The development of spatial-numerical associations in pre-schoolers
ESRC DTP Studentship at the Centre for Early Mathematics Learning

Loughborough University

The Midlands Graduate School is an accredited Economic and Social Research Council (ESRC) Doctoral Training Partnership (DTP). One of 14 such partnerships in the UK, the Midlands Graduate School is a collaboration between the University of Warwick, Aston University, University of Birmingham, University of Leicester, Loughborough University and the University of Nottingham.

We are now inviting applications for an ESRC Doctoral Studentship to be based at the *Centre for Early Mathematics Learning (CEML)* at Loughborough University to start in October 2023. The project will be supervised by Dr. Silke Goebel, Dr. Francesco Sella, and Prof. Korbinian Moeller.

Background

Children's mathematical achievement is influenced by both domain-specific and domain-general skills. One important domain-general correlate of mathematical development is visuo-spatial skills. Children with better visuo-spatial skills usually also show better mathematical performance. One mechanism that has been suggested to support the association between visuo-spatial skills and mathematical performance is the metaphor of a spatially oriented mental number line representing number magnitude directionally from left-to-right – at least in Western cultures. In recent years there has been a lively debate about whether this directional association between number magnitude and space is innate or emerges with development and thus to what extent this association is shaped by experience. Some studies have reported spatial associations of small numbers with left and larger numbers with right already in newborns. Other studies, however, reported that directional spatial-numerical associations increased in line with reading experience in 4- to 6-year-old children and were absent in illiterate adults, and thus seemed shaped by the reading direction of the culture participants were living in. Crucially, there is a clear gap in the research on the existence/emergence of spatial-numerical associations in younger children.

Against this background, the aim of this PhD project is to investigate the emergence of the directional association between numbers and space (as described by the idea of a mental number line) in children aged 2 to 4 years by pursuing the following research questions:

1. How can we reliably measure directional associations between number and space in 2- to 4-year-old children?
2. What factors influence the emergence of spatial-numerical associations in this age range?
3. Is the development of spatial-numerical associations (i.e., the mental number line) associated with children's numerical development more generally?

Application Process

To be considered for this PhD, please complete the CEML Studentship application form available online here. Shortlisted applicants will also be required to provide transcripts and two references.

Application deadline: Application deadline: Wednesday 28th June 2023

Midlands Graduate School ESRC DTP

Our ESRC studentships cover fees at the home rate, a maintenance stipend, and extensive support for research training, as well as research activity support grants. Support is available to both home and international applicants. For further details, visit: www.mgsdtp.ac.uk/studentships/eligibility/.

Informal enquiries about the research or CEML prior to application can be directed to Prof. Korbinian Moeller k.moeller@lboro.ac.uk.