Using abbreviations to increase reading speed in low vision

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INTRODUCTION

Low vision often slows reading because visual impairments limit the visual span (the number of letters recognized in each glance). A reduced visual span places a bottleneck on visual processing that directly limits reading performance (Legge, 2007). Can this limitation be alleviated using abbreviations?

With abbreviations...
ﻯ fewer eye movements are needed
Abbreviations take advantage of the redundancy in our language to express information using fewer letters. A small span using abbreviations could transmit the same information as a larger span without abbreviations. Abbreviated texts will require fewer eye movements to navigate through the text, resulting in faster reading.

fewer letters are affected by crowding
Letters within words are potentially crowded by the letters on either side. Shortening words reduces the number of these inner letters, increasing the proportion of letters at the start and end of words where recognition is more accurate.

Can it work?
It does for braille! Braille uses 192 abbreviations, reducing texts to ~75% of their unabbreviated length. These abbreviations increase reading speed by about 35% (Legge, et al., 1999).

Current study
We have assessed the potential for abbreviations to help reading with low vision.

In the absence of a suitable abbreviation scheme, we abbreviated numbers written as words (e.g., twenty three) with their digit equivalents (e.g., 23). Using digits was convenient for this study; digits are familiar, easy to read, and they substantially reduced the length of the texts.

STUDY 1: Acuity loss

Findings: Simulated acuity loss slowed reading speeds for full-length texts by 40%. With abbreviations this deficit was reduced to 28% (p<0.005).

STUDY 2: Field loss

Findings: Reading with a ½-character window slowed reading speeds for full-length texts by 60%. With abbreviations this deficit was completely eradicated (p<0.001).

DISCUSSION

These findings show that abbreviations could produce substantial reading speed gains for people with low vision.

The search is now on for an abbreviation scheme that can realize these benefits in everyday reading materials.

To be successful, the abbreviation scheme needs to be:
• easy to learn
• quick to decode
• maximally compressive

So far we have considered:

Txt’ing
Texting abbreviations do not help. AFAIK, they are intended to enable faster encoding and not necessarily faster reading. They are mostly beneficial for shortening conversational writing rather than newspaper articles. In our preliminary studies, texting abbreviations slowed reading equally in normal- and low-vision conditions.

Braille
In a pilot study we have had success using braille symbols, e.g., 'teacher gave me
although it would be daunting to require readers to learn all 192 contractions in order to achieve the maximum reading benefit.

CONCLUSION

A suitable abbreviation scheme may increase low-vision reading speeds.

In the meantime, simply converting numbers to their digit equivalents could produce slight speed benefits for some low-vision readers.

References
