Semantic types of an anchored addition and subtraction[1]

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The poster will be split into six main sections: illustrations of fundamental terms; definitions; tasks; student's solutions; examples; didactic applications of theoretical ideas.

As a continuation of G. H. Littler's poster about semantic types of numbers (Ad = address, St = state, Co = comparison, Ch = change) the most frequent semantic types of the addition and the subtraction are discussed:

Type	E x a m p l e
St + Ch	I had 10 Kč. I found 5 Kč. How many Kč do I have now?
St – Ch	I had 10 Kč. I lost 5 Kč. How many Kč do I have now?
St + Co	Ed is 124 cm high, Eva is 3 cm higher. How tall is Eva?
St – Co	Ed is 124 cm high, Eva is 3 cm lower. How tall is Eva?
St + St	Here you see 5 girls and 4 boys. How many children are here?
St – St	Here are 9 children. 5 of them are girls. How many boys are here?

We asked pupils to indicate the semantic inverse of these cases. There were no problems with the issues St ± Ch and St ± Co, since words *to lose* and *to find* as well as *higher* and *lower* have been identified as opposite by all pupils. However the issue St ± St was a difficulty. The most frequent opposite to *put together* was identified as *to part the whole* or *do not touch it.* And the most frequent opposite to *take the complement* was identified either *take the whole* or *take the starting part* or *do not take the complement.*

Consequence. To be prepared to grasp the idea of subtraction a child has to be familiar with cases St + Ch and St + Co. If the majority of his/her semantic experiences with the addition is of the type St + St a child is not well prepared to understand subtraction.

Types Ad ± Co (I live on the 5rd floor and Fred lives 2 floors above/below. On what floor does Fred live?) or Ad ± Ch (Our family moved from the 5rd floor 2 floors up/ down. On what floor do we live now?) are of the same difficulty as St ± Ch and St ± Co. A child must to meet these cases as well.

More demanding are types Co ± Co and Ch ± Ch (Ann is 2 years older than Bert and he is 1 year older than Cindy. How many years is Cindy older than Ann?) Here some children ask for the starting state (the age of Ann). Even more demanding are the cases Co ± Ch and Ch ± Co (During the last year Mark grew 4 cm taller. Now he is 1 cm shorter than the table. How many cm was Mark shorter than the table before?)

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