Assessing young children’s experimentation abilities

Joep van der Graaf, Eliane Segers, Ludo Verhoeven

Behavioural Science Institute, Radboud University, Nijmegen, The Netherlands

Abstract
Teaching how to do science is getting more and more attention in science education. While there have been studies on how to design experiments, the children at the start of education have been ignored, namely the kindergartners, who are four to six years old. Therefore, we studied experimentation abilities in kindergartners. The ramp task introduced by Chen and Klahr (1999) was adapted to assess the use of the Control of Variables Strategy (CVS). The CVS states that when there are multiple variables and you want to study one of them, you should control all variables (by keeping them constant) and manipulate only the variable in which you are interested. In this task, children can set up experiments with two wooden ramps, which each have four dichotomous variables. The task for the children is to investigate a single variable. We introduced two important new aspects to the task procedure: dynamic feedback and a gradual built-up in difficulty. To validate this assessment, Mokken Scale Analysis (MSA; Mokken, 1971) was used. It allowed us to scale the children according to their skill in using CVS and to scale the levels according to their difficulty. In this talk, I will discuss the properties of the task and the results of the MSA. Subsequently, I will discuss why we chose MSA and the difficulties I experienced in conducting the MSA.