

## **Abstract**

Metaphorical language is common in everyday life. The ability to comprehend metaphorical language reflects the person's cognitive ability as well as his ability for performing abstract inferences. Previous studies examining the ability to comprehend metaphorical language among individuals with intellectual disability (ID), mainly focused on measuring this ability among individuals with William's syndrome. The current study is the first to examine the effect of two intervention programs of different depths of processing on the ability to comprehend visual and verbal metaphors in groups with ID: 53 participants with ID with non-specific etiology (NSID) and 50 participants with Down syndrome (DS) in two age groups: adolescents (CA=15-22) and adults (CA=25-59). The first type of intervention consisted of deep processing of the metaphorical connection between pairs of images. The second intervention consisted of shallow processing by means of rehearsal. The two intervention procedures were performed on the Metaphoric Triads Task (MTT).

The Structural Cognitive Modifiability (SCM) and Mediated Learning theories both argue that mediation assists in acquiring cognitive abilities among individuals with ID (Feuerstein, 2003; Feuerstein & Rand, 1974; Feuerstein, Rand, & Hoffman, 1979; Rand, Feuerstein, Tannenbaum, Jensen, & Hoffman, 1997). According to our hypothesis, both types of interventions will improve the participant's ability of comprehending metaphorical language. As expected, following the intervention, an improvement was found among both intervention groups. Furthermore, a greater improvement was found among participants who underwent the deep processing intervention program as compared to the shallow one. This improvement was reflected by increased metaphorical comprehension, learning, and generalization abilities. These findings suggest that deeper processing with multiple levels and manipulation on information, leads to profounder storage and leaves stronger traces in the Long Term Memory (LTM), including in population with ID (Lifshitz, Weiss, Tzuriel, & Tzemach, 2011).

In addition, the present study examined whether there are significant differences in the levels of comprehension, learning, and generalization of visual and verbal metaphors between the two etiology

groups. The findings were mixed. The two etiology groups that underwent the deep processing procedure did not differ in the level of comprehension and learning abilities. Furthermore, the two etiology groups that underwent the shallow processing procedure differed significantly in the level of learning ability, resulting in significant better performance in the DS group as compared with the NSID group. However, the generalization and conventional metaphors comprehension abilities were significantly higher among the NSID group as compared to the DS one.

The study also examined whether there are differences between the two age groups in comprehension, learning, and generalization of visual and verbal metaphors. We hypothesized that the adult group of both etiologies would benefit from the intervention programs equally to the adolescent group. This hypothesis was confirmed. It was found that adults' comprehension and learning abilities were similar to the adolescents'. These findings are consistent with the Compensatory Age Theory (CAT), suggesting that maturity and life experience in adults with ID enables them to efficiently absorb materials similarly or even better than adolescents (Lifshitz, in press). In contrast, the generalization ability of the adolescent group that underwent deep processing was significantly greater than this ability among the adult group.

Finally, we examined the contribution of linguistic, executive functions and analogical abilities on the level of comprehension, learning and generalization of visual and verbal metaphors. The research findings show a positive effect of those cognitive abilities on the level of understanding, learning and generalization. This effect varies among the two etiology groups due to their different cognitive profile characteristics.

In summary, the current study leads to the conclusion that individuals with ID from both etiologies and age groups are able to improve their abilities, even so in tasks that require fluid thinking abilities, which involve abstract reasoning and higher-order inference processing. Furthermore, individuals with ID with a lower mental age and cognitive level have greater room for improving their learning and modifiability abilities as compared to individuals with a higher mental age and cognitive level.