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Taking away and determining the difference - a longitudinal perspective on two models of subtraction and the inverse relation to addition.

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Summary: Subtraction can be understood by two basic models-taking away (ta) and determining the difference (dd) - and by its inverse relation to addition. Epistemological analyses and empirical examples show that the two models are not relevant only in single-digit arithmetic. As curricula should be developed in a longitudinal perspective on mathematics learning processes, the article highlights some exemplary steps in which the inverse relation is discussed in light of the two models, namely mental subtraction, the standard algorithms for subtraction, negative numbers and manipulations for solving algebraic equations. For each step, the article presents educational considerations for fostering a flexible use of the two models as well as of the inverse relation between subtraction and addition. In each section, a mathe-didactical analysis is conducted, empirical results from literature as well as from our own case studies are presented and consequences for teaching are sketched.

Classification: F32 D52 D42 C32

Keywords: models of subtraction; inverse relation; arithmetic and algebra; mental arithmetic; standard algorithms; negative numbers; algebraic equations; taking away; determining the difference; educational research

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