

Bjørnebye, M. (2022). Full-body interaction in young children's modelling of counting-based addition. *Nordic Studies in Mathematics Education*, 27 (2), 21–41.

## Abstract

This study explores characteristics of kindergarteners' talk, use of tools, and full-body interaction in the modelling of counting-based addition from the perspective of embodied cognition. Ten 4- and 5-year-olds participated in a 5-week outdoor embodied intervention for learning the min strategy (e.g. count on from the largest addend "four, five, six" in  $2 + 4$ ). Video analyses of individual testing showed that strategy efficiency was associated with fluency in the embodied interaction, use of mental representations and a structural awareness of numerical relations. Inefficiency was shown to be related to extensive offloading of the additive thinking to fingers and/or dice to keep track of counted units. An unexpected finding was the inclusion of expressive body movements (e.g. rotation, rhythm, force, and tempo) while modelling their counting strategies. The study contributes to educational research on body-based learning in mathematics by revealing patterns of young children's physical modelling of arithmetic.

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Morten Bjørnebye is an Associate Professor in mathematics education at Inland Norway University of Applied Sciences. His main research interests are design-based research and children's body-based learning of mathematics.