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Visual search task estimation in Latvian school - age children

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Visual search is often used to study many topics, such as attention and oculomotor control to memory (Eckstein, 2011). What is more, reading supports different levels of language, visual process and working memory, attention, motor movement and even cognition (Norton & Wolf, 2012). These elements become accurate and rapid while our reading skills develop, and our reading becomes automated. In order to understand if there are any age differences in visual search task performance and how does reading speed affect the result, we analysed data from 126 school-age children (68 male, 58 female, age 6-13 years) who were enrolled in vision screening in Latvia. We used paper test version for reading assessment and visual search task. Although head movements were aloud, finger dragging across the text was forbidden. Tests were held at a comfortable distance - 30 or 40 cm. We recorded reading speed and reaction time for visual search task using chronometer. Errors were recorded on a separate sheet of paper. As for the reading text, children were instructed to read it out loud and remember what they read. We tested understanding of the text by asking two questions from it. Visual search task consisted of 14 pt square letters C (gap on the top, down, left, right). School - age children memorized the first letter's direction and counted all the letters in the same direction as fast as they could. When they completed the task, they were instructed to say the number of targets out loud. Every child was introduced with the task by searching through 25 elements (3 of them were targets). The main task consisted of 100 elements (depending on the test card 11, 12 or 13 of them were targets). Results demonstrated that reaction time for visual search task decreases with age (ANOVA, $p < 0.01$). Average time per one element in a visual search task was 0.68 ± 0.19 seconds at the age of 6 and decreased evenly to 0.29 ± 0.02 seconds at the age of 13. Children made overall 2 errors during the visual search task. Some of them counted even more targets than were actually present. Accuracy of the visual search task performance did not depend on child's age (ANOVA, $p > 0.05$) but rather on individual differences. It should be noted that one person did not understand the visual search task even after five times of explaining. Only one child reported problem remembering the exact number of items due to someone talking behind him, what could be an indicator to attention or working memory deficiency. Similarly to the visual search task, where more targets were found in shorter amount of time, reading speed increased with age (ANOVA, $p < 0.01$). Therefore, more words were red in shorter amount of time. Despite that, reading speed had a weak positive correlation ($r = 0.4$) with reaction time of the visual search task.