**EXPERIMENT ONE**

**METHOD**

**Participants**

Thirty-two native English speakers (2 male, 30 female) with an average age of 20.00 years participated in exchange for course credits or payment (£9). All had normal or corrected-to-normal vision and no known reading disabilities. None of the participants took part in Experiment 2.

**Apparatus**

Eye movements were measured with an SR-Research Eyelink 1000 eye tracker operating at 1000 Hz (1 sample every millisecond). Participants viewed the stimuli binocularly, but only the right eye was tracked. Words were presented in 14pt mono-spaced Courier font. The participant’s eye was 73 cm from the display; at this distance three characters equalled about 1° of visual angle.

**Materials and design**

The stimuli in Experiment One consisted of forty edited Wikipedia articles taken from Fitzsimmons et al. (2019, Experiment Three). One-hundred and sixty target words were embedded in sentences (one target word per sentence) and four sentences were inserted into each Wikipedia article. The rest of the text was edited from Wikipedia articles and all words that were links in the original articles were retained for the experimental text. In total there were 8 conditions in a 2 (Task Type: Comprehension, Skimming) x 2 (Word Type: Linked, Unlinked) x 2 (Word Frequency: High, Low) within participants design. At a target word level, the target words within these articles were either displayed in blue or black to denote if the word was a hyperlink or not. There was also a word frequency manipulation where the frequency of the target word was either high or low frequency. The word frequencies were taken from the Hyperspace Analogue to Language (HAL) corpus. The frequency norms were used to extract both high and low frequency words to create the experimental stimuli. The high frequency words had an average log transformed HAL frequency of 9.94 and the low frequency words had an average log transformed HAL frequency of 5.81 (according to the norms collected in the HAL corpus, Burgess & Livesay, 1998). There was a significant difference between the high and low word frequency stimuli, *t*(159)=29.66, *p*<.001. All target words were 4-7 characters in length with an average of 5.60 characters and the high/low frequency pairs were matched on word length. The various versions of each stimulus were presented according to a Latin square design, meaning every participant saw only one version of each edited Wikipedia article.

**Procedure**

Participants were given an information sheet and a verbal description of the experimental procedure and informed that they would be reading passages on a monitor while their eyes were being tracked. The text on the screen gave the instructions to read either for comprehension or to skim read. This was blocked such that the first twenty stimuli were to be read for comprehension and the second twenty to be skim read. When the skim reading portion of the experiment began the participants were instructed to ‘skim read as you would naturally, as if you are reading a large text book that you need to read quickly’. Participants were told there was no time limit, and they simply had to skim read naturally. We did not counterbalance the Task Type. Participants were not told they were going to be skim reading until just before that half of the experiment was due to begin, so as not to influence the first part of the experiment which was to be read for comprehension. We worried if participants were first asked to skim read, it may become difficult to slow down and read “normally”.

The participants’ head was stabilised in a head/chin rest to reduce head movements that could adversely affect the quality of the calibration of the eye tracker. At the beginning of each trial the participant had to look at a fixation point on the screen. When the eye tracker registered a stable fixation on the fixation point, the sentence was displayed ensuring that the first fixation fell at the beginning of the text. When participants finished reading they confirmed they had finished by pressing a button on the response box in front of them.

The participants were informed that they were to respond to comprehension questions presented after each trial when four comprehension questions were presented to the participants, one at a time. The comprehension questions were simple and required a yes or no response. Participants responded to the questions by pressing the appropriate button on a response box. After the questions the next trial would appear. The experiment lasted approximately 90 minutes, but participants took breaks between trials whenever they required them.

**EXPERIMENT TWO**

Hyperlinks are visually salient and important navigational tools during reading of hypertext, as they represent a link to other content on the Web. We need to consider how the reader reads the text when it contains clickable hyperlinks. In Experiment 1, the reader could not click and navigate the environment. This was to maintain experimental control by simplifying the experience as much as possible in order to explore the impact of hyperlinks during skim reading, without yet introducing the added complexity of navigation and clicking. In Experiment 2, we run a similar manipulation to that seen in Experiment 1, where the task was manipulated (reading for comprehension or skim reading). The target words within the text were also manipulated to be either high or low word frequency and were displayed either in blue (linked) or black (unlinked). Additionally, in Experiment Two we allow the links to clicked, which also means that if the page was re-visited, the link would be made purple as if the links have been visited, consistent with how they would normally look on the Web. The reader chooses the next trial by clicking on the hyperlink they wish to go to, simulating a realistic Web environment. We predicted that we will find the mostly the same effects as in Experiment 1. However, by allowing the reader to navigate the links we might expect to observe inflated fixation durations for the linked words in total reading times where the reader may spend longer on the linked words to evaluate which link to click to navigate to another page.

**METHOD**

**Participants**

Thirty-two native English speakers (15 male, 17 female) with an average age of 20.03 years participated in exchange for payment (£9). All had normal or corrected-to-normal vision and no known reading disabilities.

**Apparatus**

The apparatus was identical to the one used in Experiment 1.

**Materials and design**

Experiment 2 was similar in design to Experiment 1. The forty wiki pages used in Experiment 1 were insufficient to allow for a realistic Web environment with full clicking and navigable functions. As such, the stimuli for Experiment 2 consisted of 843 edited new Wikipedia articles with experimental sentences inserted into the existing text. The Wikipedia articles were two to twelve lines long. Participants could follow any hyperlinks they wished to click on and because of this environment, the number of target words observed by each participant varied dependent on the pages they choose to view. The Wikipedia pages contained between zero and four target words. All target words were 4-7 characters in length with an average of 5.12 characters and the high/low frequency pairs were matched on word length. The high frequency words had an average log transformed HAL frequency of 9.62 and the low frequency words had an average log transformed HAL frequency of 6.02 (according to the norms collected in the HAL corpus, Burgess & Livesay, 1998). There was a significant difference in frequency between the high and low word frequency stimuli, *t*(471)=49.24, *p*<.001.

The experiment took place as four sessions with different starting pages. The first two sessions were read for comprehension and the last two sessions were skim read. The participant was instructed to read for comprehension or to skim read the text (dependent on the session) and to then choose any hyperlink they wished to follow. If the participant wished they could also go back to as many pages as they wished with a designated back button. Participants could use this back button at any time to re-read a page, follow a different link on a previous page or simply to navigate away from a page that was a dead-end containing no hyperlinks in the text to click. The participant was told they may occasionally have to answer a comprehension question, which could be about any part of the text displayed, after reading some of the articles . Due to the large structure of this experiment and the fact that participants could choose any hyperlinks they wished to follow, we constrained the experiment by ending each session after the participant had visited ten unique pages in each session, totalling forty unique pages per participant.

In total there were 8 conditions in a 2 (Task Type: Normal, Skimming) x 2 (Word Type: Linked, Unlinked) x 2 (Word Frequency: High, Low) within participants’ design. The participants were instructed to read the text on the screen either for comprehension or to be skim read. As in Experiment 1, we did not counterbalance the Task Type because the normal reading blocks may have been influenced by first having to skim read and being informed of the skim reading condition may have influenced their normal reading behaviour. At a target word level, the target words within these articles were either displayed in blue or black to denote if the word was a hyperlink or not respectively (and would be displayed in purple if that link had been visited). The display was 73 cm from the participant's eye and at this distance three characters equal about 1° of visual angle.

**Procedure**

The procedure was the same as Experiment 1, except to move onto the next trial the participants needed to choose a hyperlink to click on to navigate to the next trial topic. When participants finished reading the page they were on they selected a link within the text that they wished to follow or pressed a button on the keyboard that they were told corresponds to the “back button” on a browser which would go back to the page they previously visited. Participants could go back as many pages as they wished and could click any hyperlink of the page they were on. Comprehension questions were presented to the participants if that page had a comprehension question attached to it, on average participants were presented with comprehension questions on 45% of trials. The comprehension questions were related to the text on the article that had just been read, were simple and required a true or false response. The comprehension questions were presented to ensure the participants were reading and comprehending the text displayed to them and to measure the level of comprehension across the tasks. Participants responded to the questions by pressing the appropriate response on the screen with the mouse cursor. The appropriate next page that had been selected by the participant would then subsequently appear. If the participant had visited a page with a comprehension question before, the question was not displayed again. The experiment lasted approximately 90 minutes and participants could take a break between trials whenever they required.