



Brief Visuospatial Memory Test–Revised: Czech Normative Study in Young and Middle-Aged Adults

Filip Havlík^{1,2}, Petr Dušek¹, Robert Jech¹, Evžen Růžička¹, Ondřej Bezdíček¹

¹Department of Neurology and Center of Clinical Neuroscience, Charles University in Prague,
First Faculty of Medicine, Prague, Czech Republic

²Prague College of Psychosocial Studies, Prague, Czech Republic



Introduction

The Brief Visuospatial Memory Test-Revised (BVM-T-R) is commonly used test of declarative visuospatial memory and it is part of many test batteries¹⁻³. BVM-T-R scores are affected by demographic variables such as age, education, or gender⁴⁻⁶. Therefore, appropriate normative data should be available to allow interpretation of BVM-T-R results in accordance with published standards^{7,8}. The first normative data were included in the manual and since then several other normative values have been published for different populations^{1,4,9}. However, Czech normative data are still lacking. Due to that, the aim of this study was to present Czech normative data for use in clinical settings.

Methods

Participants:

- Non-random sampling was conducted.
- All participants underwent a medical history taking.
- 558 healthy participants aged 17 to 60 met the inclusion criteria.

Measures:

- The BVM-T-R is a test of visuo-spatial declarative memory.
- It consists of six figures located in a 2x3 matrix that should be remembered and drawn.
- Three trials and delayed recall are administered.
- Location and accuracy are scored.

Statistical analysis:

- To normalize the distribution of raw scores, the scores were transformed by cumulative frequency distribution to scaled scores (M = 10; SD = 3).
- Hierarchical linear regression was performed with predictors of age, age squared, education, gender.

Results

- The normative sample consisted of 44 % men, age ranged from 17 to 60 years (M = 32.44, SD = 12.20) and education from 9 to 26 years (M = 15.50, SD = 2.99).
- Depending on the BVM-T-R score, age explained 4.5 to 8.4 % variability, education 1.9 to 2.9 %, and gender 0.3 to 1.2 %.
- Age was significantly ($p < .05$) associated with all main BVM-T-R scores, as well as education, with the exception of learning, and gender was significantly associated with Trial 1, Trial 3, and Total scores.
- Trial 3 ($\chi^2 = 7.06$, $p = .008$) and Delayed recall ($\chi^2 = 14.77$, $p < .001$) did not meet the assumption of homoskedasticity.

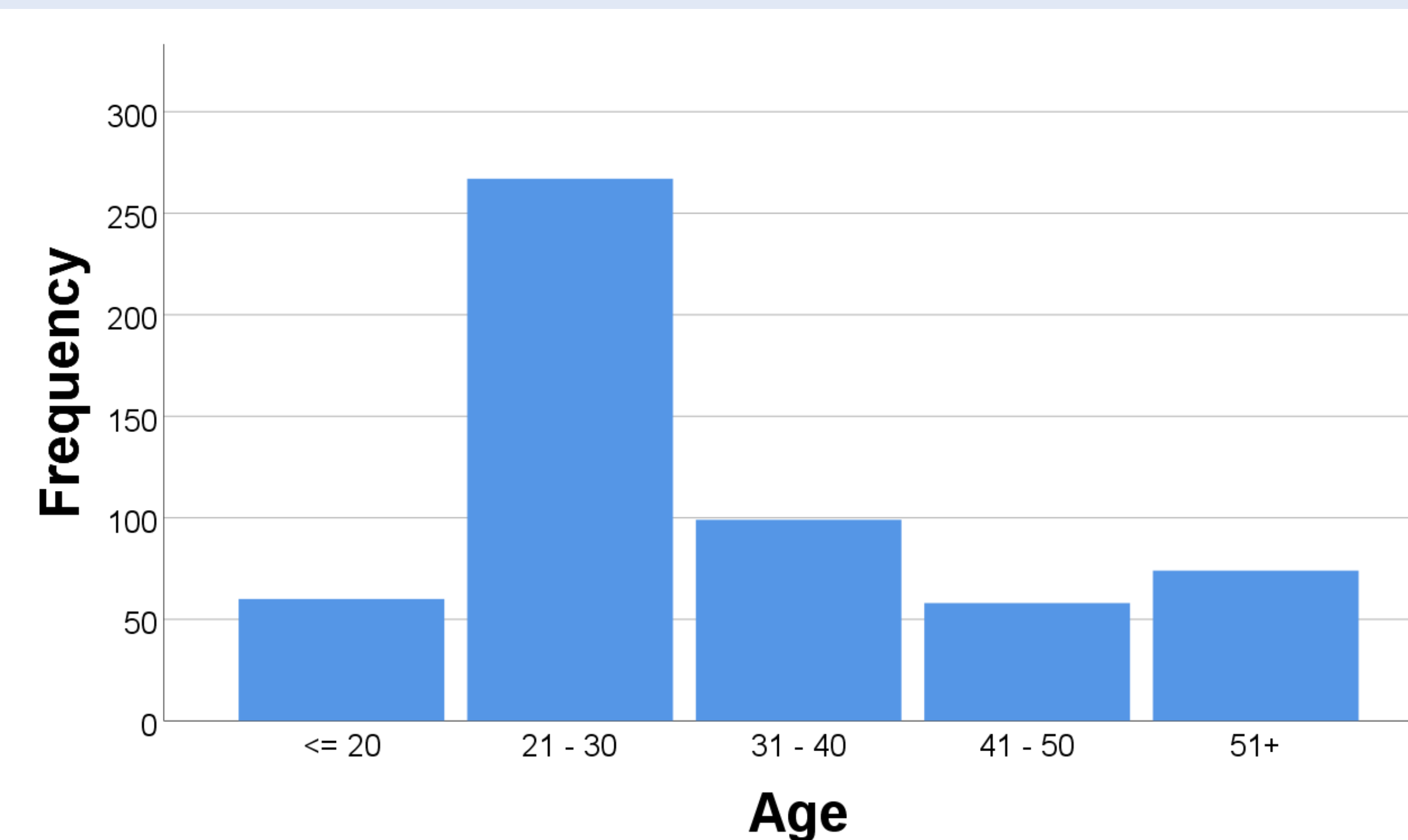


Figure 1. Number of subjects in the normative dataset divided into 10-year intervals. N = 558

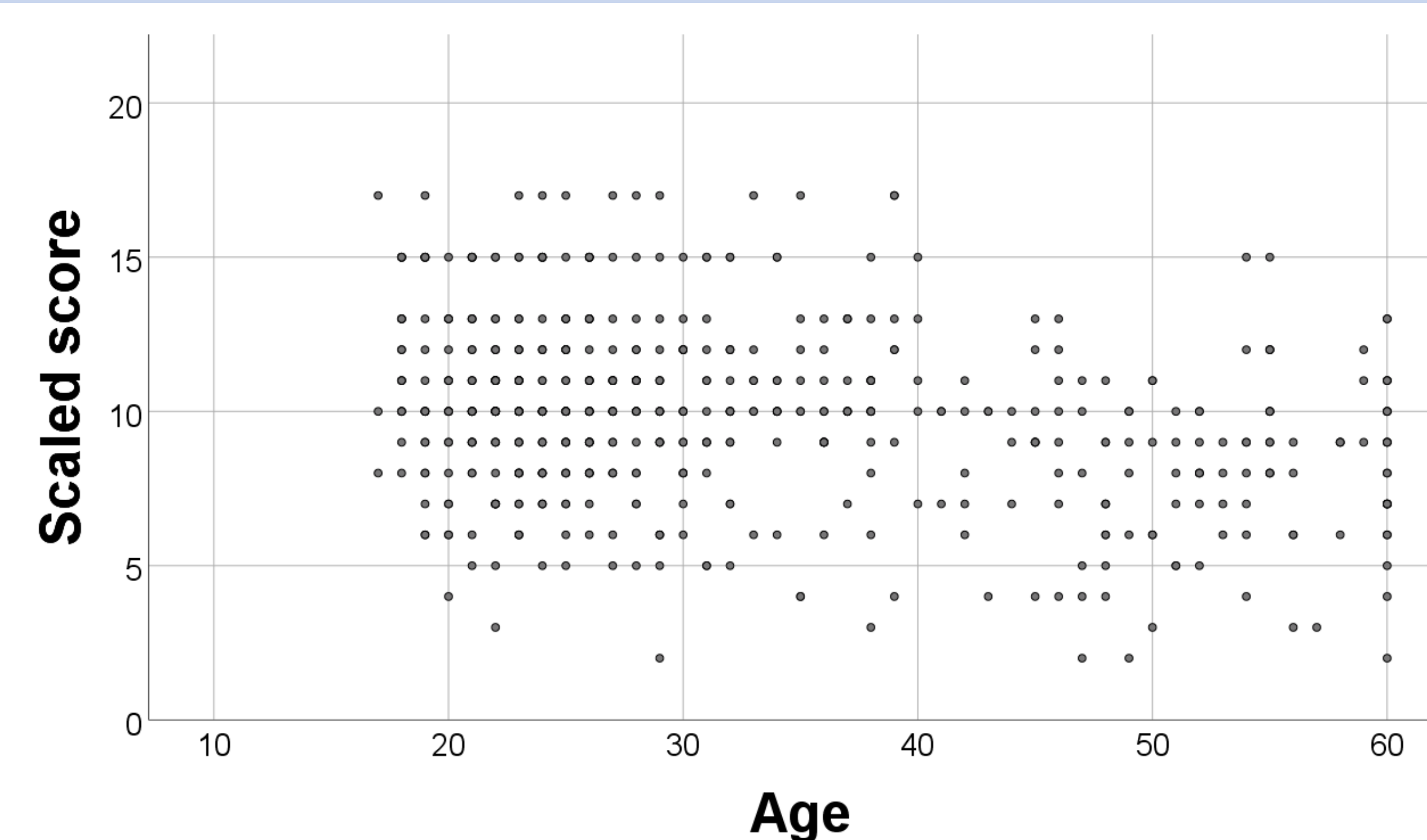


Figure 2. Association between the Total Recall in scaled scores and age in years. N = 558

Table 1. Conversion of raw scores to scaled scores

Scaled score	T1	T2	T3	Total	DR
2		0-3		0-13	
3	0-2	4	0-6	14-15	0-6
4	3	5	7	16-18	7
5	4	6-7	8	19-20	8
6	5	8	9	21-23	9
7	6		10	24-25	
8	7	9		26-27	10
9	8	10	11	28-29	
10				30-31	11
11	9	11		32	
12	10		12	33	12
13				34	
14	11	12			
15				35	
16	12				
17				36	
18					

Note. T1 = Trial 1; T2 = Trial 2; T3 = Trial 3; Total = total score across trials T1-T3; DR = delayed recall.

Table 2. Regression coefficients

	Constant	Age	Age ²	Education	Gender	R ²	SD of residuals
SS _{trial1}	10.5609	-0.14002	0.000936	0.147241	0.721203	0.109396	2.8096
SS _{trial2}	8.879102	-0.01611	-0.00055	0.13117	0.516169	0.080814	2.81688
SS _{trial3}	8.597072	-0.05218	-0.000026	0.150665	0.514015	0.104188	2.39924
SS _{total}	9.998258	-0.10288	0.000416	0.150164	0.730605	0.119974	2.74287
SS _{DR}	10.02905	-0.09274	0.000665	0.115914	0.279715	0.064765	2.34932

Note. SS = Scaled Score; DR = Delayed Recall; SD = standard deviation. Gender is coded as males = 0, females = 1 and education represents education in years.

Conclusions

- The present study provides regression-based norms for the BVM-T-R in the Czech population.
- In contrast to the original normative data¹, more subjects were involved here for the target age group (17 to 60 years), which should provide a better estimate.
- In accordance with original normative data and other studies^{1,4}, only age has a considerable impact on the BVM-T-R scores.
- Presented regression-based norms can be used for all BVM-T-R scores, but in the case of Trial 3 and Delayed recall, homoscedasticity violations should be borne in mind.

Acknowledgements

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