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**Jan, Irma; Amit, Miriam**

**A four phase model for predicting the probabilistic situation of compound events.**

Paditz, Ludwig (ed.) et al., Proceedings of the 10th international conference “Models in Developing Mathematics Education”, Dresden, Saxony, Germany, September 11–17, 2009. Dresden: Hochschule für Technik und Wirtschaft (ISBN 83-919465-9-2). 267-271 (2009).

Summary: This paper presents an innovative construction of a probabilistic model for predicting chance situations. It describes the construction of a four phase model, derived from an intense qualitative analysis of the written responses of 94 mathematically talented middle school students to the probabilistic compound event problem: “How many doubles are expected when rolling two dice fifty times?” We found that the students’ comprehension process of compound event situations can be broken down into a four phase model: beliefs, subjective estimations, chance estimations and probabilistic calculations. The paper focuses on the development of the model over the course of the experiment, identifying the process the students underwent as they attempted to answer the question. We explain each phase as it was reflected in the students’ rationalizations. All phases, including their definitions and students’ citations, will be presented in the paper. While not every student necessarily goes through all four phases, an awareness and understanding of them all allows for efficient, effective intervention during the learning process. We found that guidance and learning intervention helped shorten the preliminary phases, leading to more relative time spent on probabilistic calculations.

*Classification:* K53 C73 D53 M13

*Keywords:* probability; problem-solving strategies