

## Summary

The aim of the present study was to test how executive functions and language affect reading comprehension of children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Sixty-eight participants were assigned into one of four groups: With/without ADHD, young age group (4<sup>th</sup>-5<sup>th</sup> graders) and adolescents (8<sup>th</sup>-9<sup>th</sup> graders). Their performance was evaluated on three areas – executive functions, language (lexicon, morphology, and syntax), and reading comprehension.

As expected, significant differences were found between the groups on executive functions tests: ‘ADHD group’ demonstrated lower ability in working memory, cognitive flexibility (both on performance tests and on parent-reported questionnaires), and inhibitory response (based on parent-reported questionnaires). These differences were found in the two age groups. Note that participants were not under ADHD medication when taking these tests.

Language evaluation yielded a surprising result in the adolescents group – while there were no significant differences between the ADHD group/and the no ADHD group, at the younger age (except for one test of lexicon comprehension), in the adolescents group, we found significant differences in tests of lexicon comprehension, morphological production, and syntactic awareness. This means that ADHD group exhibited lower grades on the language abilities tested. Since medication (for attention) could improve performance, the ADHD group, took these tests without medication.

The ADHD group also had lower grades in reading comprehension. Having analyzed their abilities, we realized that they originated from difficulties in text structure, locating information

mentioned in the text, inferencing, and irony and analogy comprehension. Regardless, they could still make sense of discourse topics, and enjoy irony and analogy.

Half of the texts, designed to evaluate reading comprehension, were read under medication. This attentional treatment, for the ADHD group, had distinct effect – participants had higher grades (in comparison to the non-medicated condition); they finished the session quickly and improved their irony and analogy understanding.

The adolescent group, performed better than the younger group, in all reading comprehension measures: General reading comprehension ability, discourse topic identification, text structure, and locating information mentioned. Only inference making was not out-performed by the older group.

Expository texts are the major school-based learning, and students get familiar with that genre after having basic reading skills. In Israel, it usually happens at the 3<sup>rd</sup>-4<sup>th</sup> grade. Since narrative texts are more prevalent in younger kids' environment, it may be the case that older age children are more experienced with expository texts, and can better understand them (compared to the younger kids). Another explanation could be working memory and processing speed. As kids grow older, working memory and processing speed get better, resulting in better high – level cognitive and reading comprehension abilities.

There are two major differences between age groups. First, older participants took more 'remedial teaching' lessons, than younger ones (70% and 30%, respectively). It may also be the case that these lessons gave the older participants more experience with expository texts. Secondly, more participants at the older age group use medication on a regular basis. This means, they were treated in a holistic approach – both medically and pedagogically.

The adolescent group performed better than the young group. Their superiority could be explained by: (1) medication, (2) remedial teaching, or (3) familiarity with expository texts.

Our findings stress the complexity of reading comprehension processes alongside influence of different factors on those processes; ADHD, age, and medication, but also text structure, length and complexity – all contribute to reading comprehension.

Addressing factors affecting reading comprehension, executive functions, and language abilities, as well as age and medication, we offered an explanation for the differences between ADHD vs. no-ADHD performance. Our research stresses the importance of a holistic approach to treating ADHD alongside the experience with expository texts practices.

The results have also both, educational and therapeutic implications.