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An Azerbaijani Adaptation of Tuckman Procrastination Scale: Its Association with Academic Motivation and Self-Efficacy

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Abstract

The aim of this study was to adapt the Tuckman Procrastination Scale for use with Azerbaijani adolescents and explore the relationships between procrastination, academic motivation and self-efficacy. Data were obtained from 718 adolescents in Azerbaijan whose ages ranged from 10 to 18 years (M = 13.61, SD = 1.86) through convenience sampling. As part of the adaptation process, confirmatory factor analysis, criterion-related validity, and reliability analyses were conducted. Furthermore, the study shedding light on the relationships between procrastination and academic motivation and self-efficacy were explored using PROCESS macro mediation analysis. The results obtained from confirmatory factor analysis indicated that factor loading values of three items of the scale is less than 30 and cannot be taken into account. The remaining 13 items of Tuckman Procrastination Scale analyzed and confirmed the unidimensional structure of scale. Internal consistency reliability analysis conducted and the result indicated satisfactory reliability coefficients. Moreover, results demonstrated that procrastination was negatively associated with academic motivation and self-efficacy. Addiction to it, the mediating effect of self-efficacy on the relationship between procrastination and academic self-efficacy was unveiled. These findings suggest that the Azerbaijani version of the Tuckman Procrastination Scale has acceptable psychometric properties.

Keywords: Procrastination, Academic motivation, Self-efficacy, Scale adaptation

Citation

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Introduction

Adolescence is a critical stage marked by significant physical development and the maturation of brain functions. During this period, well-being often fluctuates, risk-taking behaviors peak, and mental health issues such as depression may emerge (D.F. Maciejewski et al., 2019). Adolescents are characterized by emotional reactivity, impulsivity, and a strong drive for novelty-seeking. Their underdeveloped self-regulation abilities make it challenging to manage risky behaviors effectively (Willems et al., 2018). The development of self-regulation skills during childhood and adolescence has long-term implications for various aspects of life (Allemand et al., 2019). A key challenge in adolescent behavior, particularly in the context of self-regulation, is their inclination towards procrastination.

The term "procrastination" is derived from two Latin words: "pro," meaning "forward," and "crastinus," meaning "tomorrow." Together, they imply "to put off until tomorrow." Research shows that at least half of all students procrastinate on important tasks such as studying for exams, writing coursework, and completing weekly assignments (Steel, 2007). Academic procrastination occurs when a student delays their work on academic tasks (Rustamov, 2023). Examining the psychological aspects of procrastination reveals issues with self-regulation (Sirois & Pychyl, 2013). Managing attention while progressing toward long-term goals can be particularly challenging for those affected by procrastination.

One study identified a lack of study skills as a major reason for academic procrastination (Grunschel et al., 2013). Poor academic skills make tasks feel more stressful, tedious, and complex, which is closely related to task avoidance (Blunt & Pychyl, 2000). According to the Temporal Motivation Theory (Steel & König, 2006; Gröpel & Steel, 2008), motivation increases with the expectation of the outcome and the value of the goal but decreases over time. The farther away the outcome is and the higher the impulsivity, the greater the likelihood of procrastination. Therefore, if an activity offers rewards in the distant future and impulsivity is high, procrastination is more likely to occur. Sirois (2014) argues that habitual procrastinators start their work at the last minute, leading to physiological stress symptoms (e.g., stomach discomfort, tension, rapid heartbeat). Continuous exposure to such situations can create feelings of guilt and shame (Sirois, 2014), as well as psychological issues like anxiety and depression (Ferrari et al., 1995).

The standard procrastination mechanism generates feelings of guilt and discomfort when a specific task is not completed, while also attempting to compensate by finishing less significant tasks (Pychyl, 2013). According to Bakhtiyar Aliyev (2019), it is still unclear how a person is inspired to do great things, what drives this enthusiasm and motivates them to do even the most difficult tasks, and achieve success. Academic procrastination is particularly prevalent among adolescents and students, significantly impacting various aspects of their lives, especially academic performance (Steel, 2007). The causes and consequences of procrastination are multifaceted and closely related to psychological factors such as motivation, self-efficacy, stress management, and internal control (Schraw et al., 2007).

Research consistently shows a significant link between locus of control and academic procrastination (Zarzycka et al. 2021). Studies indicate that individuals with a lower internal locus of control are more prone to procrastination, while those with a stronger internal locus tend to reduce procrastination by taking responsibility for their actions (Rustamov et al., 2023). Conversely, students with an external locus of control are more likely to procrastinate, as they believe success depends on external factors rather than their own effort.

Motivation and self-efficacy

Motivation and self-efficacy are critical regulators of procrastination. According to Bandura's (1997) theory of self-efficacy, a person's belief in their ability to successfully complete a task influences their willingness to start and persist with it. Students with low self-efficacy are more likely to engage in procrastination because they doubt their ability to overcome challenges. Conversely, students with higher self-efficacy are more persistent and likely to complete tasks on time, leading to better academic outcomes (Rustamov et al., 2023; Bandura, 1997).

The long-term effects of procrastination are often linked to academic failure and emotional distress. Frequent delays create mounting pressure as deadlines approach, increasing anxiety and eroding self-confidence. This cycle can lead to poor academic performance, hindering students from achieving their long-term academic and career goals. Research suggests that students who procrastinate more experience greater emotional problems as academic

demands increase, perpetuating the cycle of procrastination (Tice & Baumeister, 1997). On the other hand, students who procrastinate less and complete their tasks on time tend to achieve higher academic performance. Meeting deadlines fosters greater motivation, increases self-confidence, and promotes a stronger interest in the educational process (Steel & Ferrari, 2013). Developing time management skills not only aids academic pursuits but also contributes to overall success in life.

To reduce academic procrastination, students need to enhance their motivation and time management skills while improving their sense of self-efficacy. Motivational techniques, self-development programs, and strategies that promote self-efficacy can help reduce procrastination and lead to more effective academic outcomes (Schraw et al., 2007). Given the prevalence of procrastination in the academic sphere and its negative impacts, it is essential to have psychometrically sound scales for measurement. Valid questionnaires facilitate the development of high-quality research. The Procrastination Scale was developed to assess the tendency to procrastinate (Tuckman, 1991). Its evaluation plays a significant role in clarifying and addressing this behavior (Tisocco & Liporac, 2021). The measurement of procrastination is crucial for psychological research (Steel, 2007). One of the most widely used scales is Tuckman's Procrastination Scale, which measures procrastination due to low self-regulation. Tuckman notes that procrastination arises from inadequate self-regulation.

Tuckman Procrastination Scale

The Tuckman Procrastination Scale was developed by Tuckman and is extensively used worldwide to measure procrastination among adolescents and school students, examining their academic performance in depth. The Tuckman Procrastination Scale has been adapted in Turkey (Özer & Saçkes, 2013), Spain (C Brando-Garrido & J Montes-Hidalgo, 2020), Brazil (Ana Karla Silva Soares, 2022), and Indonesia (Abdullah Fathur Rasyid, 2023). However, this test has not yet been adapted for Azerbaijan.

Research Objectives

Given the significant impact of the "procrastination" phenomenon on adolescents' academic performance, the main objective of the current study is to adapt the Tuckman Procrastination Scale into Azerbaijani and evaluate its psychometric properties. Furthermore, the study aims to investigate the relationships between procrastination, academic motivation, and self-efficacy.

Method

Participants

Data were gathered through online surveys, employing a convenience sampling approach to reach 718 adolescents from schools in Azerbaijan. Of all the participants, 458 (63.8% of the total sample) participants were females and 260 (36.2% of the total sample) were identified as males whose ages ranged from 10 to 18 years (M = 13.61, SD = 1.86). A considerable proportion of participants expressed satisfaction with their interactions with peers within the school environment, with 65.4% reporting a positive experience. In contrast, 24.1% indicated partial satisfaction, while 6.8% partly dissatisfaction and 3.5% expressed dissatisfaction with their peer relationships. Regarding their interaction with teachers at school, 51.4% of the adolescents participating in the research reported a contentment. 25.1% reported partial satisfation, while 4.7% reported total dissatisfaction for the interaction with their teachers. In terms of perceived success at school, the majority of the participants (63.7%) expressed their happiness and satisfaction while 23% of the adolescents reported partial contentment and 13.3% of them reported dissatisfaction about their results at school. Detailed information is demonstrated in Table 1.

Ethics

The study was conducted in strict adherence to the ethical principles established in the Helsinki Declaration of 1975, as revised in 2000. Prior to the initiation of the research, ethical approval was granted by the Ethics Committee of the Psychology Scientific Research Institute in Baku, Azerbaijan. This study adhered to ethical guidelines established in Helsinki Declaration of 1975, as revised in 2000 and was approved by the Ethics Committee of the Psychology Scientific Research Institute in Baku, Azerbaijan (Approval number: T-323).

Table 1. Descriptive information of the participants

	Frequency	%
Gender		
Female	458	63.8
Male	260	36.2
Peer relationship		
Satisfied	366	51.0
Partly satisfied	173	24.1
Moderate	105	14.6
Partly dissatisfied	49	6.8
Dissatisfied	25	3.5
Interaction with teacher		
Satisfied	369	51.4
Partly satisfied	180	25.1
Moderate	106	14.8
Partly dissatisfied	29	4.0
Dissatisfied	34	4.7
Perceived success at school		
Satisfied	457	63.7
Partly satisfied	165	23.0
Dissatisfied	96	13.3

Measures

The Tuckman Procrastination Scale was developed by Bruce W. Tuckman (1991). There are 16 items in this scale (e.g., I get stuck in neutral even though I know how important it is to get started). The Tuckman Procrastination Scale assesses procrastination using a 4 point Likert scale. (1= Strongly disagree and 4= Strongly agree) . These scores reflect higher levels of procrastination. Cronbach's alpha was 86 for the tuckman procrastination scale.

The Academic Motivation Scale was designed by Robert J. Vallerand (1989). There are 28 items in this scale (e.g., I go to school because it gives me pleasure to see that I can successfully complete difficult activities in class). The Academic Motivation Scale assesses hope using a 7 point Likert scale. (1= definitely false and 7=definitely true) . The Academic Motivation Scale scores reflect higher levels of trait motivation. Cronbach's alpha were ranked between 0.62 and 0.91 motivation scale.

The General Self-Efficacy Scale was developed by Ralf Schwarzer and Matthias Jerusalem (1979). There are 10 items in this scale (e.g.,I can remain calm when facing difficulties because I can rely on my coping abilities). The General Self-Efficacy Scale using 4 point Likert scale (1= Not at all true and 4= Exactly true). This scores reflect higher levels of general self-efficacy. Cronbach's alpha for the General Self-Efficacy Scale was between .76 and .90.

Data analysis

The aim of the present study was to evaluate the psychometric properties of the Tuckman Procrastination Scale, including its structural validity, reliability, criterion-related validity, and predictive validity. Confirmatory Factor Analysis (CFA) with the use of maximum likelihood estimation was utilized to assess the structure of the Tuckman Procrastination Scale. In-depth analysis carried out on numerous goodness-of-fit indices, which include Chi-square ($\chi 2$) to the degree of freedom (df) ratio (supposed to be less than 5), the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), the Normed Fit Index (NFI), Relative Fit Index (RFI) and the Root Mean Square Error

of Approximation (RMSEA). In order to determine scale's internal consistency, Cronbach's α, McDonald's omega, and Guttmann's lambda coefficients were calculated. For the purpose of criterion-related validity, associations between the Tuckman Procrastionation Scale-Azerbaijan and academic motivation and academic self-efficacy were examined by using correlation analysis. Finally, to examine the mediating role of academic self-efficacy in the relationship between procrastination and academic motivation, the PROCESS macro developed by Hayes (2018), was employed to compute the mediation model.

Results and Discussion

To assess the normality of the Tuckman Procrastination dataset, both skewness and kurtosis were examined. The skewness value was determined as 0.221, while the kurtosis value was determined as-0.289. According to Kline (skewness between -2 and +2) and West et al. (Kurtosis between -3 and +3) skewness and kurtosis values of Tuckman Procrastination Scale were within the acceptable ranges for normality. These findings validate the symmetrical distribution of the variables, thus demonstrating their compliance with the normality criteria.

Prior to conducting the exploratory factor analysis to test the factor structures, item-total correlations were assessed to evaluate the alignment of the scale items with other scales. The correlation scores of the fourth ("I delay making tough decisions"), seventh ("I put the necessary time into even boring tasks, like studying") and 14th items ("I always finish important jobs with time to spare") with the other items was found to be below 0.30. Alongside these, results revealed that the 14th item of the scale has a negative correlation with several other items, though this reverse item was recoded. Notably, the reliability coefficient improved when these items were removed from the scale.

Confirmatory Factor Analysis (CFA) was carried out to examine the factor structure of the Tuckman Procrastionation Scale-Azerbaijan version. Results obtained from CFA demonstrated that three items have a factor loadings less than 30. Conclusively, 4th, 7th and the 14th items of the Tuckman Procrastination Scale could not be taken into account and removed from the scale.

Factor loading values of the remaining 13 items of scale which were taken into consideration, are presented in Figure 1. The scale was found to have a unidimensional factor structure consistent with its original design. As stated by Figure 1. factor loadings of items varied between .423 and .674. Factor loadings of .60 or higher are considered "high," while values ranging from .30 to .59 are classified as "medium," and may be taken into account when deciding whether to exclude a variable (Kline, 1994).

Numerous statistical fit indices used to assess model fit: χ^2 (65, N=718) =292.9, CFI = .877, IFI = .873, NFI = .873, RFI = .826, and RMSEA-0.063. These indices indicate that the hypothesized model aligns well with the empirical data, supporting the validity of the Tuckman Procrastination Scale-Azerbaijan's structure. The unidimensional factor model of the 13-item scale explained 31.207% of the total variance, with standardized factor loadings spanning from 0.424 to 0.674.

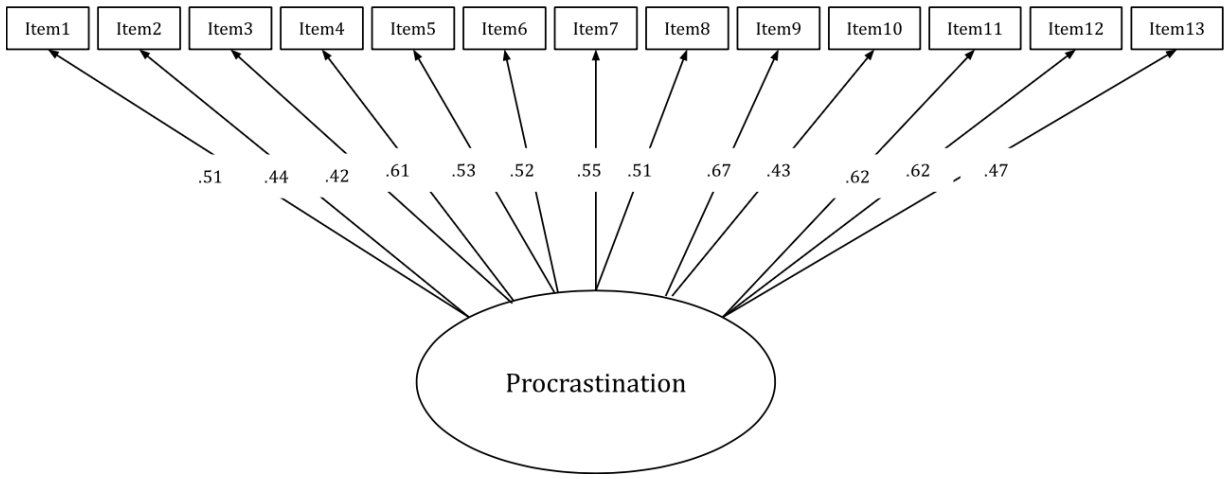

Figure 1. Structure validity of the Azerbaijani Tuckman Procrastination Scale

Subsequent to the verification of the scale's structural integrity, Item Response Theory (IRT) analysis was performed. Obtained results illustrated that the discrimination parameter (α) values ranged from 0.712-1.577. In accordance with Baker's framework, 2 items were categorized as having limited discriminative ability, while other 11 items continued to be categorized as moderate. These findings demonstrate that 11 items have a good discriminative power to distinguish different levels of procrastination.

Table 2. IRT results for the Tuckman Procrastination Scale

Item	a coefficient	SE	Confidence interval	z	p>|z|
I needlessly delay finishing jobs, even when they're important. *Mən lazımsız yerə işləri bitirməyi gecikdirirəm, hətta onlar vacib olsa belə*	1.120038	.1009584	.9221634-1.317913	11.09	0.001
I postpone starting in on things I don't like to do *Sevmədiyim işlərə başlamağı təxirə salıram*	.7128776	.0891387	.5381689-.8875863	8.00	0.001
When I have a delay, I wait till the last minute *Bir şeyi gecikdirdikdə son dəqiqəyə qədər gözləyirəm*	.6459104	.0845725	.4801514-.8116695	7.64	0.001
I keep putting off improving my work habits *İş görmə vərdişlərimi təkmilləşdirməyi daima təxirə salıram*	1.419928	.1160456	1.192483-1.647374	12.24	0.001
I manage to find an excuse for not doing something *Nəyisə etməmək üçün bir bəhanə tapmağı bacarıram*	1.291915	.1097818	1.076746-1.507083	11.77	0.001
I am an incurable time waster *Mən düzəlmə ehtimalı olmayan bir zaman israfçısıyam*	1.292886	.1163567	1.064831-1.520941	11.11	0.001
I'm a time waster now but I can't seem to do anything about it *Mən indi vaxt itirirəm, amma bununla bağlı heç nə edə bilmirəm*	1.334488	.1109123	1.117104-1.551872	12.03	0.001
When something's too tough to tackle, I believe in postponing it *Nəyisə həll etmək çox çətin olduqda, onu təxirə salmağa inanıram*	1.22863	.105597	1.021664-1.435596	11.64	0.001
I promise myself I'll do something and then drag my feet *Özümə bir şey edəcəyimə söz verirəm amma sonra onu etməyə həvəsim olmur*	1.546863	.123725	1.304366-1.789359	12.50	0.001
Whenever I make a plan of action, I follow it *Nə vaxt fəaliyyət planı qursam, ona əməl edirəm*	1.027127	.1021007	.8270133-1.22724	10.06	0.001
Even though I hate myself if I don't get started, it doesn't get me going *Bir işə başlamadığım üçün özümə nifrət etsəm də, bu yenə də məni hərəkətə keçirmir*	1.577583	.1241858	1.334183-1.820983	12.70	0.001

I get stuck in neutral even though I know how important it is to get started *Başlamağın nə qədər vacib olduğunu bilsəm də, neytral vəziyyətdə qalıram*	1.519101	.1203147	1.283289-1.754914	12.63	0.001
Putting something off until tomorrow is not the way I do it *Bu günün işini sabaha qoymaq mənim tərzim deyil*	1.199488	.1091541	.98555-1.413426	10.99	0.001

Internal consistency reliability of Tuckman Procrastination Scale was evaluated utilizing three distinct coefficients: Cronbach's alpha (α), McDonald's omega (ω), and Guttmann's lambda (λ6). Cronbach's alpha coefficient produced a value of 0.814, indicating the scale's strong reliability. Additionally, the McDonald's omega coefficient also demonstrated commendable reliability with a value of 0.812, while Guttmann's lambda coefficient yielded a value of 0.814.

Table 3. Relationship of the Tuckman Procrastination with the variables

Variable	**Correlation with Tuckman Procrastination**		**95% Confidence Interval**	
	r	**p**	**LL**	**UL**
Self-efficacy	-0.424	<0.001	-0.483	-0.362
Motivation	-0.293	<0.001	-0.359	-0.224

Regarding criterion-related validity, the analysis identified several correlations with the Tuckman Procrastination. Results on table 3. illustrated that procrastination has negative correlations with academic motivation ($r = -.293$, $p < .001$), and academic self-efficacy ($r = -.424$, $p < .001$).

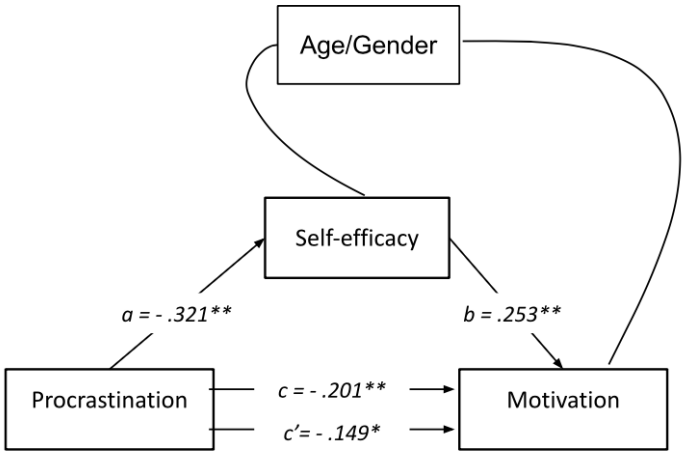

Figure 2. Predictive validity of Tuckman Procrastination Scale

Predictive validity analysis was conducted to reveal whether academic self-efficacy performs as a mediational variable in the association between procrastination and academic motivation. To evaluate the mediation effect of self-efficacy, as demonstrated Figure 2. Bootstrap studies were carried out. Obtained results illustrate that self-efficacy performs a mediating function in the relationship between procrastination and academic motivation. The Bootstrap coefficient was estimated at-.0193, with a 95% confidence interval spanning from -.193 to -.117. Furthermore, results displayed a significant association between procrastination and self-efficacy ($\beta = -0.321$, $p < .001$) and revealed a direct link between 2 variables. Additionally, association between procrastination and motivation ($\beta = .201$, $p < .001$) revealed as well.

Procrastination is a multifaceted behavior that cannot be merely defined as the intentional postponement of task completion, as it also involves the perception that such delays are unnecessary or avoidable, in addition to the

individual's intention to defer responsibility (Munda et al., 2024). Given the prevalence of procrastination in the academic sphere and its negative impacts, it is essential to have psychometrically sound scales for measurement. The Tuckman Procrastination Scale is extensively used worldwide to measure procrastination among adolescents and school students, examining their academic performance in depth. The research assessed the psychometric properties of scale in Azerbaijani students. Therefore, the primary aim of the present study is to adapt the Tuckman Procrastination Scale to Azerbaijani, to assess its psychometric properties. Additionally, examination of the relationship between procrastination, academic motivation and self-efficacy is another purpose of the study.

In present study, structure validity of the Tuckman Procrastination Scale was examined through a confirmatory factor analysis (CFA). The psychometric findings of analysis revealed that three items of TPS showed factor loading values below .30 and TPS-Azerbaijan has different structure compared to the original version of scale. Analysis demonstrated that unidimensional 13 items of the scale displayed satisfactory results regarding internal consistency and reliability and TES-Azerbaijan enables us to accurately measure individuals' levels of procrastination. During the adaptation process, specific features of the Azerbaijani language and culture were carefully considered, ensuring that the scale is suitable for use in the local context.

The Item Response Theory (IRT) analysis was conducted to evaluate the reliability of all items and examine their fit to the model. For the Azerbaijani version of the Tuckman Procrastination Scale, the item discrimination indices were found to be above 1.0, which, according to Baker (2001), indicates strong discriminative power. The results revealed that only two items had discrimination values below 1.0, while the remaining 12 items exhibited values above 1.0, demonstrating exceptionally high discriminative ability. Overall, the IRT findings suggest that the items in the Azerbaijani version of the Tuckman Procrastination Scale are appropriately calibrated in terms of item difficulty.

Tuckman Procrastination Scale, consisting of 13 items, was subjected to psychometric testing using various methods and samples. Several analyses were examined to evaluate the internal consistency of the Tuckman Procrastination Scale. According to Nunnally and Bernstein (1994), a Cronbach's alpha value above 0.70 is considered acceptable. Obtained results displayed that internal consistency of TPS was above 0.70. In other words, Cronbach's alpha, McDonald's Omega and Gutmann's Lambda analyses were performed to evaluate internal consistency. The findings revealed Cronbach's alpha was precisely .814, McDonald's Omega was .812, and Gutmann's Lambda was calculated to be .814 in this study.

In terms of criterion-related validity, the relationship between procrastination, academic motivation and self-efficacy was investigated. Acquired findings indicated negative correlation between procrastination and self-efficacy. Low self-esteem increases the likelihood of procrastination, as students doubt their ability to succeed and it generates school-related problems (e.g., low grades) and stress-related physical discomfort (Liu et al., 2020; Ge et al., 2018). The emotional consequences of procrastination, including anxiety and stress, create a negative feedback loop that further lowers academic performance (Rustamov et al., 2023; Ziegler & Opdenakker, 2018; Przepiorka et al., 2019). Findings also showed that procrastination negatively correlates with motivation (Oram, 2021; Steel & König, 2006). Higher levels of motivation are often associated with lower levels of procrastination. Motivation is positively influenced by the anticipated outcome and the perceived value of the goal, yet it tends to diminish over time. As the expected outcome becomes more distant and impulsivity increases, the likelihood of procrastination rises (Gröpel & Steel, 2008).

As with any research, this study also has certain limitations. The first limitation is that the participants were exclusively students living in Baku and surrounding districts. Studies conducted on students with different demographic characteristics in various geographical regions and schools may yield different results. Therefore, the findings of this study may not be generalizable to participants from other regions. The second limitation is that the majority of the participants were female. In future research, a more balanced gender distribution could lead to more efficient results. Another limitation is that the survey was conducted in only one language, Azerbaijani. This could prevent participation from individuals with language barriers, especially students who speak different languages, thereby limiting the study's generalizability. Finally, the online format of the survey presents additional limitations, as it only includes individuals with internet access, reducing the likelihood of representation for some groups. Although the adaptation of the Procrastination Scale for Azerbaijan makes a significant contribution to the field of educational research, these limitations highlight the need for cautious interpretation of the results.

Conclusion

This study aimed to adapt the Tuckman Procrastination Scale for use within the Azerbaijani context, addressing the need for culturally relevant instruments to assess procrastination behaviors in academic settings and explore its relationship with self-efficacy and academic motivation. The findings indicate that the Tuckman Procrastination Scale is not only suitable for use within the Azerbaijani context but also demonstrates strong psychometric properties, including high validity and reliability. This suggests that the scale is an effective tool for assessing academic procrastination among Azerbaijani students, making it a valuable resource for both researchers and educators in the region. By extending the scale's use in different fields, including psychology, education, and counseling, and by incorporating it into intervention strategies, future research could contribute to a more comprehensive understanding of procrastination behavior. The findings from these studies could help develop culturally sensitive and context-specific interventions that address the root causes of academic procrastination, ultimately leading to more effective strategies for promoting academic achievement and well-being in Azerbaijani students.

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Authors' contributions
BA, ER, UZN, AF, and RM were involved in designing the study. BA, NA, LI, FA, and RM were responsible for organizing the database. ER, UZN, and RM conducted the statistical analysis. BA, ER, AF, RM, NA, and LI wrote the initial draft of the manuscript. All authors contributed to revising the manuscript, reviewed, and approved the final version submitted.

Ethical Approval
This study adhered to ethical guidelines established in Helsinki Declaration of 1975, as revised in 2000 and was approved by the Ethics Committee of the Psychology Scientific Research Institute in Baku, Azerbaijan (Approval number: T-323).

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