**University of Leicester**

**BBSRC MIBTP Studentship Project 2025-6 entry.**

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**Section 2 – *Project Information***

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| **Project Title** | Understanding the onset and trajectory of age-related difficulties in reading: A visual and cognitive perspective |
| **Project Summary**  |
| Reading is a fundamental life skill that underpins many economic, cultural, and social aspects of life. It is concerning, therefore, that numerous studies indicate that reading becomes significantly slower and more effortful during older age (Zhang et al., 2022). Research from our laboratory has centred on using eye movement recordings to understand precisely when and where individuals move their eyes during reading. These movements reflect the cognitive processes underlying reading, and so by comparing the eye movements of young (aged 18-35 years) and older readers (aged 65+ years) we can understand how the cognitive mechanisms underlying reading differ between these groups of readers. Intriguingly, our findings show that older readers’ eye movements are distinct from those of other groups of slower readers (such as children or readers with dyslexia), and point to particular difficulties in integrating words within sentences. This suggests that age-related changes in visual and cognitive function are affecting key processes and mechanisms underlying reading. However, despite two decades of research our understanding of these age-related difficulties remains remarkably limited. Key questions, such as when reading difficulties emerge, how they progress, and how they differ between individuals, are still unanswered. Most research to date is limited by the use of discrete age groups typically focusing on comparing small groups of young adults (18-30 years) with small groups of older adults (65+ years) (e.g. Rayner et al., 2006). While informative, this approach provides only a snapshot of reading processes at two ends of the lifespan. We therefore know very little about when reading starts to decline, what the rate of decline is, or whether reading continues to decline throughout older adulthood. This is despite findings from many related domains (e.g. vision, working memory) that age-related declines start during mid-adulthood and progress non-linearly. Our aim is therefore, to more fully understand how reading changes across the adult lifespan. To achieve this we will: 1. Establish the trajectory of age-related change in reading by investigating when reading difficulties first emerge, how the rate of decline evolves, or whether there are periods of stability or rapid change in reading performance across the adult lifespan.
2. Investigate how visual and cognitive abilities contribute to age-related reading difficulty.

2a) Understand how typical changes in the eye and brain across the lifespan affect the reading process. 2b) Examine the role of individual differences in visual and cognitive functions, and how these differences contribute to variability in age-related reading difficulty. **Methods** Our project will address our objectives using a series of eye tracking experiments to examine reading across the full adult lifespan. By using eye tracking we can gain a detailed insight into how the cognitive mechanisms underlying reading change with age. Our approach will be to recruit a large and diverse set of participants for our experiments, and conduct assessments of visual (e.g. acuity, contrast sensitivity) cognitive abilities (e.g. working memory, processing speed) in addition to assessments of reading. This will enable us to examine how individual differences in vision and cognition contribute to age-related changes in reading. Techniques that will be undertaken during the projectEye movement recording during reading (EyeLink 1000 eye tracker)  Creation of carefully controlled linguistic stimuli Advanced statistical analysis using R (e.g., Linear Mixed Effects models, Bayes Factors).  Administration of visual and cognitive tests.   |
| **References** |
| Rayner, K., Reichle, E. D., Stroud, M., Williams, C. C., & Pollatsek, A. (2006). The effect of word frequency, word predictability, and font difficulty on the eye movements of young and older readers. Psychology and Aging, 21, 448-465. Zhang, J., Warrington, K. L., Li, L., Pagán, A., Paterson, K. B., White, S. J., & McGowan, V. A. (2022). Are older adults more risky readers? Evidence from meta-analysis. Psychology and Aging, 37(2), 239-259. <http://dx.doi.org/10.1037/pag0000522>  |