STATE AND TRAIT MATH ANXIETIES: PERFORMANCE-INHIBITING PREDICTORS OF MATH ACHIEVEMENT?

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This study investigated math anxiety (MA) during the transition from primary to secondary school. Currently, very disparate findings exist for these school years, which can be explained, amongst others, by inconsistent definitions and different operationalizations of math anxiety. The study aims at contributing to the definition of terms. For this purpose, questionnaires on the basis of the psychological state-trait-anxiety model were used. State-MA (s-MA) is a temporarily and situation-related anxiety reaction, which is associated with an increased arousal of the autonomic nervous system. Trait-MA (t-MA) as a personality trait includes an acquired and relatively enduring disposition of an individual. In the present research t-MA (MAQ 4-5), s-MA (KAT-III), test anxiety (PHOKI), attitudes towards mathematics, self-rating of math skills (all MAQ 4-5) and math achievement (basic number skill test) of 1,179 students (48.6% girls) from grades 4 and 5 were assessed in total. In both grades there exists a negative correlation between s-MA and math achievement, even when controlling for test anxiety. Like in previous surveys on t-MA, no significant negative correlation was found. Actually, when examining different t-MA expressions, a performance-enhancing effect could be observed. T-MA and s-MA were closely related. 30.5% of all children experienced s-MA, 17.3% showed t-MA. 7.2% had both MA-types (s-MA and t-MA). Children with s-MA and children with both MA-types showed much poorer performances than children with only t-MA or no MA. Additionally, children with both MA-types had much lower self-ratings and attitudes than children with only s-MA, t-MA or no MA. Significant predictors for math difficulties during the transition from primary to secondary school are self-rating, s-MA and IQ. These findings underline the complexity of the relationship between MA and math performance. In primary school, children already experience s-MA, which directly influences their math performance in a negative way. Perhaps no relatively enduring t-MA-disposition has developed at this point. This specific t-MA would be developed by often experiencing s-MA and would cause individuals to perceive a variety of math situations as potentially dangerous. As a reaction, more s-MA would appear, which influences math performance negatively and has strong negative consequence for attitudes and self-rating. On the other hand, some trait-anxious students seem to perform well. They do not experience math anxiety reactions (s-MA). Their fear of failure (t-MA) has a performance-enhancing effect. The findings highlight the benefit of the state-trait-anxiety model for research on MA. The differentiation between these two anxiety types seems to be one reason for inconsistent findings in math anxiety research and might initiate fruitful further investigation. As a consequence, all research results need to be interpreted under the consideration of the operationalization.