

Finding intuitive abbreviations for common words

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Rationale

We are developing a new method for helping people read with low vision.

Previous research (Mansfield & Creste, 2011; Mansfield, *et al.*, 2013) shows that using abbreviations to shorten text could improve reading speeds for people with visual impairments.

Abbreviations contain the same information as regular text, but use fewer letters. This allows the same information to be read in fewer eye movements.

The best words to abbreviate are those that will lead to the greatest reduction in text length (see Table 1). Unfortunately, nearly all of these words (*the, that, have, be, of, to, with, ...*) have no obvious abbreviations.

To be successful, the abbreviations need to be easy to recognize and intuitive to decode. Otherwise, the burden of deciphering the abbreviations might offset the benefit of having less text to read.

To find abbreviations that fit these criteria, we “crowd sourced” this task to students enrolled in our General Psychology course.

Methods

150 students completed this worksheet which asked them to suggest 'obvious' symbols, letters, or digits that could be used to abbreviate these words:

the, that, have, be, of, to, with, in, for,
you, this, they, from, there, their,
about, it, say, would.

Table 1. Percentage savings in text length achieved by reducing words to a single symbol.

rank		% savings ^a	%cumulative savings
1	the	3.29	3.29
2	and	1.60	4.89
3	that	1.16	6.06
4	have	0.96	7.02
5	be	0.94	7.96
6	of	0.77	8.73
7	to	0.76	9.49
8	with	0.60	10.09
9	in	0.54	10.63
10	for	0.49	11.13
11	you	0.46	11.59
12	this	0.42	12.01
13	they	0.42	12.43
14	from	0.37	12.79
15	there	0.33	13.13
16	their	0.32	13.45
17	about	0.32	13.77
18	it	0.29	14.06
19	say	0.29	14.35
20	would	0.28	14.63
30	when	0.21	17.05
40	like	0.18	19.01
50	these	0.15	20.69
60	your	0.15	22.19
70	look	0.12	23.54
80	over	0.11	24.71
90	or	0.10	25.80
100	problem	0.10	26.79
200	second	0.06	34.26
300	office	0.04	39.25
400	big	0.03	43.06
500	front	0.03	46.12
600	listen	0.02	48.75
700	message	0.02	51.02
800	audience	0.02	53.02
900	theory	0.02	54.81
1000	credit	0.02	56.42

^a savings = (word length - 1) × word frequency

Note: Abbreviating the top 10 words leads to an expected 11% reduction in text length. The added benefits of using more abbreviations diminish rapidly (e.g., the top 50 words need abbreviations in order to achieve a 20% reduction.)

Some words can be shortened to a single symbol, e.g., $\rightarrow$ &, α $\rightarrow$ $\otimes$. We want to find ways to shorten other words. For each of the words below, write in a **single** letter, digit, or symbol that would be an **obvious** way to shorten that word. If you cannot think of an obvious abbreviation please suggest something that could **possibly** be used (give a brief explanation if you think we might not understand why your abbreviation works). As a last resort you can use a pair of symbols e.g., ω ish $\rightarrow$ $\omega/\prime$.

Once you've done raise your hand and the researcher will give you the second part of the study.

the
that
have
be
of
to
with
in
for
you
this
they
from
there
their
about
it
say
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Results

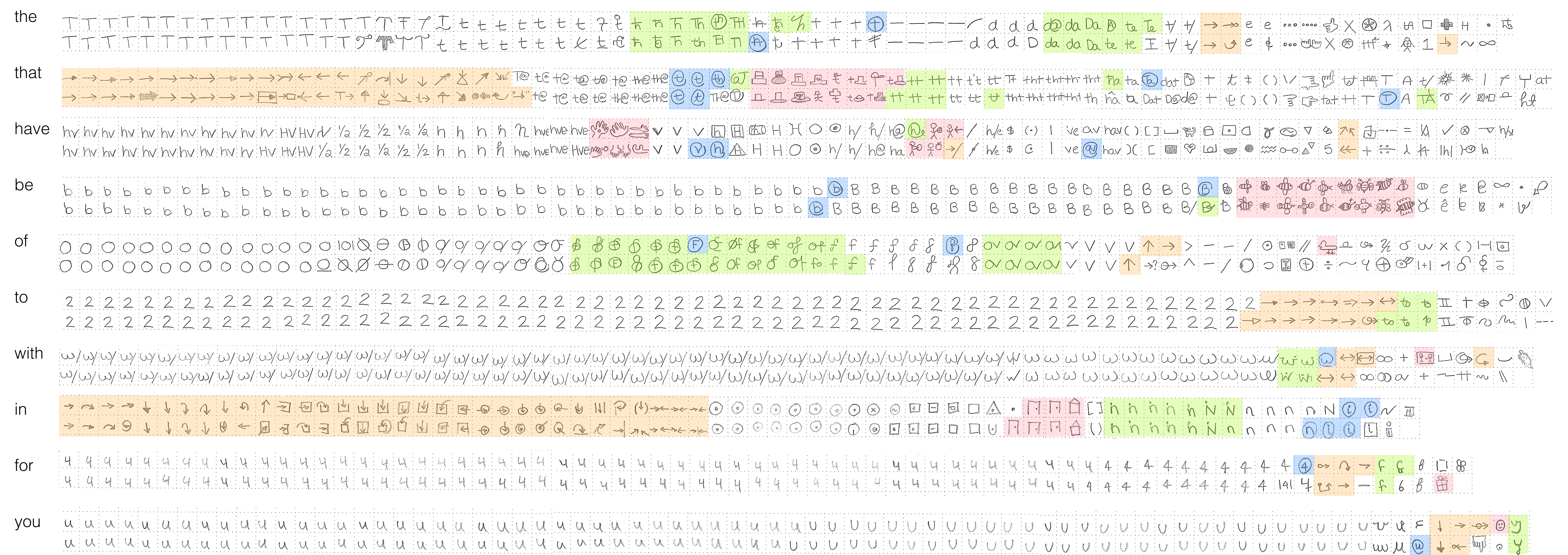


Figure 1. Abbreviations suggested for the 10 words with best savings. Key features and strategies are colored as follows:

- **Arrows:** These are suggested for many words, therefore an arrow would be a poor abbreviation because its meaning may be ambiguous
- **Ligatures:** These are combinations of letters to form new symbols
- **Symbols in circles:** like the @ symbol
- **Pictograms:** These illustrate the meaning (or sound) of the word

Implementation

We now have numerous ways to abbreviate common words. Hopefully these are easy to learn and to read (see Figure 2 for an example.)

We are now testing the efficacy of these abbreviations for improving reading with low vision.

References

Mansfield, J. S., and Creste, I. (2011). Can abbreviations improve reading speed in low vision? Presented at the Annual Conference of the Eastern Psychological Association, Cambridge, MA, USA.

Mansfield, J. S., Tifft, K., Lee, P N., Crocco, S., Wendling, J. (2013). Using abbreviations to increase reading speed in low vision. Presented at the Vision Sciences Society Annual Meeting, Naples, Florida, USA.

Acknowledgements

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Original

It is a truth universally acknowledged, **that** a single man **in** possession **of** a good fortune, must **be in** want **of** a wife. However little known **the** feelings or views **of** such a man may **be** on his first entering a neighborhood, this truth is so well fixed **in the** minds **of the** surrounding families, **that** he is considered as **the** rightful property **of** some one or other **of** their daughters.

Abbreviated

It is a truth universally acknowledged, ⁽¹⁾ a single man n pos- session o a good fortune, must b n want o a wife. However lit- tle known t feelings or views o such a man may b on his first entering a neighborhood, this truth is so well fixed n t minds o t surrounding families, ⁽²⁾ he is considered as t rightful property o some one or other o their daughters.	352 chars. 7% shorter
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Figure 2. In this example, the abbreviations reduce the text by 7% with apparently little reduction in readability.