Working Memory and Academic Performance Among Undergraduate Students: A Cross-Sectional Study

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Introduction

Studies have proposed that working memory, the brain coordination process that temporarily stores and influences information could be a predictor for academic performance.

Aim

This study aimed to examine working memory and academic performance among undergraduate students from two different universities in the capital city of Georgia.

Materials And Methods

- This cross-sectional study involved 400 undergraduate students from both East European University and the University of Georgia (UG) in Tbilisi.
- The questionnaire contained age, gender, institution, nationality, a 5-point scale on academic performance, and working memory (storage domain, attention domain, and executive domain).
- Using statistical Package for Social Sciences (SPSS) version 26.0 software (SPSS Inc., Chicago IL, USA), frequency distribution, and descriptive analysis, Chi-square was performed.

Figure 1.0 Students Characteristics

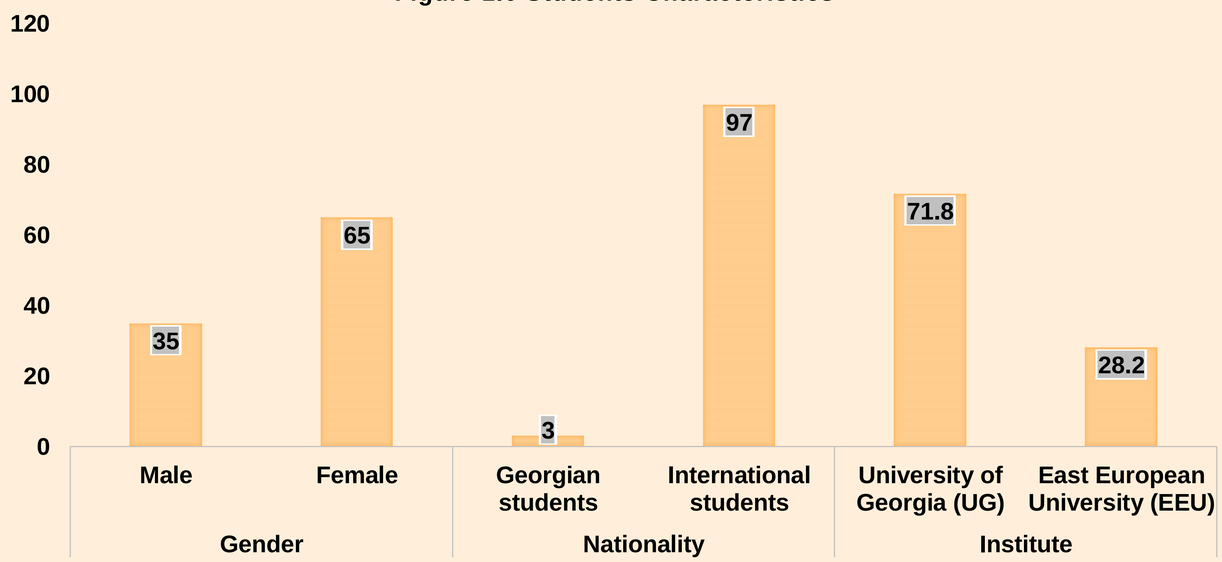
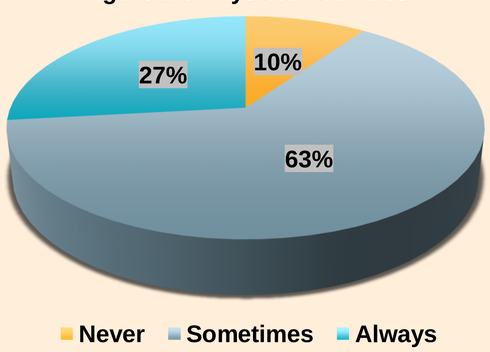


Figure 2.0 Physical Activities



Results And Discussion

From **figure 1.0,** 71.8% were from the University of Georgia with a mean age of 21.6 (SD±3.1). Most of the participants were female students and 63% **(figure 2.0)** performs physical activities. 12.3% **(Table 1.0)** of students with difficulty in retaining information in short-term memory had an increased risk of having poor academic performance (p<0.05, OR 4.662, 95% CI [1.697-12.808]). 15.8% of students who had complaints with attention domain such as distractibility, and mental slowness were at risk of poor academic achievements (p<0.05, OR 4.1, 95% CI [1.7-9.886]). 10.5% who reported difficulty in executive aspects of working memory were at risk of having academic challenges (p<0.05, OR 3.5, 95% CI [1.258-10.021]). There was no statistical significance between academic performance and other socio-demographic characteristics.

Table 1.0 Comparison between Working Memory and Academic Performance

		Academic Performance							
		Good Performance	Needs Improvement	Total	Chi-square	p-value	Odds Ratio	95% Confidence Interval	
Gender	Male	126 (36.70%)	19 (33.30%)	145	.245[a]	0.621	1.161	0.642	2.101
	Female	217 (63.30%)	38 (66.70%)	255					
Nationality	Georgian students	12 (3.50%)	1 (1.80%)	13	.473[a]	0.492	2.03	0.259	15.922
	International students	331 (96.50%)	56 (98.20%)	387					
Institute	UG	242 (70.60%)	45 (78.90%)	287	1.699[a]	0.192	0.639	0.324	1.258
	EEU	101 (29.40%)	12 (21.10%)	113					
Working Memory									
Storage Domain	Good	333 (97.10%)	50 (87.70%)	383	10.535[a]	0.001	4.662	1.697	12.808
	Needs Improvement	10 (2.90%)	7 (12.30%)	17					
Attention Domain	Good	328 (95.60%)	48 (84.20%)	376	11.295[a]	<.001	4.1	1.7	9.886
	Needs Improvement	15 (4.40%)	9 (15.80%)	24					
Executive Domain	Good	332 (96.80%)	51 (89.50%)	383	6.435[a]	0.011	3.551	1.258	10.021
	Needs Improvement	11 (3.20%)	6 (10.50%)	17					

Conclusion

Our study suggested that students who had difficulties and complaints regarding any aspect of working memory such as the storage domain, attention domain, and executive domain were at risk for poor academic performance.

Reference

McGregory, C. (2015, April 13). *[PDF] Academic Performance Questionnaire*. Academia.edu. https://www.academia.edu/57347883/_PDF_Academic_Performance_Questionnaire

Vallat-Azouvi, C., Pradat-Diehl, P., & Azouvi, P. (2012). The Working Memory Questionnaire: A scale to assess everyday life problems related to deficits of working memory in brain injured patients. *Neuropsychological Rehabilitation*, *22*(4), 634–649. https://doi.org/10.1080/09602011.2012.681110

We appreciate the effort of the students who successfully participated in this study