_\_\_." (Print the keyword(s) on the line.)  
 "If I know \_\_\_\_\_, then I know \_\_\_\_\_  
 I used the Rhyming Strategy and I read the word \_\_\_\_\_!"

## Task 2 Spelling - Strategy Application

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_  
 7. \_\_\_\_\_ 8. \_\_\_\_\_  
 9. \_\_\_\_\_ 10. \_\_\_\_\_



## Task 3 Reading - Strategy Application

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twitch swerve

1. The **booklet** provided helpful information.

Use the Rhyming Strategy. Do you see a spelling pattern?

leardrop decoy

2. She longed to visit Copper **Canyon**.

Use the Feeling Off Strategy. Do you see any beginnings or endings?

confusing unlocked

3. The lemon left a **bitter** taste in his mouth.

Use the Vowel Alert Strategy. Stop and try both sounds for the first vowel.

major rotate

4. Dad made stew in the slow **cooker**.

Read the word.

•thought •tough

5. He has a **lifetime** membership to the gym.

# Tasks closely resemble those of Rewards

## Task 1 Sound Review

kn oa tch u<sub>27</sub> au e<sub>27</sub> ur ew<sub>27</sub> ou

## Task 2 Spelling - Strategy Application

6. \_\_\_\_\_ 7. \_\_\_\_\_ 8. \_\_\_\_\_  
 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_  
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 "If I know \_\_\_\_\_, then I know \_\_\_\_\_."  
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**-tion, -sion** (note: quality, act)

"I'll peel off \_\_\_\_\_ at the beginning/end of the word."  
 (Circle the beginning/ending in the word.)  
 "The root is \_\_\_\_\_. The word is \_\_\_\_\_."  
 "I used the Peeling Off Strategy and I read the word \_\_\_\_\_!"



| Beginnings |     |
|------------|-----|
| re         | al  |
| un         | con |
| ed         | ax  |
| ful        |     |
| dis        |     |
| on         |     |
| ent        |     |
| mis        |     |
| be         |     |

| Endings |      |
|---------|------|
| ing     | chis |
| ies     | lyfi |
| ad      | ably |
| er      | al   |
| es      | tion |
| yfi     | sion |
| less    |      |
| ful     |      |
| is      |      |
| en      |      |

1. **action**

2. **version**

3. **almighty**

4. **examinable**

5. **mindfully**

6. **expansion**

7. **admission**

8. **construction**

9. **envisioned**

10. **replenishable**

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"I see the vowel \_\_\_\_\_. I'll stop and underline it with 2 lines.  
 First I'll try \_\_\_\_\_; then I'll try \_\_\_\_\_." (Try vowel sound, then vowel name.)  
 "The word is \_\_\_\_\_." (Print the word in the correct column.)  
 "I used the Vowel Alert Strategy and I read the word \_\_\_\_\_!"

| Beginnings |     |
|------------|-----|
| re         | al  |
| un         | oon |
| ed         | ax  |
| ful        |     |
| ds         |     |
| on         |     |
| ent        |     |
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| Endings |      |
|---------|------|
| ing     | chin |
| ies     | lyfi |
| ad      | ably |
| er      | al   |
| es      | tion |
| yfi     | sion |
| less    |      |
| ful     |      |
| ble     |      |
| en      |      |

1. **action**
2. **version**
3. **almighty**
4. **examinable**
5. **mindfully**
6. **expansion**
7. **admission**
8. **construction**
9. **envisioned**
10. **replenishable**

e, u

| Vowel Sound   | Vowel Name    |
|---------------|---------------|
| e (as in end) | e (as in he)  |
|               |               |
|               |               |
| u (as in up)  | u (as in use) |
| shuffle       |               |
|               |               |

shuffle legal here fulfill  
 skeleton strumming bugle educate

| Sound Combination***    | 1.87 | .000* |
|-------------------------|------|-------|
| Challenge Words***      | 0.97 | .000* |
| WJ Spelling             | 0.20 | .211  |
| WJ Word ID              | 0.56 | .098  |
| WJ Passage Comp.        | 0.36 | .078  |
| WJ Reading Fluency      | 0.25 | .244  |
| WJ Word Attack          | 0.78 | .001* |
| TOWRE—Phonemic Decoding | 0.36 | .029* |
| TOWRE Sight Word        | 0.22 | .527  |

\*\*\*Proximal Measures generated by researchers

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\*\*\*Proximal Measures generated by researchers



**What alternative interpretations of student capacity are supported by evidence?**

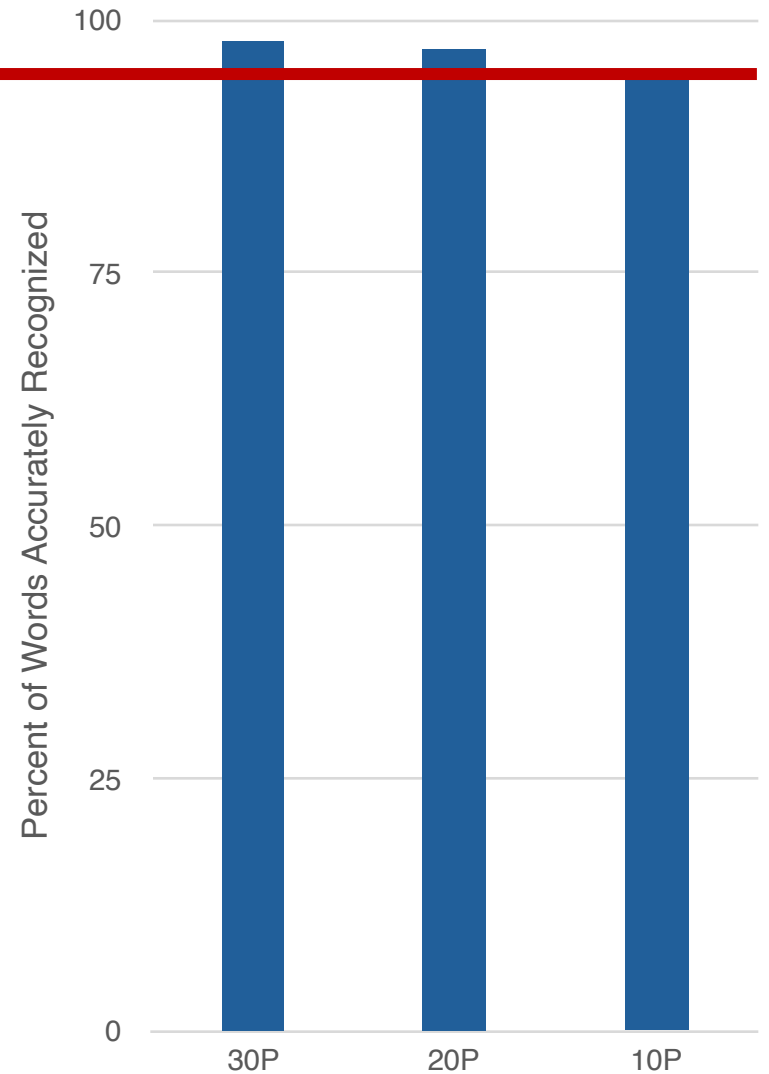


# Data Source: Performances on DIBELS

## Grade 8 Oral Reading Accuracy

Just a little over a century ago, the only way to enjoy music was to play it or listen to it in person. Then, with the discovery of radio waves and the invention of recording technology, people could enjoy music anytime. Today, digital recordings make enjoying music even easier and more portable than ever. However, the process of producing music has become more complex.

Prior to the sale of the first compact disc, or CD, music was sold and listened to on wax cylinders, phonographs, vinyl records, or cassette tapes. Although most of these technologies are thought to be obsolete, you can still buy music in these formats



## 30<sup>th</sup> Percentile: 114 wcpm, 98% accuracy

Just a little over a century ago, the only way to enjoy music was to play it or listen to it in person. Then, with the discovery of radio waves and the invention of recording technology, people could enjoy music anytime. Today, digital recordings make enjoying music even easier and more portable than ever. However, the process of producing music has become more complex.

Prior to the sale of the first compact disc, or CD, music was sold and listened to on wax cylinders, phonographs, **vinyl** records, or cassette tapes. Although most of these technologies are thought to be **obsolete**, you can still buy music in these formats.

Prior to recording the music, musicians would thoroughly

## 20<sup>th</sup> Percentile: 101 wcpm; 97% accuracy

Just a little over a century ago, the only way to enjoy music was to play it or listen to it in person. Then, with the discovery of radio waves and the invention of recording technology, people could enjoy music anytime. Today, digital recordings make enjoying music even easier and more portable than ever. However, the process of producing music has become more complex.

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## 10<sup>th</sup> Percentile: 85 wcpm, 94.5% accuracy

Just a little over a century ago, the only way to enjoy music was to play it or listen to it in person. Then, with the discovery of radio waves and the invention of recording technology, people could enjoy music anytime. Today, digital recordings make enjoying music even easier and more **portable** than ever. However, the process of producing music has become more complex.

**Prior** to the sale of the first compact disc, or CD, music was sold and listened to on wax **cylinders, phonographs, vinyl** records, or cassette tapes.

# Known Words

| Appearances per million | 2 syllable        | 2-syllable with CVC 1 <sup>st</sup> syllable | 3+ syllable (words with large morphological families) |
|-------------------------|-------------------|--|---|
| 100+                    | process, although |  | easier, producing, discovery                          |
| 99 to 16                | music             | complex, listen                              | invention, enjoying, recording, technology,           |
| 15 to 1                 |                   | cassette, compact                            | digital, phonographs                                  |

# Challenging Words

| Percentile       | 2 syllable (variant or open 1 <sup>st</sup> syllable) | 3 syllable                        |
|------------------|---|-----------------------------------|
| 30 <sup>th</sup> | vinyl   | obsolete                          |
| 20 <sup>th</sup> | vinyl   | cylinders<br>obsolete             |
| 10 <sup>th</sup> | prior<br>vinyl  | portable<br>cylinders<br>obsolete |



**How do these alternative interpretations change what & how we teach?**



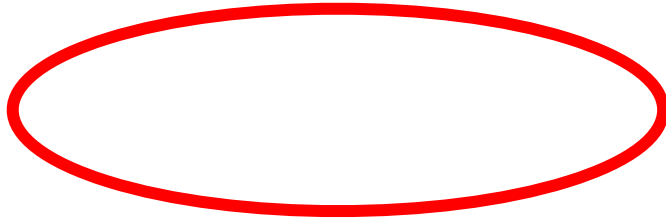
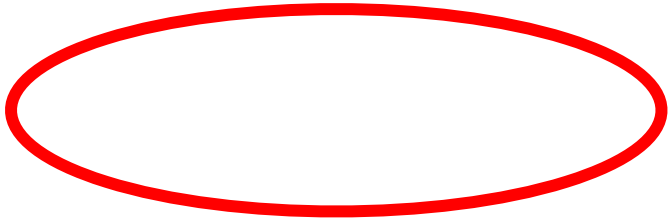


- The brain learns words by spotting patterns—across thousands of encounters.

- Automaticity comes from volume—not instruction alone.

- Morphology is present in encounters—but often hidden. Instruction makes it visible.

(Seidenberg, 2017, 2025)



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(Seidenberg, 2017, 2025)

# Distribution of Words in School Texts

Automaticity

100%

75%

50%

25%

0%

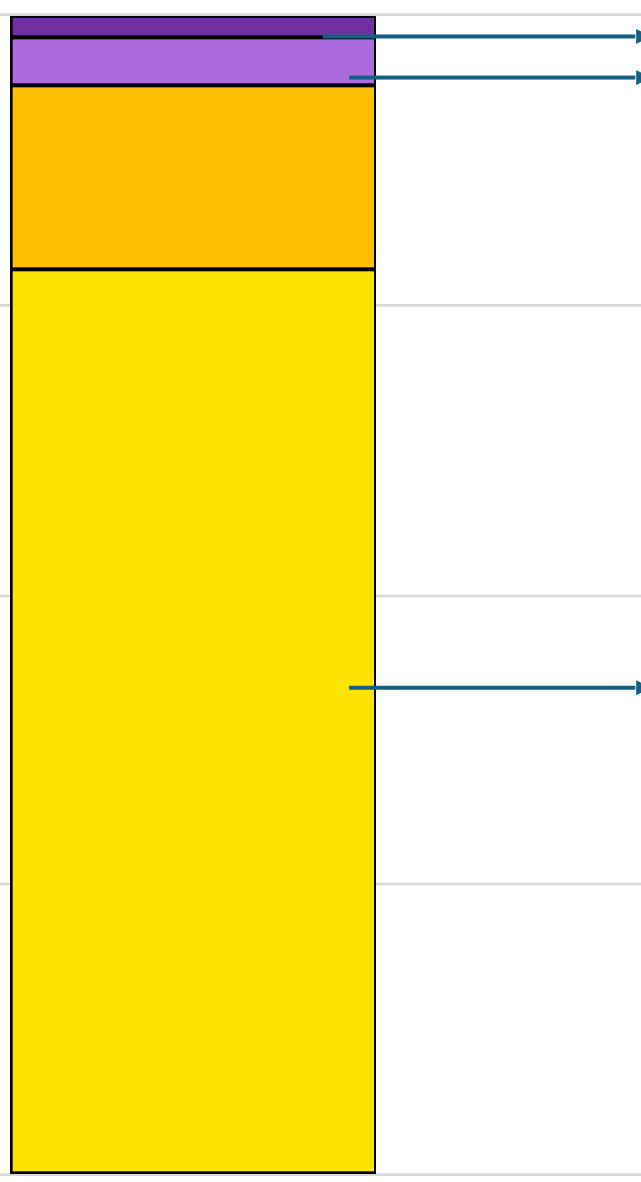
High Medium Low Rare

Rare Words:  
≈200,000+ Words

Low-Frequency:  
≈3030 Word Families

Medium-Frequency:  
≈1850 Word Families

High-Frequency:  
≈620 Word Families



# Distribution of Words in School Texts

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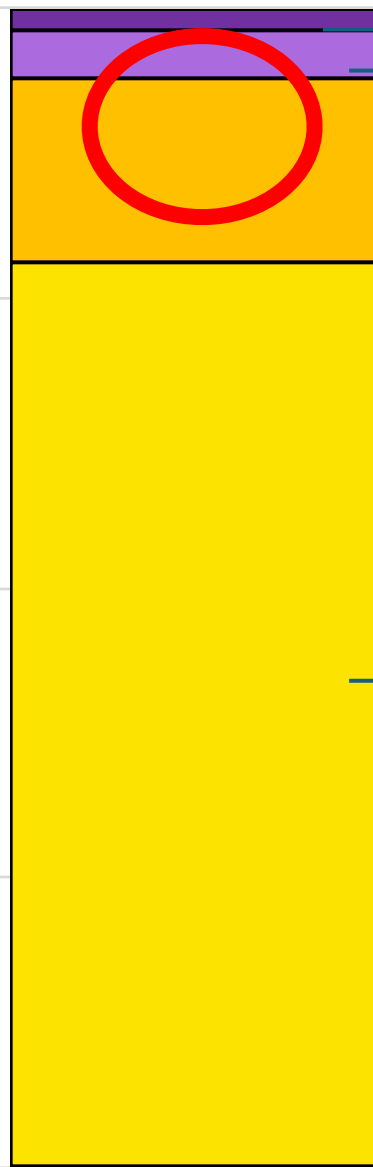
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75%

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25%

0%



Rare Words:  
≈200,000+ Words

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High-Frequency:  
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High Medium Low Rare

# TextProject's Staircase of Automaticity



## **Bronze to Gold Steps**

5,500 Most-Frequent  
Word Families

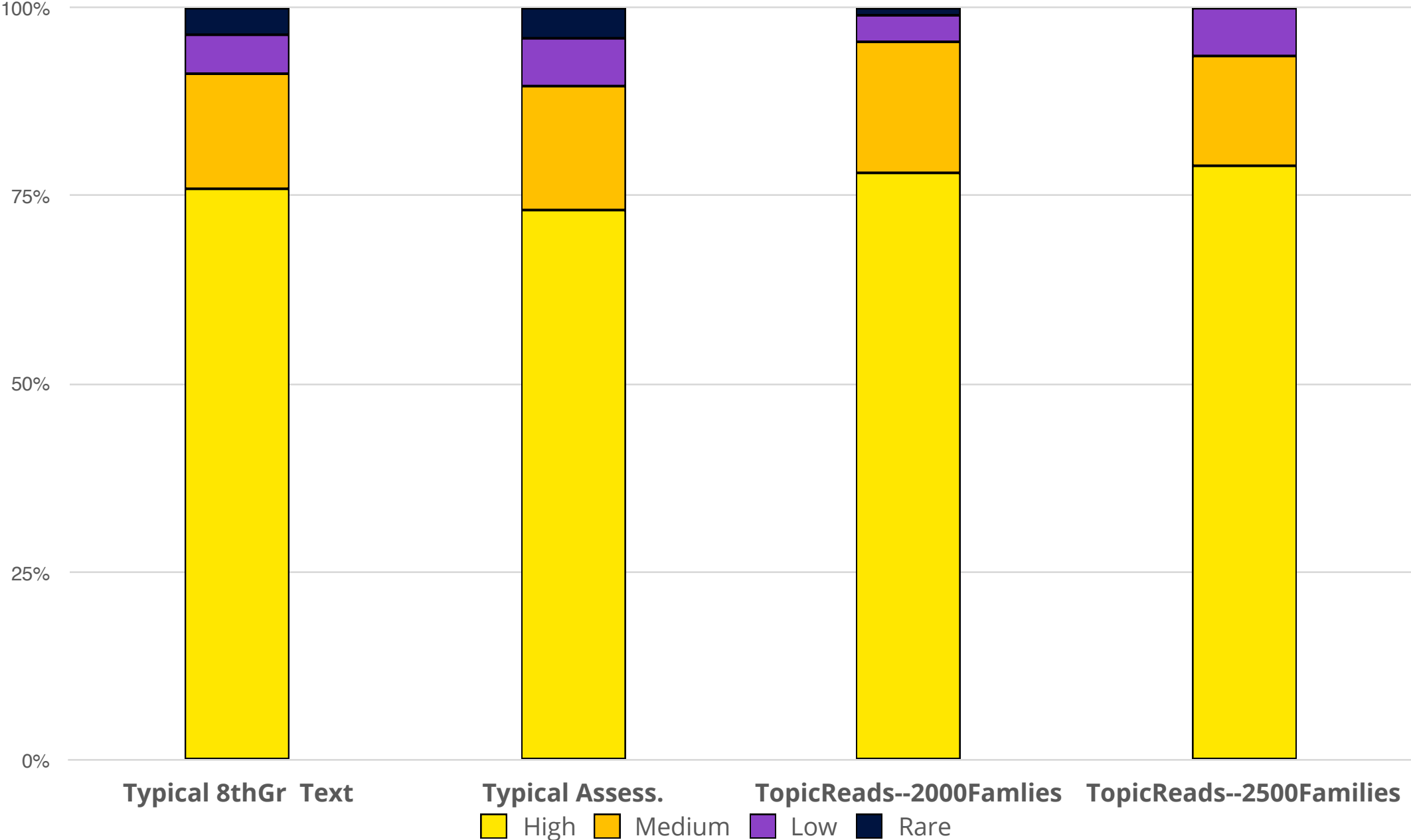
## **Crimson to Purple Steps**

•2,500 Most-Frequent Word Families


## **Light Green to Hot Pink Steps**

- 300 Most Frequent Words
- Consistent Vowels in 1-syllable words
- 2-syllable words: CVC in 1st syllable

# Profiles of Eighth-Grade Texts



# 2,000 Most Frequent Morphological Families



**RAY BRADBURY**  
**FAHRENHEIT 451**

### Erkenntnis 451

Was ist die Bedeutung der Fahrenheit 451? ...

Was ist die Bedeutung der Fahrenheit 451? ...

**Erkenntnis**

Was ist die Bedeutung der Fahrenheit 451? ...



## Science Fiction

LEVEL C-D - Arbeit by Christa H. H. Hart




**Science Fiction**

### WHAT is Science Fiction?

Science Fiction is a genre of literature, film, and television that explores the possibilities of the future. ...

**Erkenntnis**

Was ist die Bedeutung der Science Fiction? ...



**Ray Bradbury**

### Generativität

Was ist die Bedeutung der Generativität? ...

Was ist die Bedeutung der Generativität? ...

**Generativität**

Was ist die Bedeutung der Generativität? ...



**Science Fiction**

### Ray Bradbury

Ray Bradbury was an American author and screenwriter. ...


Ray Bradbury was an American author and screenwriter. ...

**Erkenntnis**

Was ist die Bedeutung der Ray Bradbury? ...






# Texts Aligned with Curriculum (n = 288)

 **Level E** [Download all Level E TopicReads \(zip file\)](#)




### Science

[Eating for Energy](#) [Earth's Moon](#) [Heat and Energy](#)






### Literature and Language

[Science Fiction](#) [All About English](#) [Newspapers](#)






### Social Studies

[Civil Rights Leaders](#) [Managing Money](#) [The American Civil War](#)



### Arts and Culture

[Guitars](#) [People in Pictures](#) [Music in the Movies](#)



# Evidence Published in Scientific Literature

| Outcome Measure                    | Statistic (reported) | Cohen's d (approx.) | Hedges'g (approx.) | 95% CI Lower | 95% CI Upper | p-value |
|------------------------------------|----------------------|---------------------|--------------------|--------------|--------------|---------|
| Reading Fluency (DIBELS ORF slope) | $t(72) = 2.28$       | 0.188               | 0.186              | 0.027        | 0.348        | .022*   |
| Vocabulary (IRAS slope)            | $t(73) = 2.20$       | 0.085               | 0.084              | 0.009        | 0.160        | .020*   |
| Comprehension (Gates-MacGinitie)   | $F(1, 1064) = 5.45$  | 0.143               | 0.143              | 0.023        | 0.263        | .020*   |

Trainin et al. (2016)

| Measure                       | d   | p      |
|-------------------------------|-----|--------|
| Vocabulary (curriculum-based) | .42 | < .01  |
| Word comprehension            | .27 | < .05  |
| Passage comprehension         | .50 | < .001 |
| Word reading accuracy         | .05 | > .05  |
| Word reading efficiency       | .05 | > .05  |
| Fluency rate                  | .05 | > .05  |

Vadasy & Sanders, 2008)

## ANCOVA-adjusted effects (the primary results):

| Measure             | d     | g     | 95% CI          | Sig        |
|---------------------|-------|-------|-----------------|------------|
| GORT Accuracy       | 0.898 | 0.887 | [0.354, 1.442]  | $p = .001$ |
| GORT Rate           | 0.557 | 0.550 | [0.028, 1.086]  | $p = .036$ |
| GORT Comprehension  | 0.462 | 0.456 | [-0.064, 0.988] | $p = .080$ |
| TOWRE Sight Word    | 0.505 | 0.499 | [-0.022, 1.032] | $p = .180$ |
| TOWRE Decoding      | 0.505 | 0.499 | [-0.022, 1.032] | $p = .180$ |
| General Information | 2.134 | 2.107 | [1.483, 2.785]  | $p < .001$ |

Huxley (2006)

General Information: Experimenter Generated Measure

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General Information: Experimenter Generated Measure



# Explicit Instruction: Multisyllabic Words

- Content: What needs to be taught?
- Instructional method: How do we support acquisition/proficiency?

# Content: Building on What Students Know

- Compound words: 96%
- Vowel team syllables: 89%
- Closed first syllables: 85%
- Consonant-le syllables: 84%

(from Tortorelli et al., 2024)

# Content: What do students not know as well?

(continued-- Tortorelli et al., 2024)

•Open first syllables: 72%

•VCe syllables: 81%

•**Rare/late-acquired vocabulary:** each added year of AoA cuts correct-reading odds by 25%

•**Derived forms** were judged to be problem (e.g., *spiny* from *spine*, *diner* from *dine*)

| Word   | Recognized (%) | Age of Acquisition | Potential explanation  |
|--------|----------------|--------------------|--|
| bugle  | 5.2            | 8.9                | bug -le  |
| clergy | 24.8           | 10.2               |  |
| rely   | 26.3           | 9.3                | ly: in almost all occurrences in 1500 most frequent words: y is represented as long e. |
| lotus  | 47.3           | 13.6               | lot-us   |
| spiny  | 48.8           | 10.2               | spin - y   |
| diner  | 61.0           | 6.8                | din-er   |

# An Alternative to Bundled Direct Instruction Strategies (Downs et al., 2026)

## Intervention

Jazz is a famous and beloved style of music that rose with the Harlem Renaissance. It was a very innovative form of music. However, it did rely on earlier music styles. One of the most famous characteristics of jazz music is improvisation.

Before text reading:

- Peel off strategy with 3 polysyllabic words in text
- Reading 3 words in words & sentences (27 repetitions of each word)

## Active Control

There were five stink bugs that lived in a garden. Stink bugs are proud if they can make a big stink. The biggest stink bug in the garden was very proud. She said, "This is how to make a stink."

Before text reading, repeated reading of groups of words:

1. first proud garden blushed beat
2. birds hard cloud tears leaving our
3. grip/gripe tim/time site/sit cone/con
4. close choked powerful right stared  
taking these whiff stinker low  
flying risks you're skunks  
noses why talked done nobody  
said striped taken turn

# An Alternative to Bundled Direct Instruction Strategies (Downs et al., 2026)

## Intervention

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Before text reading:

- Peel off strategy with 3 polysyllabic words in text
- Reading 3 words in words & sentences (27 repetitions of each word)

## Advantages of Intervention over Active Control:

- $g = 0.47$  advantage accuracy
- 2.79× likelihood of 98% accuracy
- Lowest-performing students benefited most
  - Same fluency

## Active Control

There were five stink bugs that lived in a garden. Stink bugs are proud if they can make a big stink. The biggest stink bug in the garden was very proud. She said, "This is how to make a stink."

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# Thought Experiments

- Content:
  - Units that appear with medium to high frequency in core vocabulary
    - Syllables
    - Root words, prefixes, suffixes
- Instructional Strategy:
  - A combination of word-study and short texts

# **Thought Experiment #1: Word Study of Morphological Units with Short Texts**

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# Thought Experiment #1: Word Study of Morphological Units with Short Texts

---

**Peel & Read** A strategy for reading long words.

1. Is there a prefix? Peel it off.  
2. Is there a suffix? Peel it off.  
3. How many vowel chunks in what's left? Say each chunk.  
4. Say the parts. Say the whole word.  
5. Does it make sense? Sound it out in your head.

**WATCH** — How did the **ch** in the word **unchanged** change?

**STEP 1** Is there a prefix?  
No prefix. The word is **unchanged**.

**STEP 2** Is there a suffix?  
**unchanged** → **change**

**STEP 3** How many vowel chunks are left?  
**unchanged** → **un** **ch** **ang** **ed**

**STEP 4** Say the parts. Say the whole word.  
**change** → **ch** → **ang** → **ed** → **change**

**STEP 5** Does it make sense?  
The parts make sense.

**WATCH** — How did the **ch** in the word **unchangeable** change?

**STEP 1** Is there a prefix?  
No prefix. The word is **unchangeable**.

**STEP 2** Is there a suffix?  
**unchangeable** → **changeable**

**STEP 3** How many vowel chunks are left?  
**unchangeable** → **un** **ch** **ang** **ea** **ble**

**STEP 4** Say the parts. Say the whole word.  
**changeable** → **ch** → **ang** → **ea** → **ble** → **changeable**

**STEP 5** Does it make sense?  
The parts make sense.



# Thought Experiment #1: Word Study of Morphological Units with Short Texts



## Peel & Read

A strategy for reading long words.

1 Is there a prefix? Peel it off.  
2 Is there a suffix? Peel it off.  
3 How many vowel chunks in what's left? Dry each chunk.  
4 Say the parts. Say the whole word.  
5 Does it make sense? Sound it out in your head.

WATCH — DON'T READ THE WHOLE WORD

FOUR RULES — DON'T REPEAT

### unchangedle

STEP 1 Is there a prefix? Peel it off.  
STEP 2 Is there a suffix? Peel it off.  
STEP 3 How many vowel chunks in what's left? Dry each chunk.  
STEP 4 Say the parts. Say the whole word.  
STEP 5 Does it make sense? Sound it out in your head.

REVISIT — TWO THINGS: FIND THE PREFIX AND SUFFIX. FIND EACH VOWEL CHUNK. TRY TO SAY IT. TRY TO SOUND IT OUT.

## You already know these words.

STEP 1 — READ & READ

### BOOZY

Somebody said **boozing** to me. I don't see why. What's **boozing**? The girl is so **boozing** with money. To make a plan that's **boozing** money is **boozing** money. I don't see why. I don't see why. I don't see why.

1. **boozing** is a verb. 2. **boozing** is a verb. 3. **boozing** is a verb. 4. **boozing** is a verb. 5. **boozing** is a verb. 6. **boozing** is a verb. 7. **boozing** is a verb. 8. **boozing** is a verb. 9. **boozing** is a verb. 10. **boozing** is a verb. 11. **boozing** is a verb. 12. **boozing** is a verb. 13. **boozing** is a verb. 14. **boozing** is a verb. 15. **boozing** is a verb. 16. **boozing** is a verb. 17. **boozing** is a verb. 18. **boozing** is a verb. 19. **boozing** is a verb. 20. **boozing** is a verb. 21. **boozing** is a verb. 22. **boozing** is a verb. 23. **boozing** is a verb. 24. **boozing** is a verb. 25. **boozing** is a verb. 26. **boozing** is a verb. 27. **boozing** is a verb. 28. **boozing** is a verb. 29. **boozing** is a verb. 30. **boozing** is a verb. 31. **boozing** is a verb. 32. **boozing** is a verb. 33. **boozing** is a verb. 34. **boozing** is a verb. 35. **boozing** is a verb. 36. **boozing** is a verb. 37. **boozing** is a verb. 38. **boozing** is a verb. 39. **boozing** is a verb. 40. **boozing** is a verb. 41. **boozing** is a verb. 42. **boozing** is a verb. 43. **boozing** is a verb. 44. **boozing** is a verb. 45. **boozing** is a verb. 46. **boozing** is a verb. 47. **boozing** is a verb. 48. **boozing** is a verb. 49. **boozing** is a verb. 50. **boozing** is a verb. 51. **boozing** is a verb. 52. **boozing** is a verb. 53. **boozing** is a verb. 54. **boozing** is a verb. 55. **boozing** is a verb. 56. **boozing** is a verb. 57. **boozing** is a verb. 58. **boozing** is a verb. 59. **boozing** is a verb. 60. **boozing** is a verb. 61. **boozing** is a verb. 62. **boozing** is a verb. 63. **boozing** is a verb. 64. **boozing** is a verb. 65. **boozing** is a verb. 66. **boozing** is a verb. 67. **boozing** is a verb. 68. **boozing** is a verb. 69. **boozing** is a verb. 70. **boozing** is a verb. 71. **boozing** is a verb. 72. **boozing** is a verb. 73. **boozing** is a verb. 74. **boozing** is a verb. 75. **boozing** is a verb. 76. **boozing** is a verb. 77. **boozing** is a verb. 78. **boozing** is a verb. 79. **boozing** is a verb. 80. **boozing** is a verb. 81. **boozing** is a verb. 82. **boozing** is a verb. 83. **boozing** is a verb. 84. **boozing** is a verb. 85. **boozing** is a verb. 86. **boozing** is a verb. 87. **boozing** is a verb. 88. **boozing** is a verb. 89. **boozing** is a verb. 90. **boozing** is a verb. 91. **boozing** is a verb. 92. **boozing** is a verb. 93. **boozing** is a verb. 94. **boozing** is a verb. 95. **boozing** is a verb. 96. **boozing** is a verb. 97. **boozing** is a verb. 98. **boozing** is a verb. 99. **boozing** is a verb. 100. **boozing** is a verb.

## STEP 2 — BUILD NEW WORDS

You know the prefixes. How could words you didn't read — but could form.

- 1 If something can be read, it's \_\_\_\_\_
- 2 If something is easy to break, it is \_\_\_\_\_
- 3 If something can be drunk, it's \_\_\_\_\_
- 4 If someone can be loved, they're \_\_\_\_\_
- 5 If a problem can be solved, it's \_\_\_\_\_
- 6 If something can be changed, it's \_\_\_\_\_
- 7 If something can be moved, it's \_\_\_\_\_



## Thought Experiment #2: Longer Texts with Target Morphemes

- Identify the 3+ syllable words among the most frequent 1500 words in written English: EWFG database followed by SCOPE "number of syllable" analysis:
  - 175 3+ syllable words
- Using dELP, pick 25 most difficult words
- Identify family members of target words: EWFG

|              | Difficulty | Predicted appearances /million | Additional Predicted appearances /million | Target + Family Members in 10+ /million | # Family members >9 appearances /million |
|--------------|------------|--------------------------------|---|---|--|
| revolution ▾ | 1.7 ▾      | 63                             | 13  | 76                                      | 1  |
| evidence     | 1.72       | 77                             | 9   | 86                                      | 1  |
| policy       | 1.64       | 64                             | 29  | 93                                      | 1  |
| frequently   | 2.19       | 67                             | 36  | 103                                     | 2  |
| rapidly      | 1.47       | 70                             | 34  | 104                                     | 1  |
| situation    | 1.47       | 78                             | 34  | 112                                     | 1  |
| specific     | 1.55       | 97                             | 21  | 118                                     | 2  |
| established  | 1.56       | 70                             | 51  | 121                                     | 3  |
| political    | 1.81       | 128                            | 26  | 154                                     | 1  |
| society      | 2.32       | 131                            | 25  | 156                                     | 1  |
| education    | 1.61       | 122                            | 47  | 169                                     | 2  |
| determine    | 2.2        | 69                             | 103                                       | 172                                     | 4  |
| economic     | 3.48       | 113                            | 60  | 173                                     | 2  |
| organization | 1.41       | 67                             | 114                                       | 181                                     | 4  |
| expected     | 2.23       | 88                             | 95  | 183                                     | 3  |
| industrial   | 2.84       | 75                             | 114                                       | 189                                     | 2  |
| individual   | 1.76       | 132                            | 66  | 198                                     | 1  |
| particularly | 4.05       | 69                             | 131                                       | 200                                     | 1  |
| companies    | 2.06       | 138                            | 85  | 223                                     | 3  |
| consider     | 1.67       | 104                            | 158                                       | 262                                     | 5  |
| variety      | 3.69       | 82                             | 188                                       | 270                                     | 7  |
| decision     | 2.04       | 60                             | 239                                       | 299                                     | 5  |
| provided     | 1.87       | 82                             | 235                                       | 317                                     | 4  |
| developed    | 1.43       | 151                            | 301                                       | 452                                     | 5  |
| production   | 2.01       | 91                             | 559                                       | 650                                     | 10                                       |

|              | Difficulty | Predicted appearances /million | Additional Predicted appearances /million | Target + Family Members in 10+ /million | # Family members >9 appearances /million |
|--------------|------------|--------------------------------|---|---|--|
| revolution   | 1.7        | 63                             | 13  | 76                                      | 1  |
| evidence     | 1.72       | 77                             | 9   | 86                                      | 1  |
| policy       | 1.64       | 64                             | 29  | 93                                      | 1  |
| frequently   | 2.19       | 67                             | 36  | 103                                     | 2  |
| rapidly      | 1.47       | 70                             | 34  | 104                                     | 1  |
| situation    | 1.47       | 78                             | 34  | 112                                     | 1  |
| specific     | 1.55       | 97                             | 21  | 118                                     | 2  |
| established  | 1.56       | 70                             | 51  | 121                                     | 3  |
| political    | 1.81       | 128                            | 26  | 154                                     | 1  |
| society      | 2.32       | 131                            | 25  | 156                                     | 1  |
| education    | 1.61       | 122                            | 47  | 169                                     | 2  |
| determine    | 2.2        | 69                             | 103                                       | 172                                     | 4  |
| economic     | 3.48       | 113                            | 60  | 173                                     | 2  |
| organization | 1.41       | 67                             | 114                                       | 181                                     | 4  |
| expected     | 2.23       | 88                             | 95  | 183                                     | 3  |
| industrial   | 2.84       | 75                             | 114                                       | 189                                     | 2  |
| individual   | 1.76       | 132                            | 66  | 198                                     | 1  |
| particularly | 4.05       | 69                             | 131                                       | 200                                     | 1  |
| companies    | 2.06       | 138                            | 85  | 223                                     | 3  |
| consider     | 1.67       | 104                            | 158                                       | 262                                     | 5  |
| variety      | 3.69       | 82                             | 188                                       | 270                                     | 7  |
| decision     | 2.04       | 66                             | 238                                       | 299                                     | 5  |
| provided     | 1.87       | 82                             | 235                                       | 317                                     | 4  |
| developed    | 1.43       | 151                            | 301                                       | 452                                     | 5  |
| production   | 2.01       | 91                             | 559                                       | 650                                     | 10                                       |

|              | Difficulty | Predicted appearances /million | Additional Predicted appearances /million | Target + Family Members in 10+ /million | # Family members >9 appearances /million |
|--------------|------------|--------------------------------|---|---|--|
| revolution   | 1.7        | 63                             | 13  | 76                                      | 1  |
| evidence     | 1.72       | 77                             | 9   | 86                                      | 1  |
| policy       | 1.64       | 64                             | 29  | 93                                      | 1  |
| frequently   | 2.19       | 67                             | 36  | 103                                     | 2  |
| rapidly      | 1.47       | 70                             | 34  | 104                                     | 1  |
| situation    | 1.47       | 78                             | 34  | 112                                     | 1  |
| specific     | 1.55       | 97                             | 21  | 118                                     | 2  |
| established  | 1.56       | 70                             | 51  | 121                                     | 3  |
| political    | 1.81       | 128                            | 26  | 154                                     | 1  |
| society      | 2.32       | 131                            | 25  | 156                                     | 1  |
| education    | 1.61       | 122                            | 47  | 169                                     | 2  |
| determine    | 2.2        | 69                             | 103                                       | 172                                     | 4  |
| economic     | 3.48       | 113                            | 60  | 173                                     | 2  |
| organization | 1.41       | 67                             | 114                                       | 181                                     | 4  |
| expected     | 2.23       | 88                             | 95  | 183                                     | 3  |
| industrial   | 2.84       | 75                             | 114                                       | 189                                     | 2  |
| individual   | 1.76       | 132                            | 66  | 198                                     | 1  |
| particularly | 4.05       | 69                             | 131                                       | 200                                     | 1  |
| companies    | 2.06       | 138                            | 85  | 223                                     | 3  |
| consider     | 1.67       | 104                            | 158                                       | 262                                     | 5  |
| variety      | 3.69       | 82                             | 188                                       | 270                                     | 7  |
| decision     | 2.04       | 66                             | 238                                       | 299                                     | 5  |
| provided     | 1.87       | 82                             | 235                                       | 317                                     | 4  |
| developed    | 1.43       | 131                            | 301                                       | 432                                     | 5  |
| production   | 2.01       | 91                             | 559                                       | 650                                     | 10                                       |

## Producing a Variety Show



Our class is putting on a variety show—and we are the producers. In movies, producers are the people who plan, fix problems, and keep the show moving. Our teacher said, “You are all producers.” That means this production is up to us.

A variety show has different kinds of acts. That’s where the word *variety* comes from—lots of different things in one show.

The acts vary from group to group. Mia and Jay are producing a dance. Luis’s group is producing a skit about a robot teacher who gives out homework all day. Tara is singing a song which ends with a high note that makes everyone stop and listen. There is a lot of variety in our show.

As producers, we also have various tasks. Some of us are in charge of music. Others find props. Some help people get on stage at the right time.

We run into various problems as we get ready. The music cuts out. A prop goes missing. “Producers fix problems,” our teacher reminds us. We find ways to fix the problems that come up.

We will produce this variety show for various groups—first graders, other fourth graders, and the PTA. On the final show for the PTA, the room is full. The lights go down. For a moment, it is very quiet. We smile at each other. We made this production. Then the music starts. And our variety show begins.

## Vocabulary Practice: The Sneaker Show

**Target Words:** ^ Produce

- Production
  - Product
  - Variety
  - Various
- 

### Directions:

Fill in the blanks using the correct form of the word from the list above. Each word is used once to tell the story of the event.

1. The fashion design class had to work together for weeks to \_\_\_\_\_ a high-energy event in the school gym.
2. Because each group started with the same basic shoe, they had to use \_\_\_\_\_ materials like paint and denim to make theirs unique.
3. The audience was amazed by the \_\_\_\_\_ of styles on display, ranging from bright neon sneakers to classic leather locks.
4. Every student felt proud of their final \_\_\_\_\_ as they stepped out onto the floor under the flashing lights.
5. While the crowd only saw the fun parts, the lead organizer stayed backstage to manage the entire \_\_\_\_\_ and keep things moving.

## Thought Experiment #3: Longer Texts with Syllable Units

- Among the 175 words, which syllable units (not suffixes or prefixes) are most prolific:
  - lar: regular, particular, particularly, similar, popular
  - ble: impossible, possible
  - cal: medical, political, physical

# A frequent syllable unit: “lar” among 175 3+syllable words

## Not So Different After All

At school, it can feel like there are two worlds. There’s the *popular* crowd—the people everyone notices—and then there’s everyone else, just trying to get through the day. But most students live a pretty *regular* life: classes, phones, friends, maybe a job, maybe sports, maybe just getting by. What’s interesting is how *similar* people’s experiences actually are, even when they seem different on the surface. The student who looks confident in class might feel just as unsure as the one who stays quiet. The one who seems *popular* might be worrying about things no one else sees.

Everyone also has something *particular* about them—something that matters to them more than anything else. It could be music, gaming, fashion, fixing cars, drawing, or taking care of family. That *particular* interest is often where people feel most like themselves.

The tricky part is that school doesn’t always connect to students’ *regular* lives or their *particular* interests. The books, the assignments, even the way teachers talk can feel far from what matters in a *personal* way. But when something connects—when it links to what you already know or care about—it’s easier to pay attention, and even easier to learn.

In the end, most people aren’t that different. They have *similar* worries, *similar* hopes, and a mix of *regular* routines and *particular* passions. And even if school doesn’t always connect to your *regular* life, the things you care about can still be the place where learning starts.

## Vocabulary Practice: The Trendsetters

**Target Words:** \* Regular

- Popular
  - Similar
  - Particular
  - Regularly
- 

### Directions:

Fill in the blanks using the correct form of the word from the list above. Each word is used once.

1. In the world of fashion, certain styles become very \_\_\_\_\_ and everyone wants to wear them at the same time.
  2. However, some designers don't want to follow the crowd; they have a \_\_\_\_\_ look in mind that is unique to their own brand.
  3. They might choose fabrics that are \_\_\_\_\_ to what others use, but they stitch them together in a completely new way.
  4. These designers don't just work when they are inspired; they practice their craft \_\_\_\_\_ to make sure they are always improving.
  5. While a \_\_\_\_\_ pair of pants might be boring, a designer can turn them into a masterpiece with just a few creative changes.
-

# Remaining questions

- Bundling of strategies: Which strategies really matter?
- How much exposure is needed for students to generalize the peel-off strategy? What are student characteristics that influence their generalization of peel-off strategy?
- What are the critical units of instruction?
  - Morphological units: roots, prefixes, suffixes—and from among these: which ones?
  - Prominent syllable patterns
- Assessments:
  - What are valid assessments to establish **knowledge** of multisyllabic words?
  - What are benefits of nonsense words in assessments of complex words? Might comparisons of frequent and rare words be more efficacious?

|  | FAMILIAR & VOWEL<br>COVERAGE | UNFAMILIAR WITH VOWEL<br>COVERAGE |
|--|------------------------------|-----------------------------------|
|  | <b>garden</b>                | <b>regard</b>                     |
|  | <b>person</b>                | <b>infer</b>                      |
|  | <b>birthday</b>              | <b>affirm</b>                     |
|  | <b>morning</b>               | <b>absorb</b>                     |
|  | <b>purpose</b>               | <b>recur</b>                      |
- When do we start morphological instruction?

**Adolescents are wired for growth, status, and meaning.  
When we lower the cognitive bar, they disengage.  
When we show them why the work matters—and show them that  
we believe they can do it—they rise. (Yeager, 2025)**



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