# The Effects of External Representations on Fraction Understanding

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Different external representations support different conceptual aspects of the fraction concept. To explore the effects of external representations on fraction understanding we designed a training experiment comparing the effects of pies and number lines. The participants in the experimental groups took three training sessions where they had to pair or create external and symbolic representations for fractions. The sessions were designed based on the explanatory frameworks for the development of the fraction concept described by Stafylidou and Vosniadou, (2004). The results show that the participants who trained using the number line had significantly better learning gains than the control group. The pie external representation enhanced the interpretation of fractions as part-whole relationship. The number line external representation enhanced both the interpretation of fractions as part-whole relationship and as a measure and it also promoted the understanding of fraction equivalence.

References

Stafylidou, S., & Vosniadou, S. (2004). The development of students' understanding of the numerical value of fractions. In L. Verschaffel, S. Vosniadou (Eds.), *Conceptual change in mathematics learning and teaching*, Special Issue of *Learning and instruction* 14, 5, (pp. 503–518).