Monday 23 October, 1-2pm, G10 Chandler House

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What predicts individual differences in arithmetic fluency? The role of symbolic numerical processing

Being fluent and efficient in performing basic calculations has been regarded as an important building block for the development of mathematical skills. On the other hand, deficits in retrieving arithmetic facts from memory are the hallmark of children with dyscalculia. The ability to represent symbolic numerical magnitudes has been put forward as a major determinant of children’s general mathematics achievement. Does this factor then also contribute to the specific skills of arithmetic fluency, i.e. the transition from procedure-based arithmetic to fact retrieval, its development and its impairments?

In this talk, I will present a series of recent cross-sectional and longitudinal studies in typically developing children, studies in children with dyscalculia and studies in children with genetic disorders all of which have investigated the role of numerical magnitude processing in the development of arithmetic fluency. These studies also investigated the potential contributions of domain-general factors, such as working memory or inhibitory control. The key message from these studies is that particularly children’s symbolic magnitude processing skills are a unique and very stable predictor of children’s arithmetic (fact retrieval) development. These data all suggest that screening children’s symbolic processing skills is useful for detecting children at risk children and I will present data from a recent large-scale validation of such a screening measure.