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Making sense of stochastic variation and causality in a virtual environment.

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Summary: This paper presents a case study of students (age 14–15) as they attempt to make sense of distribution, adopting a range of causal meanings for the variation observed in the animated computer display and in the graphs generated by a basketball simulation. The student activity is analysed through dimensions of complex causality. The results indicate support for our conjecture that the computer simulation can offer new ways for harnessing causality to facilitate students' meaning making for variation in distributions of data. In order to bridge the deterministic and the stochastic, the students transfer agency to active representations of distributional parameters, such as average and spread. This study finds that, whereas the stochastic is often seen as a distinct domain of knowledge, some students are able to exploit deterministic meanings to account for variation in terms of probabilistic causality.

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