

STUDENTS' PERCEPTIONS OF BRACKETS

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Brackets are essential elements to define a structure in mathematical expressions. Moreover, it is well documented that students' problems with arithmetic calculations are mainly connected to the structure of expressions (Blando, Kelly, Schneider & Sleeman, 1989). Students tend to focus on the numbers, detaching them from the operations (Linchevski & Livneh, 1999). But, brackets in themselves are not easily interpreted (Kieran, 1979), and the use of superfluous brackets may impede the development of a structure sense (Gunnarsson, Hernell & Sönerhed, 2012). However, in previous research the full spectrum of students' problems with brackets has not been described in detail.

Our research aim is therefore to analyse the perceptions of a large number of students of the bracket as a symbol and as a structure element. In particular, we would like to answer the questions "how do students perceive the bracket as a symbol in mathematical expressions?" and "how do students structure their calculations using brackets?". The sample was 84 eighth grade students (age 14-15) in eight classes in four different schools. Data was collected by a questionnaire containing 10 questions/problems asking the student to describe or handle, in total, 35 different arithmetic expressions. The findings suggest that the students have qualitatively different perceptions of what a bracket is. In short, the word 'bracket' was interpreted as either a single arch or as a pair with or without content. But in mathematical expressions the pair could be formed in new ways embracing e.g. another single bracket-arch or an equal sign. Moreover, the students could spontaneously use superfluous (useless) brackets and insert incorrect brackets to detach numbers from operations. In the presentation, the different perceptions observed in the sample will be described in detail and by examples from the students.

References

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