

BAR-ILAN UNIVERSITY

The Effects of Intervention for Classification on Classification, Verbal  
Conceptualization and Analogical Reasoning in Children with Developmental and  
Language Delays

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## **Abstract**

To prepare young children for the challenges of a rapidly changing world, the education systems in Israel are placing an even greater emphasis on developing children's thinking, learning and lingual skills.

The main objective of this study is to examine the effects of the Bright Start program (Haywood, Brooks, & Burns 1992), focusing on intervention for developing classification skills on children's cognitive modifiability of: classification skills, verbal conceptualization and analogical reasoning. These three cognitive domains may be conceptualized to represent near transfer, medium transfer, and far transfer areas, respectively. According to the literature, these abilities are crucial for the acquisition of thinking abilities in general, and in language acquisition particularly, especially among children with developmental and language delays.

In the evolving literature, there are many approaches regarding the relationship between language and cognitive development. While language acquisition takes place, children rely on existing knowledge. Clark (2004) who examined the spatial activity of children, in the absence of relevant relation concepts, found that children use existing conceptual categories for perceiving the meaning of new words and for the construction of the relevant conceptual language. He claims that they construct their own language based on the categories that they have already acquired. Goldstone and Hendrickson (2010) present evidence of neuro-plasticity due to category learning, and it is likely that categorization has an effect on the relatively low-level perception of elementary visual features, mid-level shape recognition and late processes involved with language, object-to-label associations, and decision-making. Furthermore it has been found that language forms a positive feedback

system interplay with cognition and that this interplay creates an intense drive, which promotes the individuals' learning ability (Gentner & Christie, 2010). Similarly, Goldwater, Tomlinson, Echols, & Love (2011) examined the relationship between analogical thinking ability and language among children between the ages of 4 and 5. They found that children generate analogies from pre-linguistic expressions in order to generate new expressions.

The current study is comprised of 94 kindergarten children with developmental-language delays, aged 4-6 years, enrolled in special education kindergartens. The children were randomly assigned to an experimental (n =45) and control (n =49) groups. The experimental group, composed of 30 boys and 15 girls, was taught the classification unit of the Bright Start program. This unit was taught along with the regular integrated thematic curriculum. The control group, composed of 35 boys and 14 girls, received only the previously used integrated thematic curriculum. Both groups were administered pre- and post-intervention tests. Three major tools were used: a) *Children's Conceptual and Perceptual Analogical Modifiability test* (CCPAM) – Closed Analogies version (Tzuriel, 2003, 2007; Tzuriel & Galinka, 2000). b) *Semantic categories subtest* from Katzenberger's (2004) test, and c) *Understanding of Essentialness* (Tzuriel & Stern, 2004).

Research expectations propose that the cognitive modifiability (i.e., improvement from pre- to post-intervention) in classification skills, verbal conceptualization and analogical reasoning would be higher in the experimental group than in the control group. Moreover, we were interested in determining whether verbal conceptualization is associated with classification skills and analogical reasoning. The findings indicate that while children from both groups improved their

scores in most of the cognitive tests from pre- to post-intervention, the experimental group showed greater improvements, thus demonstrating higher cognitive modifiability in all three cognitive domains. The control group results remained either static or showed only slight improvements. These findings support the ongoing research regarding the interplay between thinking and language (e.g., Goldberg et al., 2007, Goldstone & Hendrickson, 2010).

Research expectations were confirmed and findings are consistent with previous studies. These findings emphasize the effects of the intervention in classification on the cognitive modifiability in classification skills, verbal conceptualization and analogical reasoning and the relationships between categorization, conceptualization and analogical reasoning.