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Connecting mathematical creativity to mathematical ability.

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Summary: This study aims to investigate whether there is a relationship between mathematical ability and mathematical creativity, and to examine the structure of this relationship. Furthermore, in order to validate the relationship between the two constructs, we will trace groups of students that differ across mathematical ability and investigate the relationships amongst these students' performance on a mathematical ability test and the components of mathematical creativity. Data were collected by administering two tests, a mathematical ability and a mathematical creativity test, to 359 elementary school students. Mathematical ability was considered as a multidimensional construct, including quantitative ability (number sense and pre-algebraic reasoning), causal ability (examination of cause-effect relations), spatial ability (paper folding, perspective and spatial rotation abilities), qualitative ability (processing of similarity and difference relations) and inductive/deductive ability. Mathematical creativity was defined as a domain-specific characteristic, enabling individuals to be characterized by fluency, flexibility and originality in the domain of mathematics. The data analysis revealed that there is a positive correlation between mathematical creativity and mathematical ability. Moreover, confirmatory factor analysis suggested that mathematical creativity is a subcomponent of mathematical ability. Further, latent class analysis showed that three different categories of students can be identified varying in mathematical ability. These groups of students varying in mathematical ability also reflected three categories of students varying in mathematical creativity.

Classification: C40 C30
Keywords: mathematical creativity; mathematical ability; alternative models; fluency; flexibility; originality
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