**BBSRC MIBTP Studentship Project**

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| **Project Title** | How do older people read words of out order? Understanding ageing effects on “noisy channel” language processing. |
| **Project Summary** | |
| Background  Readers often fail to notice when words are missing or presented of out order, such as we presented the words “out” and “of” in the wrong order in this sentence. Such effects suggest that the language processing system can deal robustly with degraded (i.e., imperfect) input. This poses a challenge to current computational models of reading that are not equipped to deal with degraded input. However, such effects may be explained by more recent “noisy-channel” models that make use of a reader’s knowledge or expectations to resolve imperfections in the linguistic input.  For example, this might mean that readers use their knowledge about word order to determine that a sentence fragment like “presented out of order” is more likely than “presented of out order”, and so perceive the sentence as the former. However, few studies have directly examined whether the noisy-channel theory can be applied to the failure to notice errors during reading.  One further issue that is under-investigated concerns whether this noisy channel processing changes with age. Ageing is associated with visual and cognitive declines (i.e., poorer acuity and slower processing speeds). However, for most people it is also associated with increased exposure to language, which might lead older people to have better language knowledge and stronger linguistic expectations. An important question, therefore, is whether the language processing system adapts in older age to reply more on linguistic expectations to compensate for lower-quality visual input and slower processing.  The aim of the project is therefore twofold: (1) to investigate the cognitive mechanisms that allow us to understand sentences with repeated or omitted words, or words written out of word; (2) to investigate whether this capacity to deal with erroneous linguistic input changes as a function of age and reading experience.  Methods  We can investigate these questions using a combination of online experiments, which enable us to obtain data from many participants quickly and effectively, and more focused laboratory-based experiments using eye movement recordings to provide more detailed insights into the cognitive processes that underpin reading comprehension.  The participants in these experiments will be a combination of young adults (aged 18-30 years), typically recruited from the University, older adults (aged 65+ years), and potentially a broader community sample to allow us to investigate effects of reading experience on noisy channel inferences in reading.  Techniques that will be undertaken during the project:   * Programming of online and eye tracking experiments * Eye movement recordings during reading * Creation of stimuli * Complex statistical analysis using R   BBSRC Strategic Research Priority: Understanding the Rules of Life - Neuroscience and behaviour  Integrated Understanding of Health - Ageing | |
| **References** | |
| Huang, K., & Staub, A. (2021). Why do readers fail to notice word transpositions, omissions, and repetitions? A review of recent evidence and theory. *Language and Linguistics Compass, 15*, e12434.  Liu, Z., Li, Y., Cutter, M., Paterson, K.B., & Wang, J. (2022). A transposed-word effect across space and time: Evidence from Chinese. *Cognition, 218*, 104922.  Mirault, J., Snell, J., & Grainger, J. (2018). You that read wrong again! A transposed-word effect in grammaticality judgements. *Psychological Science, 29*, 1922-1929. | |