Abstract

Reading comprehension is one of the most important skills that students must acquire during their school years, and is the basis of every learning process. One of the main strategies that supports informational text comprehension is text structure instruction, through which readers learn to identify different types of text structures (e.g., comparative), and to organize the ideas appearing in the text by their importance based on the structure identified (Meyer & Freedle,1984). Over the years many intervention studies have been conducted to teach structural strategies (Meyer & Ray, 2011). But those studies focused on teaching procedural knowledge ("How") relating to the steps of action required for identifying text structure and processing the text according to that structure. Nevertheless, researchers have claimed that procedural knowledge is not always adequate, since application of each strategy depends on text and reading task features (Brown, 1978; Kuhn, 1999; Schraw & Moshman, 1995; Zohar, 2007). Therefore, aside from procedural knowledge the reader is required to develop deep comprehension of the task and the strategy in order to choose the most appropriate action in varied situations (Kuhn, 1999). In other words, the reader must develop *meta-strategic* understanding about the acquired strategies and to apply them to texts and various reading tasks.

In this study we developed an intervention program that combines meta-strategic components in teaching text structural strategies. Intervention studies done in the area of mathematical thinking and life sciences have shown that instruction which includes meta-strategic components develops students' application and transferability capabilities (Zohar & Barzilai, 2013). In this instruction, students develop knowledge regarding strategy, together with knowledge about the task and coordination between the two types of information, so that the learner is able to coordinate between the task attributes and the strategy required to solve it (Khun, 1999). A few studies of this type have been done in the area of reading comprehension

in verbal-based content-specific areas (Pressley et al., 1992), and those that have been carried out were done in the framework of small learning groups of lower grades, and with narrative texts.

In the present study we examined the influence of meta-strategic learning on achievements in reading comprehension among middle school students. Furthermore, we examined the importance of behavioral involvement of the student in structuring meta-strategic knowledge, since acquiring meta-strategic knowledge requires the student to carry out high-level thinking exercises, to provide answers to meta-cognitive questions and to get experience in thinking tasks. To that end, an intervention program was carried out in which 163 eighth graders participated from different middle schools in central Israel. This sample was divided into 4 intervention classes and two control classes. The intervention was administered by the investigators over a course of 9 weeks in a double session classes. During the intervention three different structural strategies were taught (comparison, cause and result, generalization and detail) in three different content areas (history, science and civics) using two different teaching methods – through meta-strategic mediated structuring and by strategic direct instruction. In the first intervention group, the strategies were learned accompanied by verbalizing the students' thought processes with the help of mediating questions (When, Why and How). Knowledge regarding the strategy was constructed actively by the student, while encouraging dialogue between the teacher and the class (Ben-david & Zohar, 2009). In the second intervention, group class instruction focused on the "How" component, by applying the strategy through its different stages. The teacher's role was to impart knowledge to the students in an organized and orderly fashion, by demonstrating the strategy with the text and the task in the same lesson (Adams & Engelmann, 1996). Before carrying out the intervention, all participants were tested on two tasks of reading comprehension of informative texts and a meta-strategic knowledge questionnaire. During the intervention, students' behavior was recorded

on video. Each class was recorded for two full lessons, after which the videos were coded according to a four-level involvement scale (Barber, Gallagher, Smith, Buehl & Beck, 2016).

Research results showed that students could learn structural strategies through different teaching techniques and benefit from them. The two intervention groups showed significant improvement in performing reading comprehension tasks and a meta-strategic questionnaire after intervention, as compared to pre-intervention performance; in the control groups no improvement was found. Nevertheless, by comparison with the strategic knowledge explicit instruction group, the meta-strategic knowledge structuring group showed greater spontaneous use of the different strategies learned during the intervention (such as marking cue-words and use of a diagram) during the reading comprehension task. Similarly, we found that there is a positive correlation between high involvement in tasks and discussions and students' learning outcomes after intervention. Students involved in the conditions of meta-strategic knowledge structuring benefited more than their friends, who were less involved in the intervention program.

This study suggests that students can benefit from different teaching methods and improve their achievements as a result of attaining structure strategies, when these interventions include a combination of reading and writing assignments as well as continued exercise and training. Furthermore, the study suggests that the level of a student's involvement is greatly influenced by the teaching methods applied in class. Teaching methods that support structuring of meta-strategic knowledge enable the student to participate actively and meaningfully in learning. Therefore, it is not sufficient to teach the different operations of a strategy. Thinking must be encouraged about a strategy's essence and the reasons for using it. These findings have important implications for development of interventions in the language area.