

MATHEMATICS EDUCATION AND NEUROSCIENCE

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Short description of the Discussion Group: aims and underlying ideas

The interdisciplinary research field of educational neuroscience – linking neuroscience, psychology, and education – has witnessed a tremendous growth in the past five to ten years. By combining behavioral and neuroscientific methods, its general aim is to achieve a broader understanding of the neurocognitive mechanisms underlying learning and to support the development of effective instruction. A considerable impetus for the growth of educational neuroscience came from research on mathematics learning. Some of these findings have been presented in special issues in the journal ZDM Mathematics Education, in 2010 and 2016. Despite the field's success, it has been repeatedly questioned whether the obtained neuroscientific evidence has implications for education (including research and practice) or whether the connection between neuroscience and education is a bridge too far (e.g., Ansari & Lyons, 2016; Bowers, 2016). Has the inclusion of the neuroscientific level of analysis furthered our understanding of successful mathematics learning and how to support it? These questions can only be answered from an interdisciplinary perspective. The aim of this discussion group is to bring together neuroscientists, psychologists, and math educators, and to discuss the chances and limitations of educational neuroscience research on selected topics of mathematics education.

Planned structure:

Tuesday, 16.30-18.00: Planned timeline	Topic	Material / Working format / presenter
16.30-16.40	Introduction of the Discussion Group	Powerpoint / Grabner, Obersteiner
16.40-17.00	General statements and personal perspectives on the research field	5-min statements of the presenters / von Aster, Krajewski, Leikin, Nuerk
17.00-17.30	General discussion on the research field	Questions from the audience to the presenters; discussion moderated by Grabner, Obersteiner

17.30-18.00	Topical discussion: Atypical development and learning difficulties	Topical inputs (each 7 min) from von Aster and Krajewski, subsequent panel discussion combined with questions from the audience; moderated by Grabner, Obersteiner
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Friday, 16.30-18.00: Planned timeline	Topic	Material / Working format / presenter
16.30-17.00	Topical discussion: (Typical) early math development and education	Topical input (10 min) from Nuerk, subsequent panel discussion combined with questions from the audience; moderated by Grabner, Obersteiner
17.00-17.30	Topical discussion: Higher math education	Topical input (10 min) from Leikin, subsequent panel discussion combined with questions from the audience; moderated by Grabner, Obersteiner
17.30-18.00	General discussion: Presence and future of the research field and interdisciplinary collaborations	Brief statements from the presenters, plenary discussion, moderated by Grabner, Obersteiner

References

- Ansari, D. & Lyons, I.M. (2016). Cognitive neuroscience and mathematics learning: How far have we come? Where do we need to go? *ZDM Mathematics Education*, 48(3).
- Bowers, J.S. (2016). The practical and principled problems with educational neuroscience. *Psychological Review*, <http://dx.doi.org/10.1037/rev0000025>.