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
- There is an ongoing debate about hyperlinks and whether they have a negative influence on reading behaviour
- Displaying hyperlinks in blue has become part of the online culture and most people would recognise a blue word on a Web page as a hyperlink [5]
- Carr [1] suggested that hyperlinks within the text are a distraction and therefore hinder comprehension of the text
- Other research has suggested that it does not disrupt reading, but actually assists in the reading of hyperlinked words [6]
- There is little research that has investigated how the presence of hyperlinks influences reading behaviour on the Web

Experiment One

- Coloured text does not hinder reading [2]
- Black words are processed differently to hyperlinked words

Experiment Two

- 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
- Does a hyperlinked word impair reading behaviour?

Results

- Participants showed no difference in skipping probability
- There was a significant effect of word frequency across all eye movement measures, with the low frequency word being fixated for longer due to the increased difficulty of the word
- The low frequency hyperlinked words had significantly longer fixations than the other conditions suggesting that these words caused regressive eye movements due to difficulty processing
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Conclusion

- Experiment One showed that a coloured word is skipped less often than a black word and that reduced contrast colours make reading more difficult
- Experiment Two also showed a difference between whether the target word was hyperlinked or not, qualified by an interaction with frequency
- 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

Method

- Participants were less likely to skip a target word if it was any colour except black which suggests that the saliency of the colour draws attention to it (see Figure 7)
- The grey target word had significantly longer fixations across all eye movement measures due to its reduced contrast making it more difficult to process and read (see Figure 8)
- The other coloured words were not fixated for longer than the black words, suggesting that colouring words does not either hinder or help the reading of those words

Conclusion

- Experiment One showed that a coloured word is skipped less often than a black word and that reduced contrast colours make reading more difficult
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What does this mean?

- These experiments have shown that coloured text does not hinder reading, but also that hyperlinks can cause us to reread previous content if the word is a low frequency/difficult word in order to re-evaluate the content
- In terms of Web design and layouts, the present results highlight the importance of carefully designing hyperlinks.
- The implications of hyperlinking elements in pages with low frequency material is an important issue for Web designers.
- Web designers should only hyperlink important words in pages in order to reduce the amount of time users spend on the Web searching for information.

Future Research

- By basing our future research on the vast amount of research already conducted on eye movements and reading we can build an understanding of how we read hyperlinked text
- In future research we aim to explore reading behaviour alongside the navigation and decision making elements that hyperlinked text entails

References

3. Rayner, K. Reading a sentence: the role of sentence structure and word frequency. In J. J. Orasanu, N. J. (Eds.), Advances in eye movement research, 6, 1988 (pp. 411-417)