



# The strong relationship between spatial and mathematical ability: Evidence from samples of different age groups

**Professor Li Zhang**

Department of Psychology, School of Sociology and Psychology  
Central University of Finance and Economics

**Date:** December 19, 2023 (Tuesday)  
**Time:** 10:00 – 11:15  
**Mode:** Room 408-410, Meng Wah Complex, HKU  
**Chair:** Dr Xiao Zhang

## Registration:

[https://hkuems1.hku.hk/hkuems/ec\\_regform.aspx?quest=Y&UEID=91765](https://hkuems1.hku.hk/hkuems/ec_regform.aspx?quest=Y&UEID=91765)



## Abstract:

We conduct a series of studies and observe a strong association between spatial and mathematical ability.

**Study 1** conducted a meta-analysis of 73 studies with 263 effect sizes and revealed a positive correlation between spatial and mathematical ability ( $r = 0.25$ ), but logical reasoning rather than numerical or arithmetic ability had a stronger association with spatial ability.

**Study 2** recruited a total of 123 Chinese 4-year-old children in the fall and spring of their second kindergarten year. Results showed that visual spatial skill could predict children's symbolic arithmetic and pattern construction after half year.

**Study 3** ( $n=165$ ) investigated the longitudinal effect of spatial ability on middle school students' mathematical ability. A main finding is that mental rotation can predict numerical, arithmetical and logical thinking ability after one year.

**Study 4** ( $n=173$ ) examined the neural correlates of the association between spatial and arithmetic ability in college students. Results showed that inferior parietal lobule underlie the association between perspective taking and exact arithmetic while the superior frontal gyrus underlie the association between 3D mental rotation and approximate arithmetic.

## About the speaker:

**ZHANG Li**, Professor, Department of Psychology at the School of Sociology and Psychology, Central University of Finance and Economics. Graduated from the Institute of Developmental Psychology at Beijing Normal University, PhD in Education. A visiting scholar in the Department of Psychology at University of Cambridge, UK. My main research interests are mathematical cognition and learning, emotions and health, and emotions and decision making. I have completed three projects from National Natural Science Foundation and published over 60 academic papers including some important international journals such as *Educational Psychology Review*, *Journal of Learning Disabilities*, *Globalization and Health*, *Learning and Individual Difference*, *Sex roles*, *International Journal of Disaster Risk Reduction*.



[The presentation will be delivered in Putonghua](#)

~ This seminar is sponsored by Tin Ka Ping Visiting Fellowship Scheme ~  
For enquiries, please contact the Office of Research at 3917 8254 / hkchow@hku.hk.