

Do struggling readers score lower on reading tests in part because they get discouraged and slow down? Schools track reading progress in grades K-4 by measuring Oral Reading Fluency (ORF) as words correct per minute (WCPM). If stronger readers perform consistently within and across test passages, while struggling readers tend to give up, then reading tests may be conflating perseverance with basic reading skills. We compared groups of strong and weak readers in read-aloud data from students in grade 4 and found **for both reader groups that reading rates are roughly stable across passages.** However, within each text passage, the faster readers tend to slow down and the slower readers tend to speed up.

Oral Reading Fluency

ORF is a common measure used in benchmarking and tracking progress in young readers aged 5-9 years, when words read correctly per time is a strong predictor of comprehension.

Research Question:

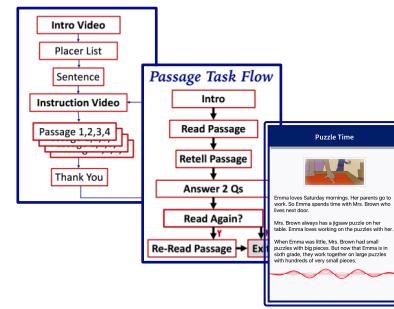
Do non-reading factors impact reading scores?

Hypothesis:

Struggling readers may have low self-efficacy and not show perseverance; thus slow down or give up during reading tests. This would exaggerate the measured difference in basic reading skills between strong readers and struggling readers.

Perseverance Measured in Children's Oral Reading

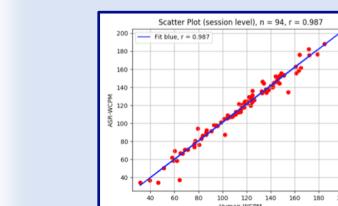
Jared Bernstein, Jian Cheng: Analytic Measures Inc.
Ahmed Magooda: University of Pittsburgh



Moby.Read (ASR-based)

A fully automated, self-administered oral reading assessment for grades 1-5 that scores Expression, Accuracy, Level, and Words Correct per Minute (WCPM).

$$\text{Accurate Rate (WCPM)} = \frac{\text{Number of Words Correct in Text Span}}{\text{Span Duration}} * 60$$



Accurate Reading Rate (WCPM)

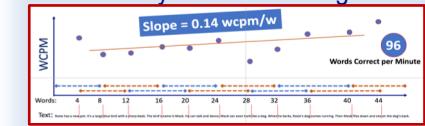
Average Human vs. Moby.Read
 $r(\text{Moby}, \text{Human})=0.99$
Human Inter-rater reliability = 0.99

New Measure

Traditional ORF tests are hand scored and produce one WCPM value per passage.

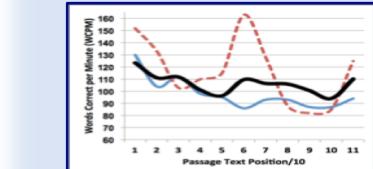


ASR-based ORF assessment, can measure the dynamics of reading rate.



Slope (WCPM/Word)

Average WCPM in Span may reflect local phonetic length and reading difficulty. This average (for each Span) is subtracted from the students' observed WCPM in that Span.

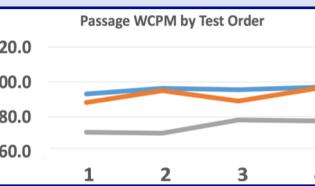


Heavy black line shows average reading rate over first 11 text spans in example text. Blue and red lines show the rate of one who read this passage below the average WCPM rate, and one who read this passage above the average rate.

Results

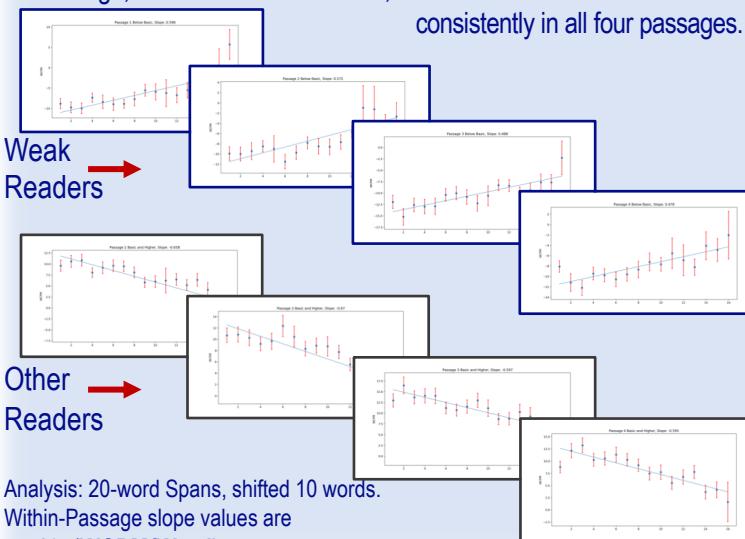
1. Cross Passage: (100 4th graders)

No change of pace (WCPM) across passages within test. No clear change in WCPM for average readers, nor for 2nd or 4th quintile readers.



2. Within Passage: (1460 4th graders)

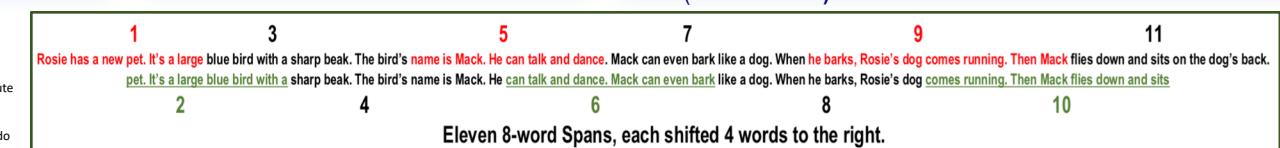
On average, weak readers accelerate, while other readers decelerate – consistently in all four passages.



Analysis: 20-word Spans, shifted 10 words.

Within-Passage slope values are

$$10 \times (\text{WCPM}/\text{Word})$$



Conclusion

Analysis does not support the hypothesis. In fact, the observed trends suggest the opposite: weaker readers accelerate and strong readers decelerate.

Open questions:

1. Is the average WCPM the best model of phonetic length and reading difficulty?
2. What is the cause of this difference in patterns of reading performance?

Next Steps

- Analyze phonetic length and reading difficulty separately. Use fluent example renditions as phonetic basis.
- Use text complexity for reading difficulty.
- B. Ask accelerating and decelerating readers why they changed pace over a passage.