

# The emergence of mathematical abstraction in the nursery

Maulfry Worthington and Bert van Oers

*VU University, Amsterdam*

## Abstract

### Research aims

This study aims to investigate the emergence of abstraction in young children's mathematical inscriptions, and their contribution to understanding the abstract symbolic (graphical) language of mathematics.

### Relationship to previous research works

Developing research into children's mathematical graphics, it builds on two recent doctoral studies into mathematics in pretend play, and children's social literacies in pretence.

### Theoretical and conceptual framework

Research into the acquisition and development of language and studies of very young children's symbolic principles in ontogeny contributes new understandings concerning some processes involved, providing insights into the rich foundational knowledge on which the children in this study built their early mathematical inscriptions.

### Paradigm, methodology and methods

The study conceives of children's mathematical representations as emergent and evolutionary, originating in their need to communicate within personally meaningful contexts. Ethnographic data comprise written documentations and the children's graphics, collected from seven children aged 3–4 years at home and in their nursery. Analysis follows an interpretive and social-semiotic paradigm. The children's visual texts are analysed in order to determine how they make mathematical meanings with their marks, signs and symbols and how this supports their understandings.

### Ethical Considerations

The research adheres to ethical research guidelines. Participants were consulted and informed at every stage and gave their informed consent, and could withdraw if they chose.

### Main finding or discussion

The findings illuminate the flexible strategies young children use as they communicate their mathematical thinking, indicating children's self-belief, enjoyment and confidence in mathematics as they progress towards increasingly mature mathematical inscriptions.

### Implications, practice or policy

Refuting a narrow 'skills based' view of mathematics, the findings have significant implications for early childhood teachers and policy makers.