

# On Measuring the Impact of Hyperlinks on Reading

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## Introduction

- We spend a vast amount of time on the Web and much of that time is spent reading
- One of the main differences between reading Web and non-Web based text is the presence of hyperlinks
- We therefore set out to measure the impact of hyperlinks on reading
- We conducted two studies:
  - an initial experiment examining reading non-Web text
  - a main experiment examining reading Web-based text
- The initial experiment involved participants reading coloured words during non-Web reading
  - This demonstrated that participants were less likely to skip coloured words in text because of their salience
  - If the word was light grey (reducing the contrast) then participants had longer fixations because it was more difficult to process
  - Coloured words were not fixated longer than black words suggesting colour does not help or hinder the reading of those words

## Experiment

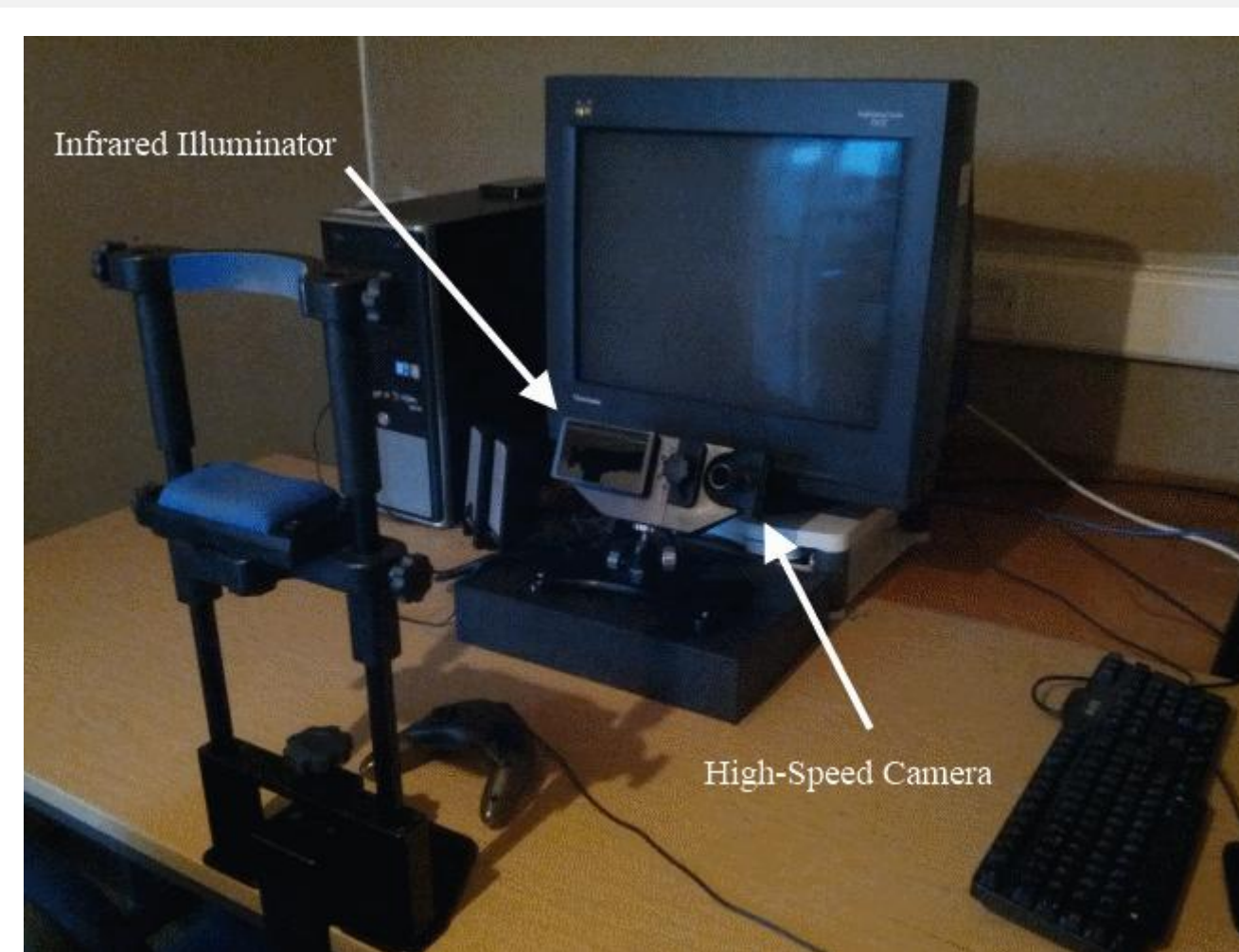


Figure 1. SR-Research EyeLink 1000 eye tracker

### Does a hyperlinked word impair reading behaviour?

32 participants  
80 experimental sentences inserted into 20 edited Wikipedia pages (4 in each, 1 per condition)

#### Experimental Conditions

High Frequent/Hyperlinked  
High Frequent/Unlinked  
Low Frequent/Hyperlinked  
Low Frequent/Unlinked

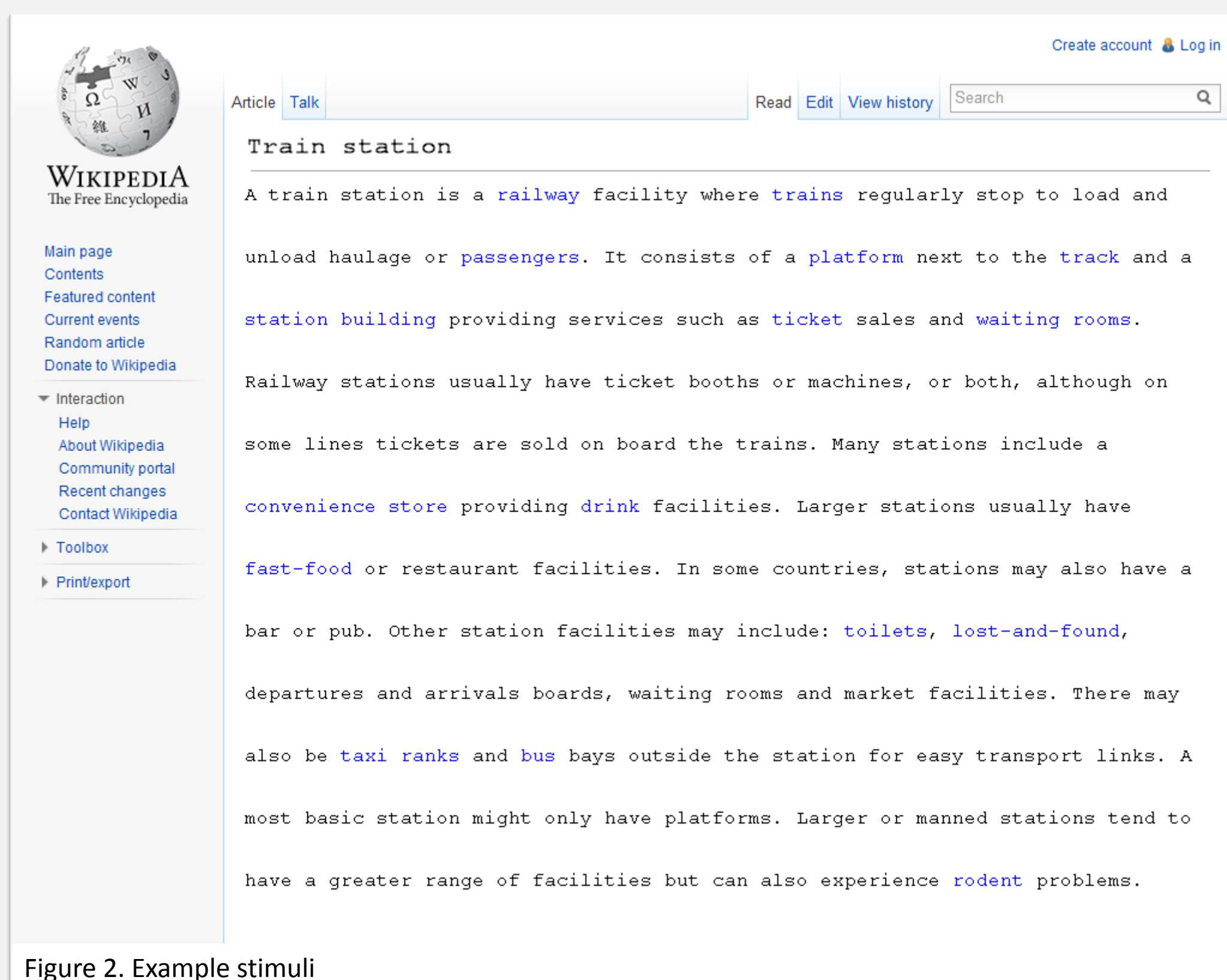


Figure 2. Example stimuli

## Results

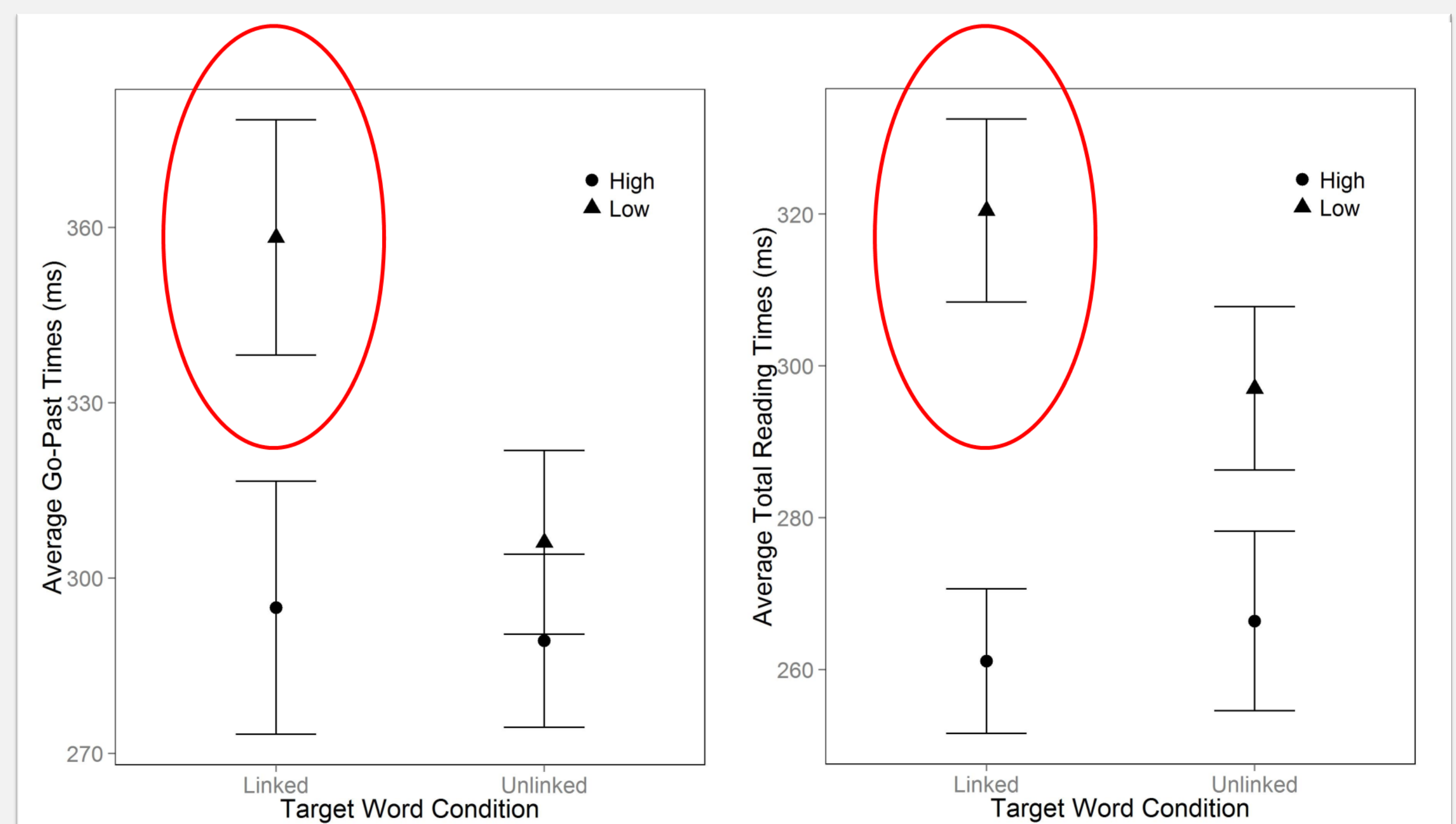


Figure 3. Word Frequency x Hyperlinked/Unlinked interaction for go-past times and total reading times

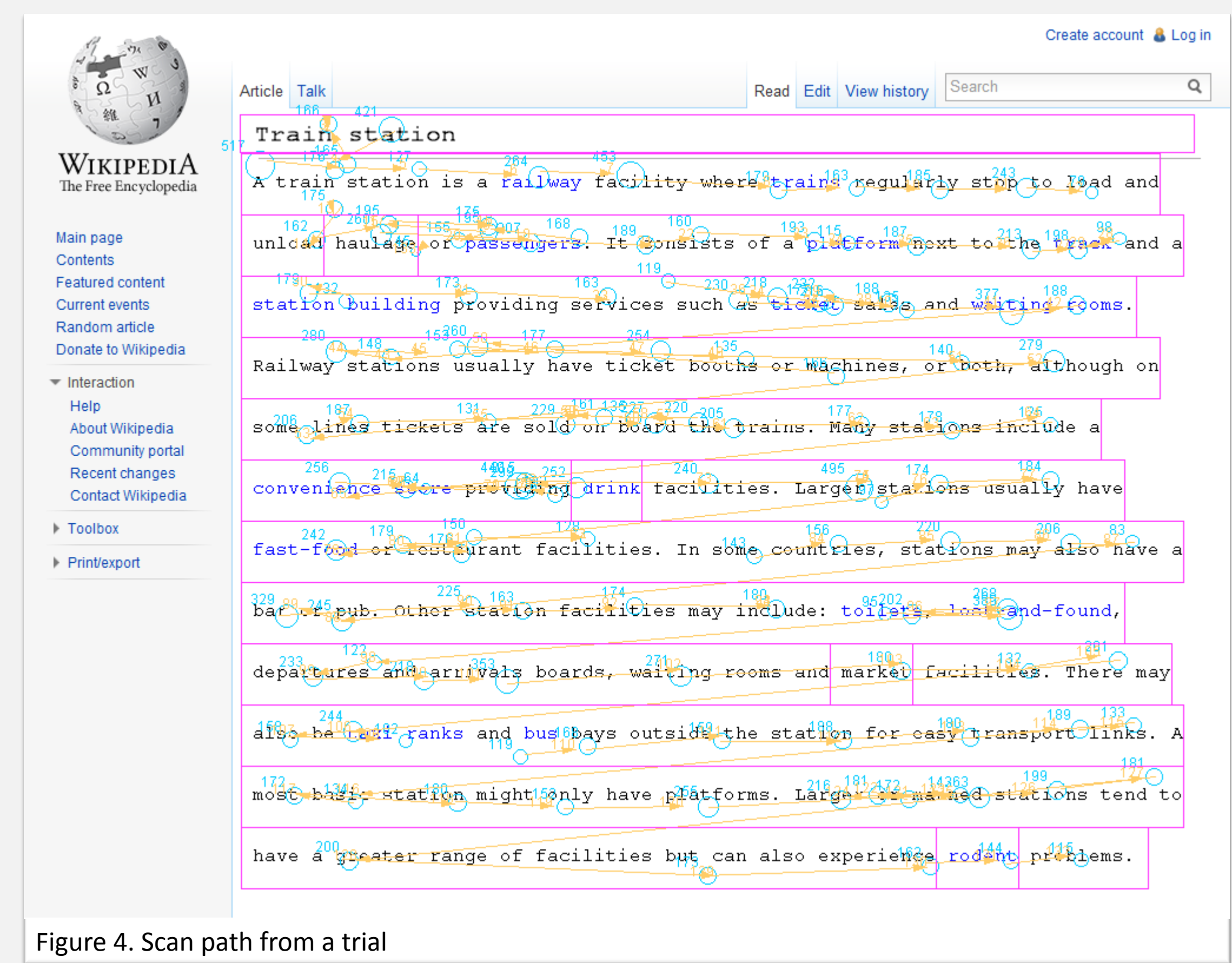


Figure 4. Scan path from a trial

- No effect of hyperlinks on early eye movement measures (first fixation duration, single fixation duration and gaze duration)
- This shows that hyperlinks were not harder to process
- Significant effect of hyperlinks on later eye movement measures (go-past times and total reading time), see red outlines in Figure 3. This indicates rereading of preceding content

## Conclusion

- The initial experiment showed that a coloured word is skipped less often than a black word
- In comparison, the main experiment showed that hyperlinked words are not skipped any more than non-hyperlinked words, indicating that **coloured words are processed differently to hyperlinked words**
- Low frequency hyperlinked words had significantly longer fixation times in the late measures of reading. **Participants had difficulty with these words and would reread the preceding content to re-evaluate it**
- **Hyperlinks indicate that the word is important.** When the hyperlinked word is a low frequency word the reader may wonder why that word is hyperlinked and want to re-evaluate the preceding content to make sure that they understood it, or try to decide why it is important

### What does this mean for reading on the Web?

- Hyperlinks do not make the text any more difficult to read
- However, when the link is a low frequent/uncommon word, readers are more likely to reread the preceding sentence in order to re-evaluate the content
- The key lesson here is that Web designers should only take extra caution when deciding to hyperlink words that are uncommon, unless necessary