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The role of metacognitive monitoring in explaining differences in mathematics achievement.

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Summary: The relationship between practised monitoring activities and performance, especially in mathematics was examined within three nested studies. The first study deals with problems of faulty term rewritings submitted to three groups of subjects-10th to 13th graders, differing in their mathematical performance-whose task was to find the mistakes. Moreover, a questionnaire on the practice and appreciation of monitoring activities was developed. The third study, first, repeats the first study with a similar population and secondly adds interviews with some of the subjects while solving additional items concerning faulty term rewritings. Studies 1 and 3 show similar success in finding mistakes and in the replies to the questionnaire within the various groups. Furthermore, the third study points up that the subject's answers do neither predict the practised monitoring nor the success in the test. However, the success correlates significantly with the practised monitoring. For a deeper understanding concerning the role of metacognition in explaining performance, the second study examined two of the groups who had already been involved in the first study. These were assigned some problems of a matrices test as used in cognitive psychology. While trying to solve the problem, their eye movements were recorded by means of an eye-tracker. Afterwards they had to justify their solutions in an interview. The eye movements were analysed, the verbal comments classified. Again, the groups differ in their problem solving success, dependant on the quality of the monitoring practised. Altogether, the results of the three studies elucidate the importance of practised metacognitive monitoring activities not only for success in school algebra, but furthermore the ability and the willingness to do it is deeper anchored in a person than just a trained behaviour for school algebra.

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