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Is problem posing a tool for identifying and developing mathematical creativity?

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Summary: The mathematical creativity of fourth to sixth graders, high achievers in mathematics, is studied in relation to their problem-posing abilities. The study reveals that in problem-posing situations, mathematically high achievers develop cognitive frames that make them cautious in changing the parameters of their posed problems, even when they make interesting generalizations. These students display a kind of cognitive flexibility that seems mathematically specialized, which emerges from gradual and controlled changes in cognitive framing. More precisely, in a problem-posing context, students' mathematical creativity manifests itself through a process of abstraction-generalization based on small, incremental changes of parameters, in order to achieve synthesis and simplification. This approach results from a tension between the students' tendency to maintain a built-in cognitive frame, and the possibility to overcome it, which is constrained by their need to devise mathematical problems that are coherent and consistent.

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