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Perceiving permutations as distinct outcomes: the accommodation of a complex knowledge system.

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Summary: There is ample evidence that reasoning about stochastic phenomena is often subject to systematic bias even after instruction. Few studies have examined the detailed learning processes involved in learning probability. This paper examines a case study drawn from a large corpus of data collected as part of a research project that dealt with the construction of knowledge of probability at the junior high level while working on specifically designed activities. We discuss the dynamic construction of knowledge of a student who, while working on the task with a fellow student, learned to correctly predict the probability of getting a particular event in a two-dimensional sample space, although his initial intuitive take on the situation clearly conflicted with mathematical theory and empirical evidence. The student's learning is analyzed from the knowledge in pieces (KiP) epistemological perspective. We identify key knowledge elements, extend the Piagetian notion of accommodation through the activation and deactivation of these knowledge elements, and discuss the accommodation of a particular knowledge system that informs the perception of real-world situations as instances of a simple event in probability theory.

Classification: K53 E53 C33

Keywords: probability; reasoning; conceptual change; knowledge in pieces; secondary school

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