



## Learning to Share Fairly: The Importance of Spatial Reasoning in Early Partitioning Experiences

Chelsea Cutting  
*Education Futures*  
University of South Australia  
[Chelsea.Cutting@unisa.edu.au](mailto:Chelsea.Cutting@unisa.edu.au)

Young children typically explore partitioning by creating fair shares and equal parts in everyday play experiences (such as sharing a set of counters equally or dividing lumps of playdough into equal shares). One of the critical ideas of this concept is understanding the relationship between how parts are formed and named; that is, the inverse relationship between the number of parts and their size (Lamon, 2007). Children are often provided with learning experiences that explore partitioning in continuous contexts, such as using 2D shapes and pattern blocks, and paper folding (Clarke et al., 2011). However, research suggests that children will often be prompted to *count* the parts created, rather than examining their magnitude in relation to the parts generated, which masks the inverse property of fair sharing.

This doctoral study employed a Design-Based Research (DBR) methodology to iteratively explore a teaching intervention that employed a spatial reasoning approach to teaching and learning fractions with children in the early years of primary school (6-7 years of age). This study demonstrates that the young children in this study were very capable of exploring early multiplicative and proportional foundations of partitioning through spatial contexts. That is, spatial reasoning enabled children to *visualise* the outcome of performing different partitions and determine the relationships between the part size and number of parts generated of like and unlike quantities. Furthermore, children's understanding of partitioning was evident through their focus on the geometric structural and proportional comparisons of the objects and sets of objects they were partitioning.

This paper is intended to be used as an opportunity for teachers and researchers to consider young children's capabilities for exploring the foundations for fractions, as the tasks presented in this study are not unlike activities and materials that are commonly used in primary classrooms for the teaching and learning of early fraction understanding. However, an implication of this study suggests that it is the way spatial reasoning was employed pedagogically that enabled children to make these connections about the foundations of partitioning, meaning teachers need to be supported on how to employ such an approach to provide rich opportunities for their students, whilst still meeting curriculum requirements.

### References

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- Lamon, S. J. (2007). Rational numbers and proportional reasoning: Toward a theoretical framework. In F. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 629–668). IAP

For more information, please refer to the following paper presented at the 46<sup>th</sup> Annual Conference of MERGA in July 2024.  
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