**BBSRC MIBTP Studentship Project**

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| **Project Title** | Visual and oculomotor limitations on time pressured text comprehension: Implications for decision-making |
| **Project Summary**  |
| Background: The proposed project brings together two very different areas of research. First, the visual and oculomotor (eye movement control) mechanisms involved in reading. Second, optimising comprehension and decision-making based on health risk information. The project examines how the characteristics of eye movement behaviour when skimming health information under time pressure modulates subsequent comprehension and decision-making. The research has implications for understanding how comprehension and decision processes depend on, and are limited by, the constraints of the visual and oculomotor systems during reading, especially when reading under time pressure. The work has implications for health messaging (e.g. vaccination campaigns, medicine patient information, disease prevention etc.). For example, how to enhance comprehension of key information in order to optimise subsequent decision-making (e.g. decisions about cancer screening options). More broadly, the research has wider implications for comprehension and decision making in a range of contexts (e.g. education, professional).   Previous work has focused on eye movement control during relatively careful reading for comprehension (see Rayner, 2009). Relatively few studies have explored the visual, oculomotor and cognitive mechanisms that contribute to poor comprehension when skimming under time pressure (Rayner et al., 2016). Furthermore, although eye movements have been employed to examine perceptual and preferential decision making (see Wedel et al., 2022) or to examine choice between options (e.g. Glöckner & Herbold, 2011), little work has been undertaken to reveal how the nature of eye movement behaviour during reading may be linked to subsequent decision making. Indeed, in their recent review, Wedel et al. (2022, p.20.) specifically highlight “the rich body of knowledge on eye movements during reading… …may inform future studies that aim to refine models of people’s information acquisition from text during decision making”. Crucially, when reading under time pressure, key words may be skipped (not processed in visually detailed foveal vision), and backward eye movements to reinspect text may be limited (see White et al., 2015). Such behaviour is likely to limit both the “construction” and “integration” stages of text comprehension (Kintsch, 1992) and memory of the text content, which in turn is likely to have vital implications for making subsequent decisions.   Aims & objectives: The aim of this project is to determine how eye movement behaviour can limit comprehension, and subsequent decision-making, when reading health messages under time pressure. There are three key objectives: 1) Determine how skipping of short words (or sequences of words) impairs comprehension of detail within the text, and how this affects decisions based on the content both immediately and after a delay.  2) Determine how rapid reading (i.e. reading with limited visual samples) impairs learning of new concepts, and how this affects subsequent decisions.  3) Examine factors that might optimise comprehension under time pressure, and whether this improves subsequent decision-making. For example, modulating the visual salience of key details within the text (e.g. capitals or bolding) to increase the likelihood of direct eye fixation.  Methods: Our established laboratory is equipped with an SR Research EyeLink 1000 eye tracker. Experiments will be undertaken with skilled adult readers, with sample sizes determined by power analyses (~60 per study). The studies will involve generation of carefully controlled linguistic stimuli and decision tasks. All studies will be pre-registered prior to data collection and materials made publicly available on OSF. Techniques that will be undertaken during the project:* Eye movement recording during reading (EyeLink 1000 eye tracker)
* Creation of stimuli
* Advanced statistical analysis using R (e.g. Linear Mixed Effects models, Bayes Factors).
* Administration of visual and cognitive tests.

BBSRC Strategic Research Priority: Understanding the Rules of Life - Neuroscience and behaviour |
| **References** |
| Rayner et al. (2016). So much to read, so little time: How do we read, and can speed reading help? Psychological Science in the Public Interest, 17, 4-34. |