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Children's constructions of a sample space with respect to the law of large numbers.
Chernoff, Egan J. (ed.) et al., Probabilistic thinking. Presenting plural perspectives. Dordrecht: Springer (ISBN 978-94-007-7154-3/hbk; 978-94-007-7155-0/ebook). Advances in Mathematics Education, 599-612 (2014).

Summary: The chapter describes how children use an expressive microworld to articulate ideas about how to make a game seem fair or not with the use of randomness. An open computer game was designed for children to express understanding of randomness as formal conjectures, so that they were able to examine the consequences of their understanding. The study investigates how 23 children, aged between $5\frac{6}{12}$ and 8 years, engaged in constructing a crucial part of a mechanism for a fair or not spatial lottery machine (microworld). In particular, the children tried to construct a fair game given a situation in which the key elements happened randomly. The children could select objects, determine their properties, and arrange their spatial layout in the machine. The study is based on task-based interviewing of children who were interacting with the computer game. The findings identify children's initial meanings for expressing stochastic phenomena and describe how the computer tool-based game helped shift children's attempts to understand randomness from looking for ways to control random behaviour, towards looking for ways to control events. Evidence is presented that the children constructed a set of situated abstractions for ideas such as the law of large numbers. The computer game offered children the opportunity to make their own constructions of a sample space and distribution. The children used spontaneously five distinct strategies to express the idea that their construction could only be judged with respect to a large number of trials. It is apparent that the game provided children the opportunity to express the idea that stability can come from increasing outcomes with different strategies.

Classification: K50 U70
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