

ZMATH 2014d.00827

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Levels of probabilistic reasoning of high school students about binomial problems.

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, 581-597 (2014).

Summary: In this chapter, some aspects of the process in which students come to know and use the binomial probability formula are described. In the context of a common high school probability and statistics course, a test of eight problems was designed to explore the performance of students in binomial situations. To investigate the influence of instruction to overcome some common cognitive bias or their persistency, the first three problems are formulated in a way that may induce bias. Each one is structurally equivalent to another problem phrased to avoid any bias that was included in the test. Also, the second and third problems were administered before and after the course to assess the changes produced by instruction. A hierarchy of reasoning, designed in a previous study, was adapted and used to classify the answers of the students in different levels of reasoning. The classification of these answers points out that the components of knowledge, the classical definition of probability, the rule of product of probabilities, combinations, and the binomial probability formula, are indicators of transitions between levels. The influence of the phrasing of the problems is strong before instruction, but weak after it.

Classification: K64 K54 E54

Keywords: hierarchy; SOLO levels; probabilistic reasoning; binomial distribution

doi:10.1007/978-94-007-7155-0_31