

Towards an easier way to measure the visual span

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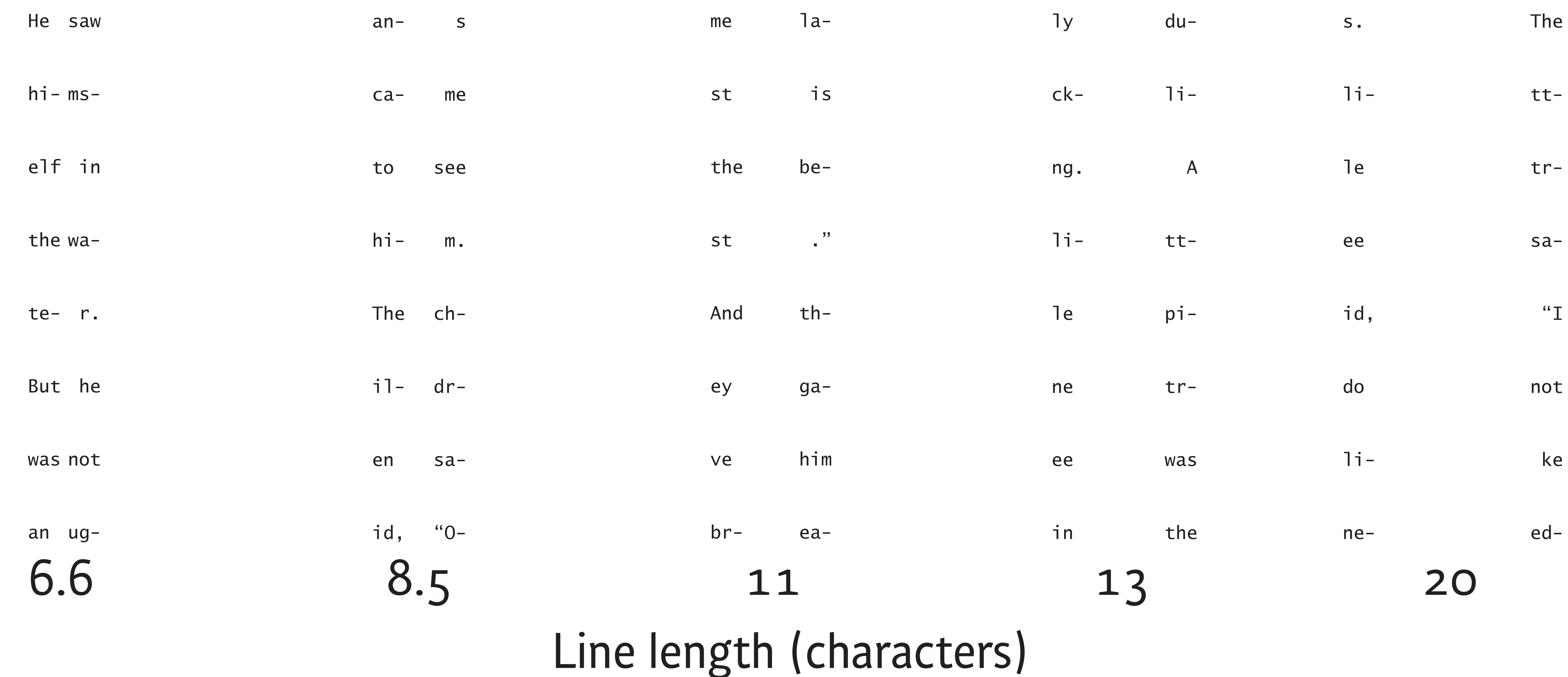


Summary: The “visual span” is defined as the number of letters, in a line of text, that one can identify without moving one’s eyes. While reading, people advance their eyes by a distance roughly equal to the visual span, five times per second. Thus, the tenfold increase in reading speed during childhood implies a proportional increase in the visual span, and there are some data to support this (reviewed in Pelli & Tillman, 2008, Nature Neuroscience). In normal adults, the vi-

sual span is limited by crowding. It is not clear what determines the visual span of children. We are developing a paper test to measure visual span. Large visual gaps are introduced. This slows reading if the two words are separated enough that they exceed the visual span. That’s because this prevents the reader from taking in both words in one glimpse. Our method requires only a stopwatch and an observer who can read.

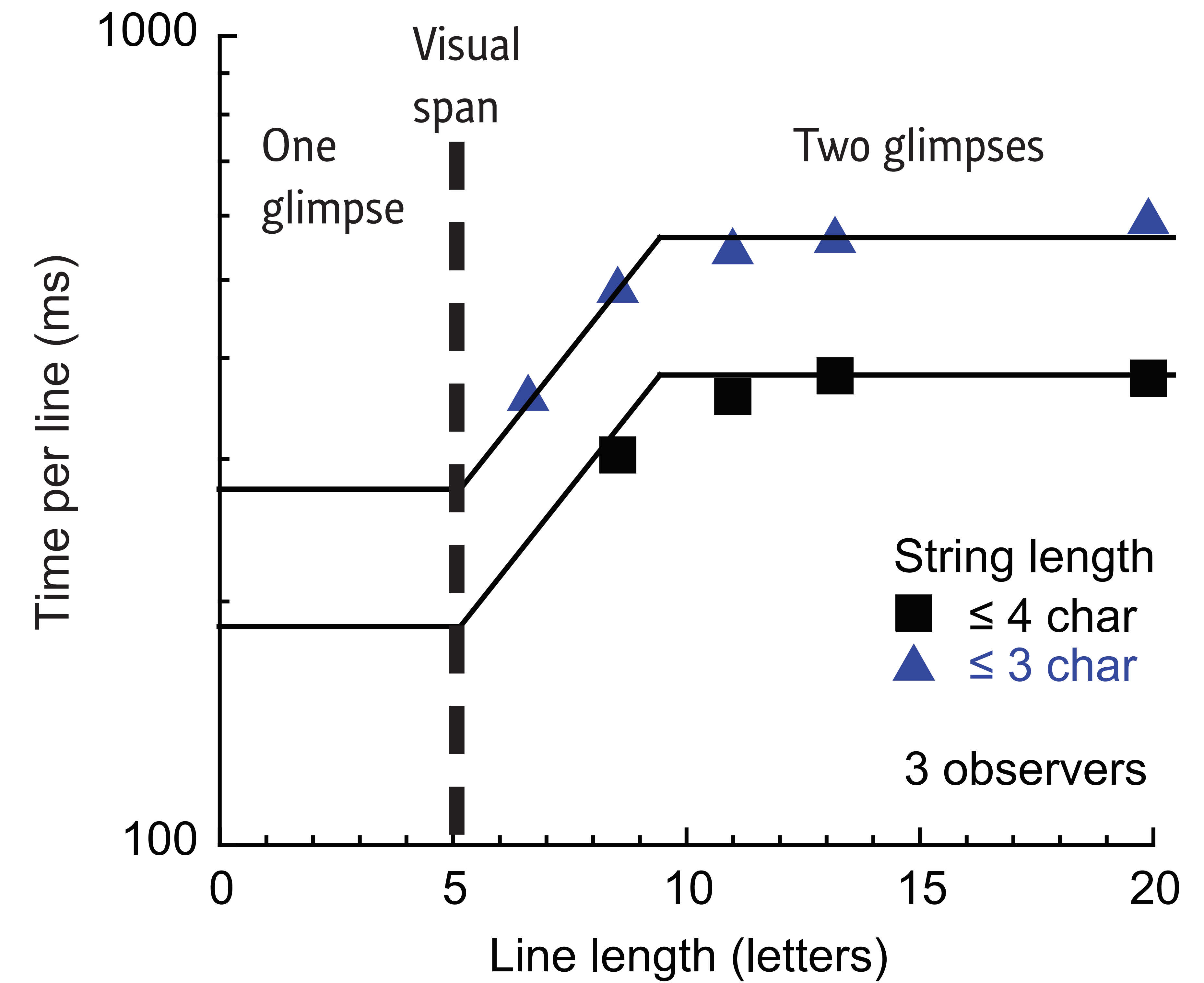
Theory: We suppose that the observer will need only one glimpse per line when the line length is less than the vi-

sual span and two glimpses when the line length is so large that the gap between words exceeds the visual span.



Stimulus: We hyphenate to break up the words of a children’s story into strings each no more than 3 characters long. We print the text with two strings per line,

right and left justified. We vary line length from 6.6 to 20 characters. Increasing the line length adds no information; it just expands the white space in the middle.



Results: Reading is slowed by increasing line length up to 9 characters, whether the experiment is done with 3- or 4-character strings. Assuming two glimpses for long lines, the extrapolation to shorter lines should reach one glimpse (half of max time) when the line length equals the visual span, which thus seems to be 5 characters. That span would be enough to get part of both strings in lines up to 11 characters long (3+5+3=11), which is where the data reach asymptote.

Conclusion: Increasing line length while keeping line content fixed increases reading time. This is consistent with a simple model of visual span, and promises to allow quick, easy measurement of span, requiring only a printed paper test, a stopwatch, and an observer who can read.