Can abbreviations improve reading speed in low vision?

Steve Mansfield & Isabelle Creste, Department of Psychology, State University of New York College at Plattsburgh

Introduction

We are studying a new approach for improving the reading performance of people with low vision. Low vision is a visual impairment, not correctable by standard glasses, contact lenses, medication, or surgery that interferes with a person’s ability to perform everyday activities. Low vision can have a drastic impact on reading performance, because visual impairments limit the visual span (i.e., the number of letters that can be recognized at a time) with normal vision 10 or more letters can be recognized at once. With low vision the visual span can be considerably smaller – down to the extreme of reading only one letter at a time. This visual span reduction places a bottleneck on visual processing that directly limits reading performance (Legge, Chung, & Cheung, 2007).

The search is now on for an abbreviation scheme that can realize the potential benefit to the reader. Abbreviation advantage has been demonstrated, but the extent to which the benefits are realized varies across different individuals. The intention of this study is to determine whether abbreviations benefit the most from abbreviations, or if the search is not limited by eye movements, the abbreviated texts will be read substantially faster than the full-length texts.

Abbreviation advantage

- Abbreviation advantage as a function of the ratio of reading speeds for low- versus normal-contrast full-length paragraphs.

**Abbreviated Full-length**

Full length paragraphs for each condition.

Procedure

- The students were timed as they read each paragraph aloud. Reading speed was calculated in words per minute (wpm).
- There were 4 practice trials followed by 8 experimental trials (two paragraphs for each condition).
- The order of the paragraphs, contrasts, and abbreviation conditions, was determined randomly for each participant.
- In separate measurements we verified that the visual span for reading the low-contrast text was 60% (on average) of the visual span for normal-contrast text.

Results

- With low-contrast, abbreviated paragraphs were read 23% faster than full-length paragraphs (p < 0.001) (see figure 3).
- With normal-contrast, abbreviated paragraphs were read only 5% faster than full-length paragraphs (p < 0.001).
- Students who were slowed the most by low-contrast tended to benefit the most from abbreviations, r = 0.73 (see figure 4).

Conclusion

- Abbreviations now produce substantial reading speed gains when reading with simulated low-vision.
- The search is now on for an abbreviation scheme that can realize these benefits in everyday reading materials for people with visual impairments.

References

