It's The Chicken Not The Egg: Visual Attentional Deficits In Adults With Dyslexia Are Not The Result Of A Failure To Learn To Read

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Declaration

I, Sarah Flint, hereby declare that this thesis is my own original work that incorporates an account of research undertaken during the Doctor of Philosophy at the Research School of Psychology at the Australian National University. This work has not been submitted, in part or whole, for a higher degree at any other university or institution. To the best of my knowledge this thesis contains no material previously published by another individual, except where due reference is noted in the thesis.

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Index of Presentations Arising From This Dissertation


Abstract
The magnocellular deficit theory of dyslexia posits that many individuals with dyslexia demonstrate deficits in reading, visual attention and visual processing which can be attributed to a functional failure of the magnocells in the visual system, or general impairment in the dorsal visual pathway. Research from the last 10 years has examined magnocellular function in pre-readers, demonstrating that there is a magnocellular deficit evident in pre-readers at familial risk of dyslexia demonstrating a neurobiological underpinning to dyslexia. The inclusion of illiterate adults as a comparison group in lieu of pre-readers has garnered increasing interest in recent years. The inclusion of illiterate adults as a test group can provide strong evidence that any magnocellular deficits demonstrated are not the result of reading experience or orthographic familiarity. If a magnocellular deficit is demonstrated between dyslexic readers and normal readers, but not between illiterate adults and normal readers, the deficit cannot be attributed to reading experience. The studies and chapters in this dissertation set out to examine this. Illiterate adults were to be recruited from the large illiterate population in Papua New Guinea. However, as there was no linguistically and culturally appropriate test of reading ability available in PNG in order to determine literacy level in the PNG population. The Flint Melanesian Reading Ability Assessment was developed to address this need. The Flint Melanesian Reading Ability Assessment examines the reading ability of adults in PNG in either English or Tok Pisin. Furthermore, as the research was being conducted cross-culturally, any possible cultural confounds that would hinder cross-cultural comparisons needed to be identified and strategies to overcome these identified. Consequently, the role of culture on visual processing across cultures was examined by comparing performance on visual search tasks between undergraduate
students from the University of PNG and the Australian National University. It was found that culture may influence visual processing. Section B examines the role of magnocellular function in dyslexic adults compared to normal, illiterate and semi-literate readers. Visual search, coherent motion, and frequency doubling tasks were used to investigate whether deficits in magnocellular processing were the result of a failure to learn to read or the result of an underlying biological deficit. Illiterate adults performed the same as normal and semi-literate readers in visual search task and all three groups performed better than the dyslexic readers did. These findings indicate that there is a difference in the visual attention of dyslexic readers. Likewise, the coherent motion and frequency doubling tasks both demonstrated that the illiterate adults did not perform these tasks differently to a normal or semi-literate reader. Again, the dyslexic readers performed more poorly on coherent motion and frequency doubling tasks. Together these studies provide supporting evidence the magnocellular deficit theory of dyslexia. They indicate that illiterate adults do not demonstrate this magnocellular deficit; therefore a deficit may not be attributed to reading experience or orthographic familiarity. These results cannot conclusively demonstrate a causal relationship; they do provide another avenue for further research that may elucidate this association.