The advance of mathematisation in young children' inscriptions

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Abstract

This study investigates young children's early beginnings in communicating their mathematical thinking through their personal inscriptions, showing how these gradually mature into formal mathematical signs that will later support effective problem-solving.

Building on research into young children's mathematical graphics over 25 years (e.g. Carruthers and Worthington 2005; 2006), it also draws on recent doctoral studies investigating incidence of children's mathematics and children's social literacies in pretend play and the emergence of mathematical abstraction (Worthington and van Oers, 2015; 2016). Starting from a Vygotskian social-historical and social-semiotic theory the study investigates the roots of mathematisation in a nursery. It investigates longitudinal ethnographic data from seven children of 3-4 years, gathered during one year. Investigating the same doctoral data set with the help of computer assisted qualitative data analysis software ('ATLAS-ti') this current study shows how children's mathematical thinking and inscriptions contribute to their confidence and agency in mathematics. 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.

Children's progressive understandings of sign-use are attained through recursive, bi-directional movement between their personal inscriptions and increasingly standard notations. This allows 'ratcheting' to more advanced knowledge over time (Tomasello 1999), allowing the 'gap' in children's understandings to be bridged. Meaningful opportunities to explore, communicate and build on their existing mathematical knowledge and inscriptions allow young children to progress towards the abstract symbolic language of mathematics with deepening understanding, and should be reflected in policy documents and practice.