Behavioral Psychology / Psicología Conductual, Vol. 32, No. 2, 2024, pp. 301-320
https://doi.org/10.51668/bp.8324205n

THE ROLE OF RESILIENCE IN THE ASSOCIATION BETWEEN STRESSFUL LIFE EVENTS AND ACADEMIC PERFORMANCE IN UNIVERSITY STUDENTS

Guillermo Martínez-Cuevas[1], Mª Asunción Lara[2], Ricardo Orozco[2], and Adrián Martínez-González[1]
[1] National Autonomous University of Mexico; [2] "Ramón de la Fuente Muñiz" National Institute of Psychiatry (Mexico)

Abstract

Although there is evidence of the relationship between stress and academic performance, the possible moderating role of resilience in this association has been investigated to a lesser extent. This study aimed to evaluate the role of resilience in the relationship between stressful life events and academic performance in undergraduate university students. The Life Events Questionnaire and the Adult Resilience Scale were administered to 389 undergraduates aged 18-29. Regressions were performed. Results showed that life event stress predicted low academic performance, while resilience predicted better academic performance and lower life event stress. Two resilience factors moderated the impact of stressful life events on academic performance: family cohesion and social support. Correlation and variance values were low but significant. The results suggest that university programs could improve academic performance by promoting greater student resilience and strengthening other significant factors.
KEY WORDS: *stress, life events, psychological resilience, academic performance, students*.

Resumen

Si bien se cuenta con evidencia de la relación entre el estrés y el rendimiento académico, se ha investigado en menor medida el posible papel moderador de la resiliencia en esta asociación. El objetivo del presente estudio fue evaluar el papel de la resiliencia en la relación entre los sucesos vitales estresantes y el rendimiento académico en estudiantes universitarios de pregrado. Se administró el "Cuestionario de sucesos vitales" y la "Escala de resiliencia para adultos" a 389 estudiantes, de entre 18 y 29 años. Se realizaron regresiones. Los resultados mostraron que la resiliencia se asoció con un mejor rendimiento académico y un menor estrés derivado de los sucesos vitales. Dos factores de resiliencia

Thanks to the Support Program for the Improvement of Academic Personnel of the General Directorate of Academic Personnel Affairs and to the Master's and Doctorate Programs in Medical, Dental, and Health Sciences, both of the National Autonomous University of Mexico. This article is part of a doctoral thesis directed by Mª Asunción Lara and presented by the first author.

Correspondence: Mª Asunción Lara, "Ramón de la Fuente Muñiz" National Institute of Psychiatry, Calz. México-Xochimilco 101, 14370 Colonia Huipulco, Tlalpan, Mexico City (Mexico). E-mail: asuncionlara@yahoo.com.mx

moderaron el impacto del estrés derivado de sucesos vitales en el rendimiento académico: la cohesión familiar y el apoyo social. Los valores de correlación y varianza fueron bajos pero significativos. Los resultados sugieren que los programas universitarios podrían mejorar el rendimiento académico a través de propiciar una mayor resiliencia en el estudiantado y fortalecer otros factores significativos.
PALABRAS CLAVE: *estrés, sucesos vitales, resiliencia, rendimiento académico, estudiantes.*

Introduction

In Mexico, as in other countries, higher education is a strategic asset that contributes to the formation of human capital and the construction and dissemination of knowledge, encouraging more equitable societies and more competitive economies (Fernández, 2017). Where the development of people with high levels of specialization is concerned, academic performance reflects the degree of learning students (Lamas, 2015; Willcox, 2011). Performance evaluation has a social function because, within certain limits, it makes it possible to guarantee that those practicing a profession are equipped with the necessary knowledge, skills, and attitudes (Santos, 2014).

Academic performance is often expressed in terms of grades. Research projects regard them as a benchmark for describing student performance because of their ability to categorize and predict performance in probabilistic terms. For example, high school GPA has been associated with the performance of university students (Duggal & Mehta, 2015; Martínez-González et al., 2021; Richardson et al., 2012). Likewise, university entrance examination results show that higher scores correspond to better performance and academic success in undergraduate degrees (Duggal & Mehta, 2015; Martínez-González et al., 2018, 2020).

The analysis of academic performance has included studying the role of stressful life events and resilience, although research is scant. Life events are experiences that alter the usual activities of an individual, causing significant readjustments to enable them to adapt to the changes this entails (Holmes & Rahe, 1967), and their stressful potential is a function of the amount of change involved. Since life events cause disturbing physiological and psychological reactions, often called "stressful life events" (Sandín, 1995).

Life events can adversely affect graduation rates (Bradley et al., 2016) as well as student academic performance. These events include financial difficulties, family problems, intimate relationships, the illness or death of people close to them, sexual harassment and bullying (American College Health Association & National College Health Assessment, 2020), leaving their families for long periods, misunderstandings or conflicts with other people, failed love affairs, being robbed and being victims of discrimination (Zou et al., 2018). Although the life events causing them the greatest stress are high-stakes exams, academic problems and the death of a close family member, serious legal problems, major physical injuries and problems with superiors at work also prove stressful (Usuga et al., 2021).

However, not all students who experience stressful life events obtain poor academic results, and resilience may be related to this variation (Warnecke & Lewine, 2019). The resilience construct attempts to explain why some people cope with stress and adversity better than others (Mangrulkar et al., 2001). According to Windle (2011), resilience is defined as the process of effective negotiation, adaptation to, or management of significant sources of stress or trauma. This adaptation or management of sources of stress is derived from the internal resources of the individual and those of their environment. Moreover, the expression of resilience varies across the lifespan. This adaptability involves coping with adversity, trauma, tragedy, and various sources of stress, such as family, intimate relationships, health, financial and work problems (American Psychological Association, 2020), which is why the concept has also been explored in academic performance.

Research exploring the association between resilience and academic performance has yielded mixed results. On the one hand, resilience has been associated with higher course passing rates, lower dropout rates (Van Hoek et al., 2019), and better academic performance (Al Omari et al., 2023; León et al., 2019). Other studies, however, have failed to find an association between academic performance and resilience (Ahmed & Julius, 2015; Cheng & Gatling, 2015; Elizondo-Omaña et al., 2010).

The results regarding resilience and its relationship with stress are more robust than resilience with academic performance. Resilient students are more able to overcome challenges by adapting better to university life transitions while maintaining their health and well-being (Kumar y Singh, 2014), with higher resilience levels being associated with lower stress levels (Al-dhuraibi & Ali Al-Abyadh, 2021; Bacchi & Licinio, 2017; Weraarchakul et al., 2016; Wilks & Spivey, 2010). It has been observed that resilience moderates the impact of life events on the mental health of university students (Peng et al., 2012) as well as the relationship between perceived stress and binge eating symptoms in college women with eating behavior problems (Thurston et al., 2018).

Given the diversity of results regarding the association between resilience and academic performance, it is important to study this issue in greater depth. On the other hand, although the moderating role of resilience between life events and stress and various pathologies is known, it is worth asking whether resilience also serves as a moderating factor between life events and student performance, which has not been explored in either study on Latin America or developed countries. Exploring this line of research would shed light on the scope of resilience and help clarify its association with performance.

The purpose of this research was to explore the role of resilience in the relationship between stressful life events and academic performance among undergraduate university students. Based on the literature review, resilience is expected to moderate the association between life event stress and academic performance. The results of this research could contribute to the design of programs to improve the resilience, mental health, and academic performance of undergraduate university students.

Method

Participants

The sample consists of 389 students whose sociodemographic and academic characteristics appear in Table 1.

Table 1
Sociodemographic and academic characteristics of students (*n*= 389)

Characteristics	3rd semester *n* (%)	5th semester *n* (%)	7th semester *n* (%)	Total *N* (%)
Sex				
Male	28 (17,39)	20 (15,62)	11 (11)	59 (15,17)
Female	133 (82,61)	108 (84,38)	89 (89)	330 (84,83)
Total	161 (100)	128 (100)	100 (100)	389 (100)
	M	*SD*	Min.	Max.
Age	21	1.87	18.54	29.71
Credits completed	6	0.66	1	8
GPA	8.8	0.75	5	10

Instruments

a) Sociodemographic data. Age, sex, and identification number provided by students. The university provided the grade point average for the semester corresponding to February-July 2019. The grading scale is from five to ten, with five being a failing grade and six to ten being passing.
b) *Life Events Questionnaire* (Sandín & Chorot, 2017). The questionnaire with sixty items, which evaluate the degree of stress produced by different life events. The items are grouped into six factors: school, couple, family, social, health, and economic resources (e.g., "conflict with a partner," "poor health," "being assaulted"), using a Likert scale from 0 to 4 (0= No stress; 4= Extremely stressful) showing Cronbach's alpha coefficients between .68 and .83. Veytia et al. (2012) validated the questionnaire in a high school population, obtaining a Cronbach's alpha of .82 and an explained variance of 55%. An exploratory factor analysis was performed based on the information obtained from the questionnaires administered in this research. Of the total of sixty items, only thirty-five were retained, with an explained variance of 86.9% and a Cronbach's alpha of .82. Ten factors were identified: relationship problems, have an illnes, academic difficulties, multiple responsibilities, housing, partner's pregnancy or abortion, robbery or assault, illness or death of a close relative, family problems, pregnancy, or abortion. For this research, the time frame included events that had happened in the semester before the one in which they were enrolled when the questionnaire was administered. Resilience is the capacity to remain adaptable despite having been exposed to severe adversity (Masten & Coatsworth, 1998). Accordingly, those who had

experienced at least one life event that had caused them "high" or "very high stress" were regarded as having been exposed to adversity, as indicated in the Life Events Questionnaire.

c) *Resilience Scale for Adults* (Friborg et al., 2003), validated in Mexico by Ruvalcaba et al. (2014). This scale consists of thirty-seven items showing the characteristics of a person's resilience grouped into five factors: personal competencies (e.g., "I trust my decisions"), social competencies (e.g., "it is easy for me to make new friends"), family cohesion (e.g., "I have a good relationship with my family"), social support (e.g., "I have friends/family who support me") and personal structure (e.g., "I am good at organizing my time"). Response options are chosen from a Likert-type scale from 1 to 7, where 1= totally false and 7= totally true. The scale has the following Cronbach's alpha values: personal competence (.90), social competence (.86), personal structure (.76), family cohesion (.92), and social support (.89). In this study, through a confirmatory factor analysis (CFA) carried out with MPlus, the five-factor structure was verified, which explains 58.3% of the variance and presents the following fit indices: root approximation error root mean square error of approximation, RMSEA= .064, 90% CI [.061, .068], $p< .001$; comparative fit index (CFI)= .946; Tucker-Lewis index (TLI)= .942. According to Hu and Bentler (1999), RMSEA values are expected to be close to .06 or less, and CFI and TLI values are expected to be close to .95 or more.

Procedure

Subjects comprised undergraduate pedagogy students at a public university in Mexico City who met the following criteria: a) being enrolled in the school system (in-person), b) having completed the previous semester, c) having passed at least one subject. Based on the attendance lists provided by the educational authorities, the number of students enrolled in the current semester was 714. To conduct a census, students were visited in their classrooms during the time assigned for a compulsory subject in each of the semesters during the period October-November 2019, corresponding to the even semesters (4th, 6th, and 8th) at the university. Their grades, therefore, corresponded to the previous semesters (3rd, 5th, and 7th).

Of the 482 students identified, thirty-eight submitted incomplete questionnaires or did not wish to answer, leaving 444 complete questionnaires. Given that resilience is expressed by having a good quality of adaptation in contexts of adversity (Masten and Coatsworth, 1998), fifty-five questionnaires from students who failed to report having experienced at least one life event resulting in "high" or "very high stress" were excluded.

To administer the questionnaires, a date was arranged with the teachers to visit the students. During this visit, the researcher explained the objectives, voluntary nature, confidentiality, and benefits of the questionnaire, telling students they would be able to clarify any doubts they had. He added that students could talk personally to him once the questionnaire had been administered. Informed consent was obtained. Students logged in to an electronic platform previously

designed and piloted through their mobile devices (phones, computers, tablets) to indicate whether they wished to participate. Those who had agreed to participate answered the self-administered instruments on the same platform. Those who had agreed to participate yet were unable to log in (due to battery problems, lack of data, poor connectivity, or not having a smartphone or other electronic device) answered the questionnaires on paper.

Approval was obtained from the Research Ethics Committee of the "Ramón de la Fuente Muñiz" National Institute of Psychiatry (CONBIOÉTICA-09-CEI-010-20170316). Students were not given financial compensation for their participation. To thank them for their time, they were given the handbook on "Stress, resilience, and academic performance. Ideas for managing stress and increasing resilience in university students," developed expressly for this study in electronic format, which could be downloaded after the data had been collected. The principal investigator was on hand during all the classroom visits to clarify doubts.

Data analysis

Pearson correlations were performed to evaluate the relationship between the variables. An alpha level $p< .05$ was established to determine the statistical significance of the coefficients (Daniel, 2002), and the magnitude of the correlations was considered following Cohen's criteria: low correlation from .10 to .29; moderate correlation .30 to .49; high correlation of .50 to 1 (Cohen, 1988).

A logistic regression model explored the moderation between life events, resilience characteristics, and their impact on academic performance. To this end, the score obtained on the scales and subscales of the independent variables—life event stress and resilience—was converted to a z score to enter it into the regression analyses and standardize the interpretation of results in terms of standard deviations.

The academic performance dependent variable (measured through the grade point average) was not converted to a z score. Given that a high GPA was observed among the population (8.8, $SD= 0.75$), it was decided to focus the analysis on students with the lowest grades who require the most attention. As a result, the average was dichotomized, assigning a coding of 1 to those in the lowest quartile of grades and 0 to the remaining students. This enabled us to explore the low grades within this range.

In addition, a linear regression analysis was performed, considering academic performance as a continuous variable (on a scale from five to ten) to identify variations in the role of resilience.

The sample was post-stratified (Kolenikov, 2014) through weighting based on the age and sex distribution and semester of the population of interest. This weighting was used in all regressions. Likewise, all regressions were adjusted for age, sex, and credits completed. An alpha level of $p< .05$ was established to determine the statistical significance of the interaction coefficients. Stata 11.2 was used for all the analyses.

Results

Correlation analysis

Pearson correlation analyses revealed that students' academic performance showed a significant negative correlation with the sum of life events scale, as well as academic difficulties, being robbed and have an illness. Significant correlations were not obtained for the remaining factors (Table 2).

Likewise, a significant positive correlation was observed between academic performance and the total resilience scale score, as well as family cohesion, social support, and personal style. No correlation was found between personal competence and social competence (Table 3).

Life event stress showed a significant negative and low correlation with the sum of the resilience scale; together with personal competence, family cohesion, social support and personal style. No correlation was found with the social competence factor (Table 4).

Analysis of moderation between life events and resilience and low academic performance

The results of the logistic regression analysis shown in Table 5 indicate the resilience factors that moderated the impact of life event stress on poor academic performance: family cohesion and social support.

Table 2
Correlation between academic performance and life events

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Academic performance	--										
2. Partner problems	-.03	--									
3. Have an illness	-.10*	.31***	--								
4. Academic difficulties	-.42***	.23***	.23***	--							
5. Responsibilities	.07	.16***	.20***	.34***	--						
6. Housing	-.03	.21***	.18***	.12*	.09	--					
7. Partner's pregnancy	-.09	.13**	.12*	.05	.03	.10*	--				
8. Experienced theft	-.20***	.17***	.15**	.23***	.10*	.13**	.10*	--			
9. Relative's illness	-.08	.08	.16***	.16***	.14**	.02	-.00	.16***	--		
10. Finances	-.09	.26***	.27***	.22***	.16***	.28***	.01	.11*	.14**	--	
11. Pregnancy	-.03	.13**	.14**	.06	.03	.03	.26***	.00	.03	.04	--
12. Combination of life events	-.21***	.70***	.61***	.61***	.47***	.40***	.20***	.39***	.40***	.55***	.22***

Note: *p< .05, **p< .01, ***p< .001.

Table 3
Pearson correlation between academic performance and resilience

Variables	1	2	3	4	5	6
1. Performance	--					
2. Personal competence	.03	--				
3. Social competence	.03	.56***	--			
4. Family cohesion	.12*	.43***	.30***	--		
5. Social support	.15**	.51***	.47***	.60***	--	
6. Personal style	.18***	.42***	.28***	.31***	.38***	--
7. Total resilience	.11*	.82***	.70***	.74***	.80***	.60***

Note: *p< .05, **p< .01, ***p< .001.

Table 4
Correlation between resilience and stressful life events

Variables	1	2	3	4	5	6
1. Total life events	--					
2. Personal competence	-.17***	--				
3. Social competence	-.02	.56***	--			
4. Family cohesion	-.23***	.43***	.30***	--		
5. Social support	-.11*	.51***	.47***	.60***	--	
6. Personal style	-.17**	.42***	.28***	.31***	.38***	--
7. Total resilience	-.19***	.82***	.70***	.74***	.80***	.60***

Note: *p< .05, **p< .01, ***p< .001.

Table 5
Analysis of moderation between life events and resilience and low academic performance. Multiple logistic regression models (n= 389)

Models	OR	p	95% CI		Pseudo-R^2
Model 1. Personal competence					
Personal competence	0.88	.44	0.77	1.0	3.92%
Life events	1.22	.001	1.09	1.36	
Personal competence x Life events	1.03	.56	0.93	1.15	
Model 2. Social competence					
Social competence	0.88	.04	0.78	0.99	3.93%
Life events	1.23	<.001	1.10	1.38	
Personal competence x Life events	1.0	.97	0.89	1.13	
Model 3. Family cohesion					
Family cohesion	0.89	.057	0.78	1.00	4.49%
Life events	1.15	.018	1.02	1.29	
Family cohesion x Life events	**0.88**	**.022**	**0.79**	**0.98**	
Model 4. Social support					
Social support	0.71	< .001	0.63	0.80	5.51%
Life events	1.21	.001	1.08	1.35	
Social support x Life events	**1.23**	**.002**	**1.08**	**1.41**	

Models	OR	*p*	95% CI		Pseudo-R^2
Model 5. Personal style					
Personal style	0.81	<.001	0.72	0.91	1.71%
Life events	1.19	.003	1.06	1.33	
Personal style x Life events	0.95	.421	0.83	1.08	
Model 6. The sum of five resilience factors					
The sum of five resilience factors	0.79	<.001	0.70	0.89	1.47%
The sum of ten life event factors	1.19	.004	1.06	1.33	
The sum of five resilience factors x the sum of ten life event factors	0.99	.812	0.87	1.11	

Note: Weighted values; adjusted by age, sex and subjects studied.

To present these data in graph form, Figure 1 shows the moderating function of family cohesion. When life event stress was low (-1 SD), the probability of being in the low quartile of grades was similar in students with either low (-1 SD) or high family cohesion (+1 SD). However, among those with a high degree of life event stress (+1 SD), high family cohesion (+1 SD) decreased the likelihood they would be in the bottom quartile of grades compared to those with low family cohesion (-1 SD).

Figure 1

Graphic representation of the interaction between life event stress and family cohesion to predict low academic performance (Model 3 of Table 5)

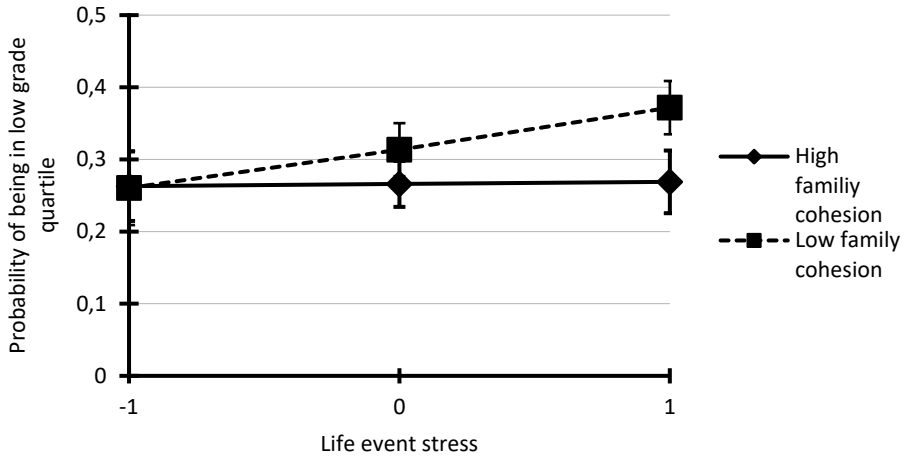
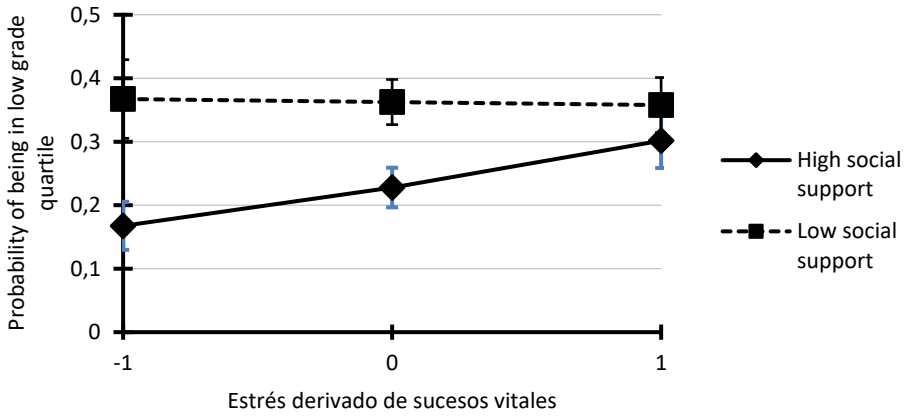


Figure 2 shows the moderating function of social support. When students experienced low life event stress (-1 SD), students with greater social support (+1 SD) were less likely to be in the bottom quartile of grades than those with lower social support (-1 SD). However, when students experienced high life event stress (+1 SD), there was no difference in the probability of having low grades, whether they had high (+1 SD) or low social support (-1 SD).

Figure 2
Graphic representation of the interaction between life event stress and family cohesion to predict poor academic performance (Model 4 of Table 5)



Where academic performance was considered a continuous variable, linear regression analyses showed that only social support moderated the impact of life event stress on academic performance (Table 6).

Table 6
Analysis of moderation between life events and resilience with low academic performance
Multiple logistic regression models (*n*= 389)

Models	β	*p*	95% CI		R^2
Model 1. Personal competence					
Personal competence	0.03	.11	-0,01	0,07	
Life events	-0.14	<.001	-0,18	-0,11	7.77%
Personal competence x Life events	-0.03	.05	-0.07	0.00	
Model 2. Social competence					
Social competence	0.05	.02	0.01	0.08	
Life events	-0.15	<.001	-0.18	-0.11	0.07%
Personal competence x Life events	-0.02	.37	-0.05	0.02	
Model 3. Family cohesion					
Family cohesion	0.01	.66	-0.18	-0.10	
Life events	-0.14	<.001	-0.18	-0.01	7.55%
Family cohesion x Life events	0.02	.20	-0.01	0.06	
Model 4. Social support					
Social support	0.11	<.001	0.07	0.15	
Life events	-0.13	<.001	-0.17	-0.10	9.64%
Social support x Life events	-0.08	<.001	-0.12	-0.03	

Models	β	*p*	95% CI		R^2
Model 5. Personal style					
Personal style	0.81	<.001	0.72	1.33	10.1%
Life events	1.19	.003	1.06	1.33	
Personal style x Life events	0.01	.464	-0.02	0.05	
Model 6. The sum of five resilience factors					
The sum of five resilience factors	0.07	<.001	0.03	0.11	8.28%
The sum of ten life event factors	-0.14	<.001	-0.17	-0.10	
The sum of five resilience factors x the sum of ten life event factors	-0.02	.272	-0.06	0.02	

Note: Weighted values; adjusted by age, sex and subjects studied.

Discussion

This research aimed to evaluate the role of resilience in the association between stressful life events and academic performance in undergraduate university students. Although resilience was expected to moderate the impact of life events on academic performance, only two resilience factors were found to perform this function: family cohesion and social support.

The results indicate that the following life events increased the probability of achieving poor academic performance: academic difficulties, being robbed/attacked, experiencing illness, and the sum of life events. These data coincide with the findings of other research, which report the impact of life events on students' academic performance (Usuga et al., 2021; Zou et al., 2018). The fact that the sum of life events has had an impact on performance may indicate that the accumulation of various types of life event stress hurts student performance. On the other hand, some events in the literature that have shown a significant correlation with student grades did not behave that way in this study, such as financial problems, marital problems, or the illness of close relatives (American College Health Association & National College Health Assessment, 2020; Guerrero et al., 2022; Norazlan et al., 2020; Zou et al., 2018). Although this may suggest that the population studied was economically, emotionally, and socially stable, it is also necessary to consider that 32.5% of the population of enrolled students were not in the classroom when the data was collected, which prevents us from knowing whether these factors influenced the sample characteristics.

The data showed that four of the five factors and the sum of all the factors in the resilience scale were associated with a lower perception of life event stress: personal competence, comprising confidence in oneself and one's future; family cohesion, defined as having a good relationship with the family, where there is loyalty, enjoyment, and optimism; social support, which includes having friends/family that support, help, motivate; and personal style, meaning the ability to plan, set goals, organize time, and follow routines. These results agree with the findings of other researchers (Bacchi & Licinio, 2017; García-Rojas et al., 2021).

Previous studies have suggested a positive association between resilience and academic achievement (Beauvais et al., 2014; León et al., 2019). The data found in this study partially support this assumption. Three of the five factors and the sum

of resilience were positively associated with academic performance: family cohesion, social support, and personal style, as well as the sum of resilience. However, other variables not included in the study could affect the relationship between resilience and school performance, such as the presence of anxiety and depression symptoms (Ahmed & Julius, 2015; Spence et al., 2020), procrastination (Umerenkova & Flores, 2017), the combination of resilience, coping strategies, and the deep learning approach (de la Fuente et al., 2017), the ability to self-regulate effort, self-assigned goals, exam performance and academic performance at high school (Duggal & Mehta, 2015; Martínez-González et al., 2021). Certain elements of the higher education institution, such as teacher training programs, summer catch-up courses, training new students, peer tutoring, and alert systems to prevent dropouts may also be involved in this relationship (Hernández et al., 2015).

Finally, it was suggested that resilience would moderate the impact of stress derived from life events on students' academic performance. The data found partially supported this assumption since only two of the five resilience factors performed a moderating function: family cohesion and social support.

Regarding the fact that greater family cohesion would improve the likelihood of students achieving better academic performance, a systematic review by Rocha et al. (2021) found that good family functioning and family relationships benefited students' learning process. Conversely, chaotic family relationships and family dysfunction impaired academic performance. The data found in this research contribute further information: when life event stress was lower, no difference was observed between students with high or low levels of family cohesion. When life event stress was greater, students with low family cohesion were likelier to have poor academic performance. Those with a high level of family cohesion maintain lower probabilities of poor performance, despite having high life event stress. In any case, family cohesion moderates the impact of life event stress on low academic performance.

The relationship between social support and academic performance has been reported in several studies (Feldman et al., 2008; López-Angulo et al., 2020; Tinajero et al., 2020). The data found in this research enable us to observe how social support operates concerning life event stress. Only when stress is lower are students with high social support less likely to achieve poor academic performance compared to those with low social support. When life event stress was greater, students were more likely to perform poorly, despite having high social support. Students with low social support maintained the same probability of poor performance, even when their life event stress increased. This finding is important because it explains how high social support operates in conjunction with other factors. In other words, accumulating life event stress decreases its protective function. Nevertheless, social support continued to be an element of resilience that contributed to preventing low academic performance. Moreover, social support was the only factor moderating the impact of life event stress on the entire student sample, not just the group with the lowest grades, as shown by the linear regression analyses.

Two approaches can be identified in the evolution of resilience studies. In one of them, resilience is considered a fixed, stable individual or personality trait over

time. On the other, resilience is considered a dynamic process in which adaptation depends on the interaction between various factors surrounding the individual, such as the family, the community, or their social system (Lee et al., 2013). This refers to the fact that, whereas in the trait-focused approach, resilience consists of personal qualities enabling a person to succeed despite adversity (Connor & Davidson, 2003), in the approach that understands resilience as an interactive process, a person uses their internal resources (creating meaning, deciding and acting), interacts with others (parents, peers or mentors) and accesses resources in their environment to cope with adversity (Liebenberg et al., 2017). From a theoretical point of view, the results of this research support the approach that views resilience as a process.

At the same time, although it has been said that resilience is inferred from adaptive results (Masten & Barnes, 2018), perhaps academic performance is not the only result that can be classified as adaptive. Despite poor academic performance, continuing university studies despite adversity can be considered an adaptive result. Evidence shows that more resilient students fail fewer subjects and drop out less (Van Hoek et al., 2019). Moreover, remaining at university has proved especially difficult for first-generation students (the offspring of parents without a university education), who are 2.6 times more likely to drop out than those whose parents graduated from university (Adrogué & García de Fanelli, 2018). Various events have been found in the literature that causes students to drop out: financial problems, working and studying simultaneously, the illness of the student or a family member, family problems such as the divorce of their parents or the birth of a new member (González-Ramírez & Pedraza-Navarro, 2017; Miranda & Guzmán, 2017). Based on these findings, remaining at university despite experiencing causes that encourage dropout can be considered an achievement, in other words, an adaptive result.

Thus, the moderating role of resilience was explained by two factors: family cohesion and social support serve to moderate the impact of life event stress on students' low academic performance. When higher stress levels were present, high family cohesion was more likely to prevent students from being in the bottom quartile of academic achievement than students with low family cohesion. Conversely, high and low social support offered a similar probability of preventing students from being in the bottom quartile of grades when high life-event stress levels occurred. Social support was the only resilience factor that moderated the impact of stress derived from life events in the entire sample of students, regardless of low performance or not.

Some of the limitations of this study are related to the design chosen. The fact that it is cross-sectional research means that it is impossible to make predictions, only associations between the variables evaluated. Conversely, the absence of students in their classrooms when administering the survey (32.5%) limits the degree to which results can be generalized. Those who were not in class may have had a different profile, such as poorer academic performance, than those present at the time of data collection. Another aspect is related to the instrument used: although it has been validated in different countries and specifically in the Mexican population since it is considered helpful in measuring

resilience, it would be advisable to create and use other questionnaires measuring the availability of resources in the context of the population researched more accurately. Liebenberg et al. (2017) noted that health, educational, recreation, and civic and religious participation services are fundamental for resilience processes in the face of adversity.

For future research, study results point to the importance of including moderation analysis to understand the role of resilience concerning other factors. At the same time, it would be more accurate to research the role of resilience with other elements of academic performance apart from grades, such as passing courses and lower dropout rates, in addition to using longitudinal designs enabling one to identify the role of resilience throughout a person's academic life. It would be important to estimate the levels of resilience and life events of students who drop out of school and compare them with those who remain in the classroom to determine whether staying in the education system, despite having low performance, can also be considered an adaptive achievement, to avoid using the GPA as the sole measure of achievement.

Some practical implications of this research are associated with the work of universities, professors, administrative staff, and students. Resilience can be fostered at any stage of life (Henderson, 2006) if it is understood as a dynamic cycle that includes individual characteristics, relationships of support and affection with people, and resources existing in the context (Liebenberg et al., 2017). The role of higher education institutions could therefore be crucial to the development of resilience in students experiencing illness or a robbery if they attempted to create adequate scaffolding for students to maintain physical and mental health. This could include campaigns and health fairs, including health education as a transversal theme in the study curriculum, scholarships, promotion, and access to medical services inside or outside the educational institution, the timely identification of anxious and depressive symptoms, and the creation of conditions to prevent insecurity within educational establishments and their surroundings. Moreover, the fact that in this study, academic difficulties have been associated with low performance underscores the importance of promoting training processes to help students improve their study techniques, ensure they get enough sleep, regulate the use of cell phones, organize their time, and adaptively interact with their classmates and teachers. Promoting caring relationships that provide social support, both at university and in their families, will also have an impact on student performance.

After the Pan American Health Organization (PAHO) and the World Health Organization (WHO) proposed the Regional Initiative of Health Promoting Schools (EPS) in 1995, universities in Europe and Latin America created a movement to achieve the objectives proposed by the WHO (Fajardo et al., 2023; Martínez & Keller, 2019). Universities have gradually been recognized as spaces for increasing health and well-being, improving academic performance, transitioning to the world of work, and healthy lifestyles for the rest of their lives (Sanci et al., 2022). These advances have materialized in the incorporation of programs to build resilience, either to alleviate the loss of mental health of the student body or to prepare students to cope with the challenges entailed by practicing their chosen

profession (Price, 2023). Universities and higher education institutions are spaces for formal, non-formal, and informal education. By promoting resilience, they contribute to the integral development of students, thereby achieving their educational goals.

In conclusion, this study found evidence that stress derived from life events contributes to the poor academic performance of undergraduate university students, especially having academic difficulties, suffering theft or assault, suffering from an illness, and accumulating stressful life events independently of its kind. Resilience contributed to reducing life event stress and improving students' academic performance. Two resilience components moderated between life event stress and poor performance: family cohesion and social support. Other elements of resilience did not achieve this moderating effect. This finding emphasizes the importance of factors external to the subject for resisting adversity beyond individual characteristics, or at least a person's ability to establish bonds of support and trust with those around them. Explained variance was significant but small, suggesting that, to improve academic performance, in addition to resilience, it would be useful to explore other variables such as learning strategies, anxious and depressive symptoms, coping strategies, self-regulation, and test performance. Promoting education to develop resilience among undergraduate university students, emphasizing improving social support and family cohesion, can help reduce the stress derived from life events and enhance academic performance.

References

Adrogué, C., & García de Fanelli, A. (2018). Gaps in persistence under open-access and tuition-free public higher education policies. *Education Policy Analysis Archives, 26*(126), 1-23.

Ahmed, Z., & Julius, S. H. (2015). Academic performance, resilience, depression, anxiety and stress among women college students. *Indian Journal of Positive Psychology, 6*(4), 367-370.

Al Omari, O., Al Yahyaei, A., Wynaden, D., Damra, J., Aljezawi, M., Al Qaderi, M., Al Ruqaishi, H., Abu Shahrour, L., & ALBashtawy, M. (2023). Correlates of resilience among university students in Oman: A cross-sectional study. *BMC psychology, 11*(1), 1-9.

Al-dhuraibi, A. M., & Ali Al-Abyadh, M. H. (2021). Psychological resilience and its relationship to life stress among Al-Bayda University students. *International Journal of Human Rights in Healthcare*. doi: 10.1108/IJHRH-04-2021-0099

American College Health Association, & National College Health Assessment. (2020). *Reference group. Executive summary*. *American College Health Association*.

American Psychological Association. (2020). *Building your resilience*. https://www.apa.org/topics/resilience/building-your-resilience

Bacchi, S., & Licinio, J. (2017). Resilience and psychological distress in psychology and medical students. *Academic Psychiatry, 41*(2), 185-188.

Beauvais, A. M., Stewart, J. G., DeNisco, S., & Beauvais, J. E. (2014). Factors related to academic success among nursing students: A descriptive correlational research study. *Nurse education today, 34*(6), 918-923.

Bradley, E. C., Robert, D. R., Samantha, N., & Megan, G. (2016). Life happens (outside of college): Non-college life-events and students' likelihood of graduation. *Research in Higher Education, 57*(7), 823-844.

Cheng, V., & Gatling, J. (2015). The role of resilience, delayed gratification and stress in predicting academic performance. *Psychology Teaching Review 21*(1), 13-24.

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd Ed.). Erlbaum.

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76-82.

Daniel, W. W. (2002). Bioestadística: Base para el análisis de las ciencias de la salud [*Bioestadistics: A foundation for analysis in the health sciences*] (4th Ed.). Limusa. (Orig. 1977).

de la Fuente, J., Fernández-Cabezas, M., Cambil, M., Vera, M. M., González-Torres, M. C., & Artuch-Garde, R. (2017). Linear relationship between resilience, learning approaches, and coping strategies to predict achievement in undergraduate students. *Frontiers in Psychology, 8*(1039). doi: 10.3389/fpsyg.2017.01039

Duggal, M., & Mehta, P. (2015). Antecedents to academic performance of college students: An empirical investigation. *Paradigm, 19* (2). doi:10.1177/0971890715609992

Elizondo-Omaña, R. E., García-Rodríguez, M. d. l. A., Hinojosa-Amaya, J. M., Villarreal-Silva, E. E., Avilan, R. I. G., Cruz, J. J. B., & Guzmán-López, S. (2010). Resilience does not predict academic performance in gross anatomy. *Anatomical sciences education, 3*(4), 168-173.

Fajardo, E., Nuñez, M. L., & Sánchez, H. E. (2023). *Educación para la salud en las instituciones de educación superior* [Health education in higher education institutions]. Sello Editorial Universidad del Tolima.

Feldman, L., Goncalves, L., Chacón Puignau, G., Zaragoza, J., Bagés, N., & Pablo, J. d. (2008). Relaciones entre estrés académico, apoyo social, salud mental y rendimiento académico en estudiantes universitarios venezolanos [Relationships between academic stress, social support, mental health and academic performance in Venezuelan university students]. *Universitas Psychologica, 7*(3), 739-751.

Fernández, E. (2017). Una mirada a los desafíos de la educación superior en México [A look at the challenges of higher education in Mexico]. *Innovación Educativa, 17*(74), 183-207.

Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *International Journal of Methods in Psychiatric Research, 12*(2), 65-76.

García-Rojas, K., Salazar-Salvatierra, E., & Barja-Ore, J. (2021). Resiliencia y estrés percibido en estudiantes de Obstetricia de una universidad pública de Lima, Perú [Resilience and perceived stress in Obstetrics students from a public university in Lima, Peru]. *FEM: Revista de la Fundación Educación Médica, 24*(2), 95-99.

González-Ramírez, T., & Pedraza-Navarro, I. (2017). Variables sociofamiliares asociadas al abandono de los estudios universitarios [Socio-family variables associated with dropping out of university studies]. *Educatio Siglo XXI, 35*(2 Jul-Oct), 365-388.

Guerrero, A. M., Ramírez, Y., Rodríguez, M. C., & Muñoz, D. (2022). Manifestaciones de la violencia en el noviazgo en personas estudiantes universitarias: Una revisión integrativa [Manifestations of dating violence in university students: An integrative review]. *Enfermería Actual de Costa Rica, 42*, 104-124. doi: 10.15517/enferm. actual costa rica (en línea).v0i42.47643

Henderson, E. (2006). *La resiliencia en el mundo de hoy* [Resilience for today. Gaining Strenght from Adversity]. Gedisa.

Hernández, C. A., Jiménez, M., & Sánchez, S. (2015). El rendimiento académico en universitarios, una revisión teórica a las variables internas y externas [Academic

performance in university students, a theoretical review of internal and external variables]. In F. Santillán (Ed.), *Experiencias educativas en instituciones de educación superior en Latinoamérica* (pp. 201). Cenit.

Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research, 11*(2), 213-218. doi: 10.1016/0022-3999(67)90010-4

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55.

Kolenikov, S. (2014). Calibrating survey data using iterative proportional fitting (raking). *The Stata Journal, 14*(1), 22-59.

Kumar, U., & Singh, R. (2014). Resilience and Spirituality as Predictors of Psychological Well-Being among University Students. *Journal of Psychosocial Research, 9*(2), 227-235.

Lamas, H. A. (2015). Sobre el rendimiento escolar [About school performance]. *Propósitos y Representaciones, 3*(1), 313-386.

Lee, J. H., Nam, S. K., Kim, A. R., Kim, B., Lee, M. Y., & Lee, S. M. (2013). Resilience: A meta-analytic approach. *Journal of Counseling & Development, 91*(3), 269-279.

León, A., González, S., Barcelata, B. E., & González-Arratia, N. I. (2019). Estrés, autoeficacia, rendimiento académico y resiliencia en adultos emergentes [Stress, self-efficacy, academic performance and resilience in emerging adults]. *Electronic Journal of Research in Educational Psychology, 17* (1), 129-148.

Liebenberg, L., Joubert, N., & Foucault, M.L. (2017). Understanding core resilience elements and indicators. A comprehensive review of the literature. http://lindaliebenberg.com/wp-content/uploads/2017/11/PHAC-Resilience-Report-Final-Version-November-2017.pdf

López-Angulo, Y., Pérez-Villalobos, M. V., Cobo-Rendón, R. C., & Díaz-Mujica, A. E. (2020). Apoyo social, sexo y área del conocimiento en el rendimiento académico autopercibido de estudiantes universitarios chilenos [Social support, sex and area of knowledge in the self-perceived academic performance of Chilean university students]. *Formación Universitaria, 13*(3), 11-18.

Mangrulkar, L., Whitman, C. V., & Posner, M. (2001). *Enfoque de habilidades para la vida para un desarrollo saludable de niños y adolescentes* [Life skills approach for healthy development of children and adolescents]. Pan American Health Organization.

Martínez, G., & Keller, J. (2019). Promoción de la salud mental: Una necesidad ante los síntomas de ansiedad, depresión y síndrome de burnout en el profesorado universitario [Promotion of mental health: A necessity in the face of symptoms of anxiety, depression, and burnout syndrome in university teaching staff]. In A. Valero (Ed.), *Promoción, alfabetización e intervención en salud: Experiencias desde la multidisciplina* (pp. 115-129). Escuela Nacional de Trabajo Social, Universidad Nacional Autónoma de México.

Martínez-González, A., Manzano-Patiño, A. P., García-Minjares, M., Herrera-Penilla, C. J., Buzo-Casanova, E. R., & Sánchez-Mendiola, M. (2018). Grado de conocimientos de los estudiantes al ingreso a la licenciatura y su asociación con el desempeño escolar y la eficiencia terminal. Modelo multivariado [Students' knowledge level upon admission to the degree and its association with school performance and terminal efficiency. Multivariate model]. *Revista de la Educación Superior, 47*(188), 57-85.

Martínez-González, A., Manzano-Patiño, A. P., García-Minjares, M., Herrera-Penilla, C. J., Buzo-Casanova, E. R., & Sánchez-Mendiola, M. (2020). Perfil del estudiante con éxito académico en las licenciaturas del área de las Ciencias Biológicas, Químicas y de la Salud [Profile of the student with academic success in bachelor's degrees in the area of Biological, Chemical, and Health Sciences]. *Revista de la Educación Superior, 49*(193)*, 129-152*.

Martínez-González, A., Soto-Estrada, G., García-Minjares, M., & Sánchez, M. (2021). Perfil de éxito académico en estudiantes de medicina de acuerdo a su trayectoria académica del bachillerato [Profile of academic success in medical students according to their high school academic career]. *Revista Investigación en Educación Médica, 10*(38), 23-31.

Masten, A. S., & Barnes, A. J. (2018). Resilience in children: Developmental perspectives. *Children, 5*(7), 98. doi: 10.3390/children5070098

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American psychologist, 53*(2), 205.

Miranda, M. A., & Guzmán, J. (2017). Análisis de la deserción de estudiantes universitarios usando técnicas de minería de datos. *Formación Universitaria, 10*(3), 61-68.

Norazlan, N., Yusuf, S., & Mohamed, F. (2020). The financial problems and academic performance among public university students in Malaysia. *The Asian Journal of Professional and Business Studies, 1*(2).

Peng, L., Zhang, J., Li, M., Li, P., Zhang, Y., Zuo, X., Miao, Y., & Xu, Y. (2012). Negative life events and mental health of Chinese medical students: The effect of resilience, personality and social support. *Psychiatry Research, 196*(1), 138-141. doi: 10.1016/j.psychres.2011.12.006

Price, R. A. (2023). A review of resilience in higher education: Toward the emerging concept of designer resilience. *Studies in Higher Education, 48*(1), 83-99.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*(2), 353-387. doi: 10.1037/a0026838

Rocha, C., Santiago, N., & Borré-Ortiz, Y. M. (2021). Funcionalidad familiar y rendimiento académico en estudiantes de ciencias de la salud: Una revisión sistemática [Family functionality and academic performance in health sciences students: A systematic review]. *Revista Salud Uninorte, 37*(2), 465-487.

Ruvalcaba, N. A., Villegas, D., Gallegos, J., Morales, A., & Macías, E. (2014). Propiedades psicométricas de la Escala de Resiliencia para Adultos (RSA) aplicada en población mexicana. In S. Rivera, R. Díaz, I. Reyes, & M. M. Flores (Eds.), *La psicología social en México* [Psychometric properties of the Resilience Scale for Adults (RSA) applied in the Mexican population] (Vol. 15, pp. 228-234). Asociación Mexicana de Psicología Social.

Sanci, L., Williams, I., Russell, M., Chondros, P., Duncan, A.-M., Tarzia, L., Peter, D., Limm, M.S.Y., Tomyn, A., & Minas, H. (2022). Towards a health promoting university: Descriptive findings on health, wellbeing and academic performance amongst university students in Australia. *BMC Public Health, 22*(1), 1-24.

Sandín, B. (1995). El estrés [Stress]. In A. Belloch, B. Sandín, & F. Ramos (Eds.), *Manual de Psicopatología* (Vol. 2, pp. 3-52). Mc Graw Hill.

Sandín, B., & Chorot, P. (2017). Cuestionario de sucesos vitales (CSV): Estructura factorial, propiedades psicométricas y datos normativos [Life Events Questionnaire (CSV): Factor structure, psychometric properties and normative data]. *Revista de Psicopatología y Psicología Clínica*, 22(2), 95-115.

Santos, M. Á. (2014). *La evaluación como aprendizaje* [Evaluation as learning] (2nd Ed.). Narcea.

Spence, R., Kagan, L., Nunn, S., Bailey-Rodriguez, D., Fisher, H. L., Hosang, G. M., & Bifulco, A. (2020). Life events, depression and supportive relationships affect academic achievement in university students. *Journal of American College Health*. doi 10.1080/07448481.2020.1841776

Thurston, I. B., Hardin, R., Kamody, R. C., Herbozo, S., & Kaufman, C. (2018). The moderating role of resilience on the relationship between perceived stress and binge eating symptoms among young adult women. *Eating Behaviors, 29*, 114-119.

Tinajero, C., Martínez-López, Z., Rodríguez, M. S., & Páramo, M. F. (2020). Perceived social support as a predictor of academic success in Spanish university students. *Anales de Psicología, 36*(1), 134-142.

Umerenkova, A., & Flores, J. (2017). El papel de la procrastinación académica como factor de la deserción universitaria. *Revista Complutense de Educación, 28*(1), 307-324.

Usuga, A. J., Lemos, N. V., Pinzón, J. L., Pérez, P. F., & Uribe, A. F. (2021). Sucesos vitales estresantes, ansiedad y depresión en estudiantes de una universidad privada de Bucaramanga [Stressful life events, anxiety, and depression in students of a private university in Bucaramanga]. *Informes Psicológicos, 21*(2), 61-74. doi: 10.18566/infpsic.v21n2a04

Van Hoek, G., Portzky, M., & Franck, E. (2019). The influence of socio-demographic factors, resilience and stress reducing activities on academic outcomes of undergraduate nursing students: A cross-sectional research study. *Nurse Education Today, 72*, 90-96.

Veytia, M., González-Arratia, N. I., Andrade, P., & Oudhof, H. (2012). Depresión en adolescentes: El papel de los sucesos vitales estresantes. *Salud Mental, 35*(1), 37-43.

Warnecke, A., & Lewine, R. (2019). First Semester Academic Functioning of College Students: The Role of Stressful and Traumatic Life Events. *International Journal for the Scholarship of Teaching & Learning, 13*(2), 1-10.

Weraarchakul, W., Weraarchakul, W., Thinsathid, N., & Chapawang, C. (2016). Resilience Quotient among Dental Students at Clinical Level, Faculty of Dentistry, Khon Kaen University, Thailand. *Journal of the Medical Association of Thailand, 99*(5), S148-S154.

Wilks, S. E., & Spivey, C. A. (2010). Resilience in Undergraduate Social Work Students: Social Support and Adjustment to Academic Stress. *Social Work Education, 29*(3), 276-288. doi: 10.1080/02615470902912243

Willcox, M. d. R. (2011). Factores de riesgo y protección para el rendimiento académico. Un estudio descriptivo en estudiantes de Psicología de una universidad privada [Risk and protective factors for academic performance. A descriptive study in Psychology students from a private university]. *Revista Iberoamericana de Educación, 55*(1), 1-9.

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in clinical gerontology, 21*(2), 152-169. doi: 10.1017/S0959259810000420.

Zou, P., Sun, L., Yang, W., Zeng, Y., Chen, Q., Yang, H., Zhou, N., Li, Y., Zhang, G., Liu, J., Lin, A., & Cao, J. (2018). Associations between negative life events and anxiety, depressive, and stress symptoms: A cross-sectional study among Chinese male senior college students. *Psychiatry Research, 270*, 26-33. doi: 10.1016/j.psychres.2018.09.019

RECEIVED: November 9, 2022
ACCEPTED: April 8, 2023