

VISUAL ATTENTION IN SCHOOL – AGE CHILDREN

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Introduction

Visual search is often used to study attention, although different stimuli can be used [1, 2]. Baranov-Krylov et al. have demonstrated that attention system appear to mature completely by the age of fifteen [3], though they test only five, seven and fifteen years old children. Nevertheless, they propose that larger number of false alarms in a visual search could reveal deficiency of inhibitory processes, whereas larger number of misses could demonstrate weakness of selective attention. As far as paper-based and computer-based version of a test demands different visual load, it is essential to understand it's possible effect on attention and visual search task.

Methods

- Landolt square letters in four different directions (see Fig.1., Fig.2.).
- Statistical data analysis was made using OriginPro 7.0 and MS Excel.

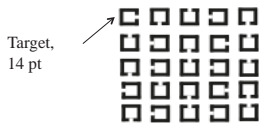


Fig.1. Introduction task.

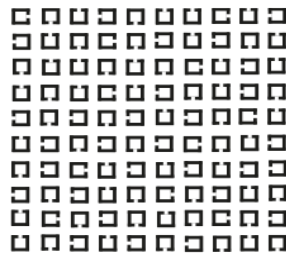
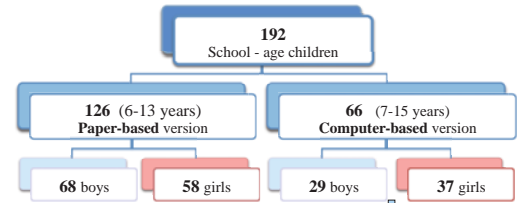


Fig.2. An example of the main task.



- 11, 12 or 13 targets in the main task.
- Test was held at 30 or 40 cm.
- Total time was recorded using chronometer.
- Head movements were allowed, finger dragging across the text was forbidden.
- Total time and number of errors were recorded.

- 24, 26 or 27 targets in the main task.
- Test was held at 40 cm.
- Total time, errors and their location was recorded in the program.

Results

	Age (years)	6	7	8	9	10	11	12	13	14	15	16	17
Paper-based version	Number of children	5	10	13	13	26	27	19	12	-	-	-	-
	Median time, seconds	66.62	47.05	43.32	43.25	34.86	30.70	30.00	28.48	-	-	-	-
	Median errors, %	18	38	15	18	15	17	15	13	-	-	-	-
	Median corrected time, seconds	56.00 ± 24.09	57.52 ± 10.85	53.86 ± 4.89	53.44 ± 15.13	46.02 ± 2.46	36.84 ± 2.10	33.00 ± 2.33	36.90 ± 4.51	-	-	-	-
Computer-based version	Number of children	0	1	12	12	9	16	7	0	1	8	1	1
	Median time, seconds	-	74.56	60.12	58.12	50.52	47.13	42.48	-	40.20	37.66	41.63	58.14
	Median errors, %	-	7	8	12	15	13	15	-	7	8	8	0
	Median corrected time, seconds	-	80.52	68.78 ± 6.38	69.6 ± 15.41	61.57 ± 4.58	51.54 ± 3.38	49.87 ± 4.59	-	43.42	39.98 ± 1.57	49.19	58.14

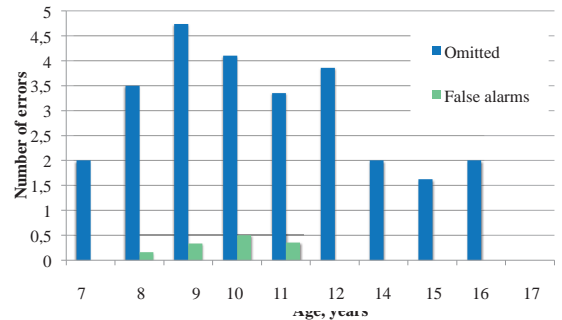


Fig.3. Average number of errors in the computer-based test for each age.

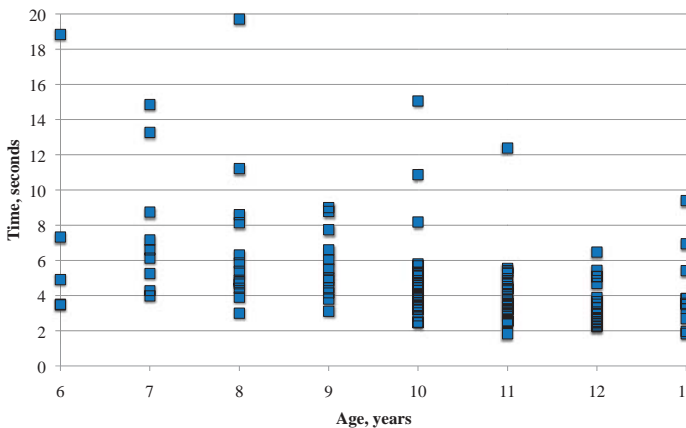


Fig.4. Corrected time per one target in the paper-based version for each age.

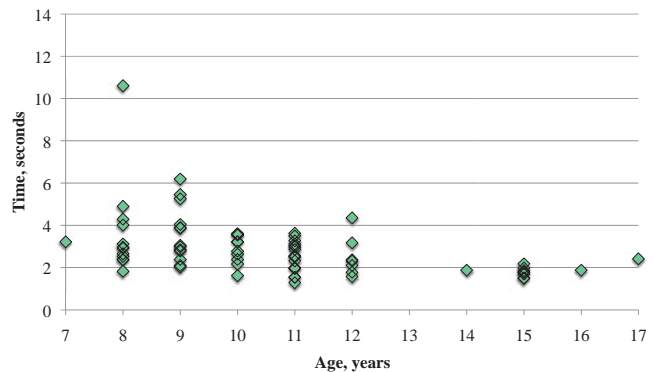


Fig.5. Corrected time per one target in the computer-based version for each age.

Conclusions

1. Visual search task performance improves with age – there are less errors and the task can be completed faster.
2. Paper-based version of a visual search is completed faster comparing with a computer-based version, although it takes more time to find one element in paper-based version of the test.
3. Number of errors do not differ significantly between paper-based and computer-based version of the test ($p > 0.05$, ANOVA).

References

- [1] Eckstein M. P., Visual search: A retrospective, Journal of Vision, 11 (5):14, pp.1-36, 2011.
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- [3] Baranov-Krylov I. N., Kuznetsova T. G. and Ratnikova V. K., Attention Parameters in Visual Search Tasks in Different Age Groups, Neuroscience and Behavioral Psychology, 39 (5), pp. 481-487, 2009.

Acknowledgements

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