



Physical Activity and Engagement Coping: A Key for Stress-Recovery in Mexican University Students

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Physical activity and coping styles are factors that contribute to health status and to the reduction of stress. The aim of this research was to analyze the influence of physical activity and coping styles on recovery-stress state among Regular Physical Activity University Students ($n = 67$) and High-Performance University Athletes ($n = 67$) from a Mexican university. The results show statistically significant differences in the capacity of recovery from stress in High-Performance University Athletes. Additionally, two positive correlations emerged: one of engagement coping and recovery, and one of disengagement coping and stress. The interaction between engagement coping and physical activity predicted general well-being. In females, the engagement coping style predicts recovery from stress. We concluded that physical activity in combination with an engagement coping style contributes to the development of health in university students.

Keywords: sports, coping style, mental health, school sports

According to the World Health Organization, stress is a subjective set of psychological and physiological responses of the human being to cope with complex situations of everyday life (World Health Organization, 2010). It is thought that an adequate amount of stress can be stimulating and positive (eustress), while long-lasting stress (distress) supposes an impairment of social, labor, and personal life (García-Moran & Gil-Lacruz, 2016). The stress response presents an instantaneous reaction to an event, increases alertness, muscular tension, and release of hormones to cope with the situation, and in the best scenario the person comes back to a normal

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state and recovers. However, this reaction can also be long lasting and the body responses can last indefinitely, and this is related to heart disease, hypertension, anxiety, and depression (Fernández-Barradas & Herrera-Meza, 2022).

One of the keys to the developing a good mental health is the ability to overcome everyday stress (Organización Mundial de la Salud, 2013). Nonetheless, due to lifestyles and labor activities of the population, stress increasingly more frequent (Ávila, 2014). In this respect, the Head Office of the Department of Social Communication of Universidad Nacional Autónoma de México (Dirección General de Comunicación Social, 2022) points out that Mexico is considered as one of the countries with the highest levels of stress, surpassing countries such as China and the United States. It is thought that >70% of the working population show symptoms of stress due to work overload, labor responsibilities, and long working hours (Condoyque-Méndez et al., 2016; Dirección General de Comunicación Social, 2022). This condition is not exclusive of the work sphere, as the Office of Scientific and Technological Information of the Congress of the Union reports that students of all levels are exposed to highly stressing situations, derived from homework overload, low academic achievement, and school dropout (Oficina de Información Científica y Tecnológica para el Congreso de la Unión, 2018; Toribio-Ferrer & Franco-Bárceñas, 2016).

In this regard, some studies have found that the higher the level of education, the stress tends to increase, placing the university students in a critical stage since the increase in academic activities in combination with poor stress management generates health conditions such as anxiety and depression (Castillo & Castillo, 2015; Castillo-Pimienta et al., 2016; Rearte, 2013; Rull et al., 2011), often related to ineffective coping strategies (Cuamba-Osorio & Zazueta-Sánchez, 2020; Figueroa et al., 2005).

Coping strategies are cognitive, and behavioral resources are continuously employed to manage the pressures of the environment (Lazarus & Folkman, 1986), while coping style constitutes a set of coping strategies employed by individuals to cope with stressing situations (Cano et al., 2007). Coping styles are usually classified according to their functionality in coping with stressful situations, the most used classifications are problem-focused and emotional regulation (Oblitas, 2010). However, coping can also be explained from an adaptive perspective that combines these two styles, creating a new categorization with two different coping styles: engagement and disengagement (Tobin et al., 1989; Zimmer-Gembeck & Skinner, 2016). Engagement coping aims to get people involved with the stressful situation they are facing and achieve a solution that does not generate any distress, and is composed by the following strategies: (a) problem solving, (b) social support, (c) cognitive restructuring, and (d) emotional expression. While disengagement coping disconnects the person from the stressful situation, without providing a solution to the problem and is composed of (a) problem avoidance, (b) social withdrawal, (c) desiderative thinking, and (d) self-criticism.

Several research studies have observed that people practicing sports or other frequent physical activities tend to use coping strategies related to engagement coping styles (Hogrefe et al., 2018; Juarros, 2016; Secades et al., 2015), considered as healthy styles (Chau & Vilela, 2017; Paris & Omar, 2009). Also, it has been observed that the use of coping strategies from the engagement styles such as

emotional expression, identification of emotions, modification of thinking, and social support is related to stress reduction (Esmailmotlagh et al., 2018; Fernández et al., 2020). Conversely, the use of disengagement coping strategies such as self-critical thoughts, social withdrawal, or avoidance is normally related to high levels of stress, anxiety, and depression (Chau & Vilela, 2017; Cuamba-Osorio & Zazueta-Sánchez, 2020).

On the other hand, recent studies have revealed that physical exercise and practicing sports at different ages can constitute a strategy to decrease the effects of stress (Cosma et al., 2020; Mariani et al., 2020). In sports science, the stress-recovery model considers that it is not bad to have high levels of stress if there is adequate recovery. An adequate state of recovery is characterized by good sleeping, socializing with peers, feeling successful in daily activities, and good physical recovery; this will lead people to an adequate and successful reaction to stressful situations. While a low level of recovery will generate high levels of stress in the individual which will limit the possibility of recovery, creating a harmful vicious cycle for the person (Kellmann, 2010; Kellmann & Kallus, 2016).

Studies in high-performance athletes showed a relationship between recovery and some coping strategies (Molinero & Salguero, 2012; Secades et al., 2015), as well as an adequate recovery with the interaction of problem-focused coping styles and emotional regulation coping styles (Aranza et al., 2021). Conversely, studies in populations of university students who do not practice extracurricular sports show higher levels of stress (Lemos, 2018).

Research on gender has described that females have higher levels of stress compared with males (Pozos-Radillo et al., 2015; Rull et al., 2011; Vidal-Conti et al., 2018). However, studies reveal that, despite this condition, the female gender usually perceives greater psychological well-being, personal self-growth, and development of strategies related to the engagement coping style (Huamán & Huamán, 2019; Matalinares et al., 2016). Although the literature in this domain is varied and not many studies have been found to be consistent with this type of assumption. Likewise, it has been detected that students who use engagement coping strategies have an easier time adapting to daily school demands, while those who opt for disengagement strategies are a potential population to experience mental health damage related to the conditions of the academic context (Ferradás-Canedo et al., 2021).

One of these conditions shows evidence that students tend to decrease their levels of physical activity during university life (García-Puello et al., 2018; Rodríguez-Rodríguez et al., 2018). Specifically in Mexico, only 20% is physically active enough to have health benefits (Instituto Nacional de Estadística y Geografía, 2022), including the university population in these statistics. This situation may be determinant for the increase of stress levels. The presence of these two conditions leaves university students in a critical stage that can generate health affections in general. This is why carrying out studies that show the benefits derived from the practice of sports in university populations can become a viable strategy for the health promotion through physical sports activity.

For this reason, the present study was aimed to analyze the influence of physical activity and coping styles on the stress-recovery state in Regular Physical Activity University Students (RPAUS) and High-Performance University Athletes

(HPUA), hypothesizing that both physical activity and engagement coping style would predict a greater recovery from stress.

Methods

Participants

A total of 134 university students (females $n = 72$, males $n = 62$) aged 18–24 years ($M = 20.74$, $SD = 1.91$) from Universidad Veracruzana, Veracruz, México, participated. It was a nonprobabilistic convenience sample. The students were registered in 32 different undergraduate programs in the period February–May 2022.

Participants were assigned to two groups: (a) HPUA ($n = 67$) and (b) RPAUS ($n = 67$). Thirty-six females and 31 males were admitted in each group. HPUA are students who represent their university in local, state, national, and international competitions, while RPAUS are university students who perform activities such as going to school, walking in parks or public squares, and going to the gym, but without formal or high-performance sports practice.

The participants had to fulfill the following inclusion criteria: (a) HPUA group: (1) be part of a team registered at the Department of Sports Activities and (2) train with the corresponding team five or more sessions a week. (b) RPAUS group: (1) not be part of a team registered at Department of Sports Activities and (2) practice a physical activity 2 or more days a week. The exclusion criteria included: (a) to have neuropsychological disorder, (b) to be under psychiatric treatment, or (c) have a chronic degenerative disease. Finally, the elimination criteria were: (a) not completing an assessment, (b) abandoning the sports team, or (c) not attending the research study visits.

Procedure

The study was conducted from January 2022 to April 2022. The principles of the Declaration of Helsinki were complied with and the project was approved by an Ethics Committee in Research (registration: CONBIOÉTICA-30-CEI-006-20191210) and folio 202106. To have access to HPUA students, an authorization was requested to the University Sport Activities Department and the different university careers for the RPAUS group. An invitation was sent to the potential participants within the campus in different schools and spaces for training sports, with an explanation of the objectives and scope of the study. A pilot test was done where measuring instruments were employed with a total of 15 participants (none of them were to participate in the study), to make sure that the different scenarios and the methods were appropriate for the study. Last, all the students who complied with the inclusion criteria and agreed to sign the informed consent became participants in the study (see Figure 1). They first provided sociodemographic data such as age, years of sports practice, academic career, and academic period. They then answered the Coping Strategies Inventory, International Physical Activity Questionnaire, and Recovery-Stress Questionnaire in the educational or sports facilities in groups. Finally, the results were sent to the University Sport Activities Department and the student who requested them via email.

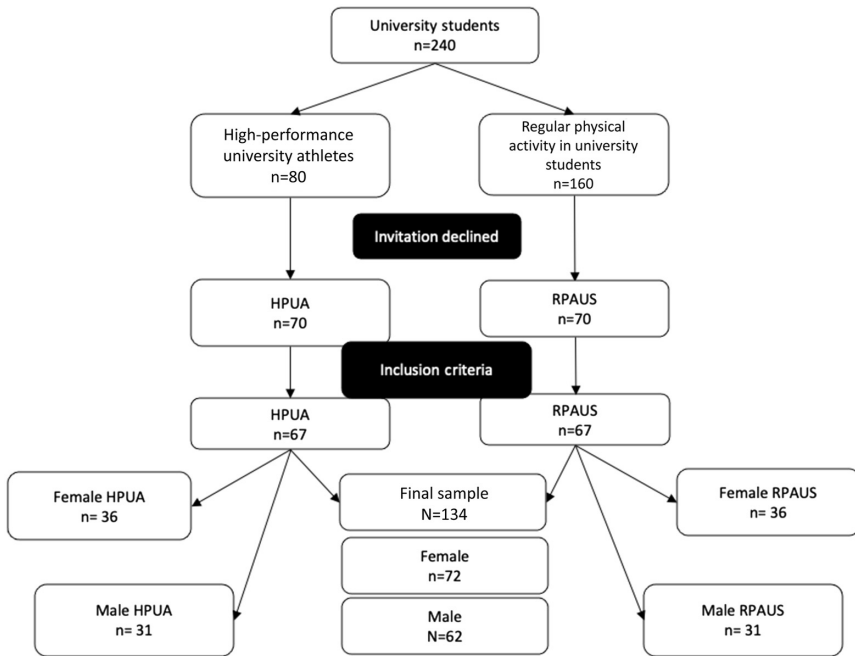


Figure 1 — Participants flowchart. HPUA = High-Performance University Athletes; RPAUS = Regular Physical Activity University Students.

Instruments

Coping Styles

Coping was assessed using the Coping Strategies Inventory composed of 49 items. The frequency with which the participants engaged in the different activities described in each item was measured on a Likert scale (from 1 to 5). To analyze the coping styles, the third hierarchical factor of Tobin et al. (1989) was used, where it is considered that an engagement coping style is made up of the strategies (a) problem solving, (b) cognitive restructuring, (c) emotional expression, and (d) social support, reflecting an active and adaptive effort to compensate for the stressor. And that the disengagement coping style consists of (a) problem avoidance, (b) wishful thinking, (c) social withdrawal, and (d) self-critical thoughts, showing a passive and nonadaptive coping with the stressor. This instrument has a version in Spanish and a validation in Mexico (Cano et al., 2007; Quiroz & Méndez, 2010). Cronbach's alpha was used to determine the consistency of the employed scales; in addition to this, Composite Reliability (CR) was determined for every scale used, which resulted in acceptable scores for the disengagement coping scale ($\alpha = .83$, $CR = 0.75$), and for the engagement coping scale ($\alpha = .87$, $CR = 0.71$), according to literature (Hair et al., 2010).

Physical Activity

For the assessment of physical activity, the International Physical Activity Questionnaire in short version was used, developed in 12 different countries (Craig et al., 2003) and with validation in Mexico (Medina et al., 2013). The instrument consists of seven items collecting information about activities of housekeeping, gardening, labor activities, transport, free time, and sedentary activities. Three characteristics of physical activity were evaluated: (a) intensity (light, moderate, or vigorous), (b) frequency (days per week), and (c) duration (time per day). Physical activity is registered in metabolic equivalent tasks (METs), walking = 3.3 METs, moderate physical activity = 4 METs, and vigorous physical activity = 8 METs (Mantilla-Tolosa & Gómez-Conesa, 2007).

Recovery-Stress

The Recovery-Stress Questionnaire consists of 48 items using a Likert scale going from 0 (*never*) to 6 (*always*). The scale is divided into 12 subscales identifying sources of stress and recovery perceived by the individual. Stress consists of physical alterations, lack of energy, conflicts-pressure, social stress, emotional stress, general stress, and fatigue, while recovery consists of success, social recovery, physical recovery, general well-being, and sleep quality. This instrument has been validated in Mexico for young athletes (Reynoso-Sánchez et al., 2021). Cronbach's alpha and CR were determined for general stress ($\alpha = .83$, CR = 0.85), emotional stress ($\alpha = .81$, CR = 0.87), social stress ($\alpha = .85$, CR = 0.86), success ($\alpha = .74$, CR = 0.74), social recovery ($\alpha = .82$, CR = 0.84), physical recovery ($\alpha = .76$, CR = 0.77), general well-being ($\alpha = .86$, CR = 0.87), and sleep quality ($\alpha = .71$, CR = 0.71), subscales for physical alterations, lack of energy, conflicts-pressure, and fatigue were excluded, as they resulted in a value lower than the recommendation (Hair et al., 2010).

Data Analysis

The analyses were done using a statistical package for Social Sciences (SPSS version 24) and Jeffrey's Amazing Statistics Program (version 17.2.1) for Macintosh Operating System. To evaluate the normality of data, the Shapiro-Wilk test was run, resulting in normality for variables of engagement and disengagement coping styles ($p > .05$) and nonnormal data for the remaining stress-recovery subscales ($p < .05$). To run comparisons between groups, Student's *t* tests for the scales of engagement coping and disengagement coping were conducted; Mann-Whitney *U* test was used for physical activity, general stress, emotional stress, social stress, success, social recovery, physical recovery, general well-being, and sleep quality scales for independent samples. In addition, Cohen's *d* was used to determine the effect size (Cohen, 1988) being 0.30 = small, 0.50 = medium, and 0.80 = large, for the interpretation of this value (Dominguez-Lara, 2018). In the correlations of physical activity, engagement coping and disengagement coping with general stress, emotional stress, social stress, success, social recovery, physical recovery, general well-being, and sleep quality, Spearman's rho was used. Finally, to analyze the influence of the coping styles and physical activity on stress-recovery, a binary logistic regression analysis was executed, through the

dichotomization of dependent variables with the use of tertiles assuming that those participants with scores in the third tertile show the evaluated trait.

Results

Table 1 shows the comparison in general, and by gender, for engagement and disengagement coping style, showing that there are statistically significant differences ($p < .05$) between HPUA and RPAUS groups using both coping styles, scores being higher in the HPUA group with a small and medium effect size ($d = 0.46, 0.66$, and 0.22). This difference was not observed when females and males were analyzed separately.

In terms of physical activity, the Mann–Whitney U test shows statistically significant differences in the comparisons in general and by gender, favoring the HPUA group with a large effect size ($d = 0.79, 0.83$, and 0.82). Also, higher levels with small effect size in physical recovery ($d = 0.34$) and general well-being ($d = 0.40$) scales were observed in HPUS in comparison with RPAUS ($p < .05$). Separate comparisons showed that HPUA females have higher levels ($p < .05$) with medium effect size in the success ($d = 0.52$), social recovery ($d = 0.62$), and general well-being (0.49) scales when compared with females in RPAUS. Comparisons in males showed no statistically significant differences (see Table 1).

Table 2 shows the Spearman correlation tests done. In the total population, positive and statistically significant correlations were detected ($p < .05$) between the disengagement coping and general, emotional, and social stress, while the engagement coping style and physical activity had positive correlations with success, social recovery, physical recovery, general well-being, and sleep quality.

As to correlations by gender, in the case of females, the disengagement coping style has a positive correlation ($p < .05$) with general stress and emotional stress, while it had a negative correlation with sleep quality. On the contrary, the engagement coping style has a positive correlation with success, social recovery, physical recovery, general well-being, and sleep quality, while physical activity only has a correlation with physical recovery and general well-being.

For males, positive and statistically significant correlations were detected between the disengagement coping and general, emotional, and social stress. The engagement coping style showed correlations with success and social recovery. Physical activity showed no correlation with none of the variables (see Table 2).

The binary logistic regression analyses had as an adjustment of goodness criterion, the Hosmer–Lemeshow test ($p > .05$). Table 3 shows the odds ratio (OR) and the variance explained by the coping styles and physical activity on the stress-recovery subscales. For the total of participants, the disengagement coping style showed 1.031 (OR) times more probability of having high scores in general stress social recovery. Also, the engagement coping style showed 1.046 (OR) times more probability of having high scores in social recovery, while physical activity showed 3.44 (OR) times more probability of high scores in physical recovery. Finally, interaction between engagement coping style and physical activity showed 1.067 (OR) more probability of having high scores in general well-being.

In the case of females, the engagement coping style has an OR of 1.042 on social recovery, an OR of 1.111 on success, an OR of 1.072 on physical recovery,

Table 1 Comparison Between HPUA Versus RPAUS in Coping Style and Recovery-Stress

Coping style	HPUA	RPAUS	Sig.	<i>t</i>	Cohen's <i>d</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Engagement coping					
General	49.56 (14.66)	42.83 (14.34)	.00*	−2.68	0.46
Female	50.55 (15.15)	40.86 (13.77)	.00*	−2.83	0.66
Male	48.41 (14.22)	45.12 (14.87)	.37	−.89	0.22
Disengagement coping					
General	42.53 (17.33)	35.8 (14.81)	.01*	−2.40	0.41
Female	41.94 (18.77)	34.13 (14.69)	.05	−1.96	0.46
Male	43.22 (15.76)	37.80 (14.94)	.17	−1.38	0.35
	HPUA	RPAUS	Sig.	<i>z</i>	Cohen's <i>d</i>
	Mean rank (<i>M</i>)	Mean rank (<i>M</i>)			
Physical activity (METs)					
General	85.25 (7,394.65)	49.75 (4,053.64)	.00*	−5.29	0.79
Female	46.86 (6,294.61)	26.14 (3,544.97)	.00*	−4.20	0.83
Male	39.34 (8,672.12)	23.66 (4,644.35)	.00*	−3.42	0.82
Recovery-stress	HPUA	RPAUS	Sig.	<i>z</i>	Cohen's <i>d</i>
	Mean rank (<i>M</i>)	Mean rank (<i>M</i>)			
General stress					
General	65.92 (2.12)	69.08 (2.20)	.63	−0.47	0.05
Female	36.83 (2.50)	36.17 (2.39)	.89	−0.13	0.06
Male	29.56 (1.68)	33.44 (1.99)	.39	−0.84	0.23
Emotional stress					
General	64.73 (2.14)	70.27 (2.28)	.40	−0.82	0.10
Female	34.83 (2.33)	38.17 (2.44)	.49	−0.67	0.08
Male	30.37 (1.93)	32.63 (2.00)	.62	−0.49	0.13
Social stress					
General	65.30 (2.00)	69.70 (2.16)	.51	−0.65	0.12
Female	35.31 (2.24)	37.69 (2.39)	.62	−0.48	0.11
Male	30.90 (1.72)	32.10 (1.90)	.79	−0.26	0.13
Success					
General	73.74 (4.14)	61.26 (3.74)	.06	−1.86	0.35
Female	41.54 (4.09)	31.46 (3.46)	.04*	−2.04	0.52
Male	32.61 (4.21)	30.39 (4.06)	.62	−0.48	0.14
Social recovery					
General	71.17 (3.78)	61.26 (3.42)	.06	−1.86	0.25

(continued)

Table 1 (continued)

Recovery-stress	HPUA	RPAUS	Sig.	z	Cohen's <i>d</i>
	Mean rank (<i>M</i>)	Mean rank (<i>M</i>)			
Female	41.96 (3.94)	31.04 (3.06)	.02*	-2.21	0.62
Male	30.02 (3.59)	32.98 (3.83)	.51	-0.64	0.16
Physical recovery					
General	74.84 (3.36)	60.16 (2.94)	.02*	-2.19	0.34
Female	41.07 (2.89)	31.93 (2.45)	.06	-1.85	0.36
Male	41.07 (3.91)	31.93 (3.50)	.09	-1.69	0.38
General well-being					
General	75.21 (4.14)	59.79 (3.66)	.02*	-2.30	0.40
Female	41.46 (4.00)	31.54 (3.40)	.04*	-2.01	0.49
Male	34.19 (4.32)	28.81 (3.96)	.23	-1.18	0.30
Sleep quality					
General	68.42 (3.29)	66.58 (3.16)	.78	-0.27	0.09
Female	36.36 (3.05)	36.64 (2.94)	.95	-0.05	0.08
Male	32.35 (3.56)	30.65 (3.42)	.70	-0.37	0.11

Note. HPUA = High-Performance University Athletes; RPAUS = Regular Physical Activity University Students; Sig. = significance.

* $p < .05$.

and an OR of 1.082 on general well-being. For the males, disengagement coping showed an OR of 1.057 on social stress, while engagement coping had an OR of 1.039 on success and an OR of 1.050 on social recovery.

Discussion

The objective of this study was to evaluate the influence of physical activity and the coping styles on recovery-stress state in HPUA and RPAUS. Research in this field has reported that university students that are physically active show a greater use of engagement coping strategies (Hogrefe et al., 2018; Juarros, 2016; Secades et al., 2015). In the present study, the group of HPUA showed a greater use of engagement coping styles. This is consistent with findings in other research studies where it is pointed out that the constant exposition to sports and competitive environments contributes to the development of engagement coping strategies such as problem solving, emotional regulation, and cognitive restructuring (Chirivella et al., 2015; Chirivella & Checa, 2015).

Considering that sports people can use a healthier coping, recent research studies have postulated that engaging in physical exercise and sports reduces stress in several populations (Barbosa-Granados et al., 2020; Barbosa Granados & Urra Cuéllar, 2018; Cosma et al., 2020; Mariani et al., 2020). However, in this study the levels of stress in RPAUS and HPUA were similar ($p > .05$). This finding could be related to two conditions, the first one is the amount of physical activity of university students not being part of the HPUA group, and second, both groups

Table 2 Correlation Between Physical Activity, Coping Styles, and Stress-Recovery

Spearman's rho	Physical activity METs	Engagement coping	Disengagement coping
General stress			
General	−.06	−.07	.30**
Female	.01	−.21	.28*
Male	−.08	.11	.38**
Emotional stress			
General	−.06	−.05	.32**
Female	−.03	−.19	.26**
Male	−.05	.12	.44**
Social stress			
General	−.09	−.04	.27**
Female	−.02	−.21	.16
Male	−.09	.17	.46**
Success			
General	.24**	.45**	.05
Female	.20	.56**	.05
Male	.23	.31*	.05
Social recovery			
General	.24**	.36**	.03
Female	.29	.36**	−.04
Male	.16	.39**	.10
Physical recovery			
General	.23**	.33**	.04
Female	.26*	.53**	−.05
Male	.15	.21	.20
General well-being			
General	.30**	.34**	−.04
Female	.34**	.49**	.07
Male	.20	.18	−.21
Sleep quality			
General	.18*	.18*	−.22*
Female	.21	.31**	−.30**
Male	.11	.04	−.16

* $p < .05$. ** $p < .01$.

share the condition of being university students which is a stressful situation by itself (Chacón-Cuberos et al., 2019; Pozos-Radillo et al., 2015). It is important to consider that HPUA group has very demanding physical preparation with tight schedules, rigorous nutrition plans, and multiple activities that can increase

perceived stress levels (Gouttebarga et al., 2019; Rice et al., 2019), generating a similar level of stress to the RPAUS group. Despite this, it should be noted that although stress levels are similar, recovery levels did present differences that favor HPUA, partially coinciding with previous studies that postulate a decrease in perceived stress (thanks to high recovery) in physically active people.

On the other hand, it has been reported that females show higher levels of stress compared with males (Pozos-Radillo et al., 2015; Rull et al., 2011; Vidal-Conti

Table 3 Coefficients of Multiple Logistic Regression Model With Significant Factors Only

Independent variable	R^2 Nagelkerke	B	Sig.	OR	95% CI Exp (B)	
					Lower	Higher
Logistic regression ($n = 134$)						
General stress						
Disengagement coping	.07	0.03	.01	1.03	1.00	1.05
Social recovery						
Engagement coping	.11	0.04	.00	1.04	1.00	1.07
General well-being						
Physical activity ^a		-2.08	.81	0.12	0.00	2.14
Engagement coping ^a		-0.00	.15	0.94	0.94	1.04
Physical activity engagement coping ^b	.17	0.06	.04	1.06	1.00	1.13
Physical recovery						
Physical activity	.08	1.23	.00	3.44	1.43	8.23
Female logistic regression ($n = 72$)						
Social recovery						
Engagement coping	.09	0.04	.03	1.04	1.00	1.08
Success						
Engagement coping	.36	0.10	.00	1.11	1.05	1.17
Physical recovery						
Engagement coping	.18	0.07	.00	1.07	1.01	1.12
General well-being						
Engagement coping	.25	0.07	.00	1.08	1.03	1.13
Male logistic regression ($n = 62$)						
Social stress						
Disengagement coping	.15	0.05	.01	1.05	1.01	1.10
Success						
Engagement coping	.09	0.03	.04	1.03	1.00	1.08
Social recovery						
Engagement coping	.13	0.04	.01	1.05	1.00	1.09

Note. OR = odds ratio; CI = confidence interval; Sig. = significance.

^aNonpredictor variable. ^bInteraction between predictor variables.

et al., 2018). However, some studies show that despite this, females show greater psychological well-being, social competence, personal development, and emotional expression compared with males (Huamán & Huamán, 2019; Matalinares et al., 2016). The results of the present research are consistent with this postulate but show that females present better recovery from stress with higher scores in success, social recovery, physical recovery, and general well-being, even more so in the group of high-performance female student-athletes. This can be attributed to the fact that women regulate their thoughts more efficiently and pay more attention to their emotional responses in stressful situations (Piemontesi et al., 2012; Vidal-Conti et al., 2018), which are coping strategies of the engagement style.

Conversely, it has been established that the disengagement coping styles may trigger health impairments (Chau & Vilela, 2017; Cuamba-Osorio & Zazueta-Sánchez, 2020; Figueroa et al., 2005). In this regard, our data analysis shows the use of disengagement coping styles in the presence of general stress, social stress, and emotional stress. While a relationship between the engagement coping style and the elements of recovery, such as success, social recovery, physical recovery, general well-being, and sleep quality was observed. These results are consistent with other research studies with university student-athletes, reporting that the strategies in the engagement coping style (cognitive restructuring, emotional expression, social support, and problem solving) can mitigate the effects of stress (Esmailmotlagh et al., 2018; Fernández et al., 2020). This leads to a causal relationship between the combination of problem-focused and emotional regulation coping strategies with the ability to recover from stress with a healthier perspective (Aranza et al., 2021; Tobin et al., 1989).

Additionally, literature reports that the coping styles can predict a better health state (Cuamba-Osorio & Zazueta-Sánchez, 2020; Huamán & Huamán, 2019; Paris & Omar, 2009), which also suggests that physical activity can provide the population with higher levels of well-being (Barbosa-Granados et al., 2020; Jiménez & Martínez, 2008), even with a moderating role in the reduction of some symptoms related to anxiety and stress (Morales-Beltrán et al., 2022). The results of the regressions carried out showed that university students with the highest level of physical activity did not show adequate recovery from stress, regardless of gender. However, the use of engagement coping style did show a greater probability of recovery from stress, as well as an interaction with physical activity that increases the probability of greater general well-being. This allows to infer that being a high-performance athlete might not be enough to have a better state of recovery, which may be related to the physical and psychological demands that practicing sports under these conditions can generate (Gouttebarger et al., 2019; Rice et al., 2019). This infers that physical activity at different levels requires certain guidelines to improve the state of mental health in general. At the same time, more evidence is generated about mental health and its multifactorial characteristics (social environment, personal experiences, genetic factors, etc.) which, in turn, can contribute to the development of more effective and healthier coping styles.

This becomes important because only 2% of the health-related costs in Mexico is destined to mental health and, most of it, is invested in the infrastructure of psychiatric hospitals while very little is destined to programs that aim at the prevention and promotion of mental health through different strategies (Oficina de Información Científica y Tecnológica para el Congreso de

la Unión, 2018), such as the promotion of sports practicing. In addition, in Mexico only 40% of the population considers itself physically active, although only 20% actually gets enough physical activity to have health benefits in general (Instituto Nacional de Estadística y Geografía, 2021, 2022). This condition evidences a high level of sedentary lifestyles throughout the Mexican population, which is reflected in multiple health indicators, such as obesity, chronic degenerative diseases, and high levels of stress.

To address the problem, the Mexican government has a set of objectives to promote physical activity and sport, including the development of healthy universities, and the increase in the quantity and quality of scientific research and dissemination to contribute to the updating and improvement of physical culture and sport professionals (Comisión Nacional de Cultura Física y Deporte, 2021). Due to these conditions, promoting physical activity, sports practice, and psychological support becomes a priority to improve mental and physical health not only in Mexican university students but also in general population.

As for the limitations of the present study, there are two issues with the sample, the first one is that a group of sedentary students was not included as has been done in other research; the second one is that the sample size does not allow making stronger inferences in this research. In addition, data collection was carried out during the period in which university students returned to their academic activities after the confinement caused by the COVID-19 pandemic, which was an important condition that reduced physical activity in many sectors of the population (Maugeri et al., 2020). It is important to note that the transversal research design used allows comparisons, correlations, and predictions to be established at a specific moment in time. It is not known whether at any time during the academic period, the results are affected considering factors such as the different university programs, the load of activities in each program, the school period, the gender, or any other sociodemographic variable. Finally, it is important to point out that the indirect assessment of physical activity through the International Physical Activity Questionnaire has been shown to be a reliable tool in some populations; however, it also has the weakness that each person indicates his or her physical activities; therefore, influences the calculation of METs. In this way, athletes could underestimate their own physical activity and score themselves with a lower level, while sedentary people could consider themselves with a higher level of physical activity, due to the social desirability of sports practice and its influence on health status (Mella-Norambuena et al., 2019).

One of the strengths of this research is the use of a model of coping styles combining problem-focused and emotional regulation, creating engagement and disengagement styles (Tobin, et al., 1989). This classification explains coping from a more adaptive and healthier perspective, versus the traditional approach where strategies or styles are analyzed separately (Hogrefe et al., 2018; Matalinares et al., 2016). Likewise, not only the isolated effects of physical activity on health were analyzed but a combination of engagement coping styles was produced, which allowed the observance of the results, the interactions of these variables, and their contribution to the health of university students. It is worth noting that both physical activity (Barbosa-Granados et al., 2020; Cervelló et al., 2014) and coping styles (Cosma et al., 2020; Mariani et al., 2020) have traditionally been analyzed individually.

Clinical Implications

The results presented here give rise to a multidisciplinary work involving psychology within the exercise and sport sciences, where the psychologist is not only related to the treatment of mental disorders but also involved with the development of the health of people who are related to the world of physical activity. In addition, it can help university students to raise awareness about the importance of taking care of both physical and mental health through physical activity, exercise, sport, and the development of new coping strategies. Likewise, the results of this study give rise to the use of other types of analysis, such as cluster analysis or person-centered approaches. Furthermore, although indirect assessment of physical activity is important, direct assessment through strength or endurance tests may be a more reliable strategy to determine a person's level of physical activity and thus generate more reliable inferences about the influence of physical activity on several psychological variables. Finally, two guidelines are considered to intervene with this population, the first one is the development of academic programs that consider the practice of sports as a recurrent activity in all university students, the second is to create specialized mental health services that can provide support and containment to university students who are currently high-performance athletes. In this way, it is possible to contribute to the increase of physical activity and the development of more effective coping styles in university populations.

Conclusions

As a conclusion, it can be affirmed that better recovery from stressful demands among university students is related to the use of engagement coping and the level of physical activity. Also, the empirical evidence indicates that females show a tendency to use emotional regulation strategies, because the engagement styles (cognitive restructuring and emotional expression) are possible their best way to favor recovery from stress.

References

- Aranza, M., Salguero, A., Molinero, O., & Boleto, A. (2021). Modelo predictivo de los niveles de estrés y recuperación en nadadores de competición. *Revista de Psicología del Deporte*, 30(1), 49–59.
- Ávila, J. (2014). El estrés, un problema de salud del mundo actual. *Revista Con-ciencia Iº*, 2(1), 115–124.
- Barbosa-Granados, S., Grajales-Ramírez, P., & Yepes-Osorio, D. (2020). Capítulo 11: Descripción del perfil psicológico en deportistas universitarios colombianos. In *Frontera y Salud Mental* (22nd ed.). Universidad Simón Bolívar. <https://doi.org/10.17081/r.book.2022.08.7060>
- Barbosa Granados, S.H., & Urrea Cuéllar, Á.M. (2018). Influencia del deporte y la actividad física en el estado de salud físico y mental: Una revisión bibliográfica. *Revista Katharsis*, 25, 155–173. <https://doi.org/10.25057/issn.2500-5731>
- Cano, F., Rodríguez, L., & García, J. (2007). Adaptación Española del Inventario de Estrategias de Afrontamiento. *Acta Española Psiquiátrica*, 35(1), 29–39.

- Castillo, R.A.D., & Castillo, G.D. (2015). Influence of stress on the academic performance of a group of college students. *Educación y Ciencia*, 4(43), 10–15. <https://doi.org/10.34293/sijash.v10i1.4664>
- Castillo-Pimienta, C., Chacón, T., & Díaz-Véliz, G. (2016). Ansiedad y fuentes de estrés académico en estudiantes de carreras de la salud. *Investigación en Educación Médica*, 5(20), 230–237. <https://doi.org/10.1016/j.riem.2016.03.001>
- Cervelló, E., Peruyero, F., Montero, C., González-Cutre, D., Beltrán-Carrillo, V.J., & Moreno-Murcia, J.A. (2014). Ejercicio, bienestar psicológico, calidad de sueño y motivación situacional en estudiantes de educación física. *Cuadernos de Psicología del Deporte*, 14(3), 31–38. <https://doi.org/10.4321/S1578-84232014000300004>
- Chacón-Cuberos, R., Zurita-Ortega, F., Olmedo-Moreno, E.M., & Castro-Sánchez, M. (2019). Relationship between academic stress, physical activity and diet in university students of education. *Behavioral Sciences*, 9(6), Article 59. <https://doi.org/10.3390/bs9060059>
- Chau, C., & Vilela, P. (2017). Determinantes de la salud mental en estudiantes universitarios de Lima y Huánuco. *Revista de Psicología*, 35(2), 387–422. <https://doi.org/10.18800/psico.201702.001>
- Chirivella, E.C., & Checa, I. (2015). Estrategias de afrontamiento, optimismo y satisfacción con la vida en futbolistas españoles y polacos: Un estudio preliminar. *Revista de Psicología del Deporte*, 22(2), 337–343.
- Chirivella, E.C., Esquivá, I.C., & González, M.Y.V. (2015). Bienestar psicológico y ansiedad competitiva: El papel de las estrategias de afrontamiento. *Revista costarricense de Psicología*, 34(2), 71–78.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). L. Erlbaum Associates.
- Comisión Nacional de Cultura Física y Deporte. (2021). Programa Institucional para el desarrollo de Cultura Física y Deporte. In *Programa Institucional Derivado del Plan Nacional de Desarrollo 2019–2021*.
- Condoque-Méndez, K.J., Herrera-Pérez, A.E., Ramírez-Pacheco, A., Hernández, P.L., & Hernández-Arzola, L.I. (2016). Nivel de Estrés en los Estudiantes de las Licenciaturas en Enfermería y Nutrición de la Universidad de la Sierra Sur. *Salud y Administración*, 4(9), Article 10.
- Cosma, G., Chiracu, A., Stepan, R., Cosma, A., & Păunescu, C. (2020). Impact of coping strategies on sport performance. *Journal of Physical Education and Sport*, 20(3), 1380–1385. <https://doi.org/10.7752/jpes.2020.03190>
- Craig, C.L., Marshall, A.L., Sjöström, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J.F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, 35(8), 1381–1395. <https://doi.org/10.1249/01.MSS.0000078924.61453.FB>
- Cuamba-Osorio, N., & Zazueta-Sánchez, N. (2020). Salud mental, habilidades de afrontamiento y rendimiento académico en estudiantes universitarios. *PSICUMEX*, 10(2), 71–94. <https://doi.org/10.36793/psicumex.v10i2.351>
- Dirección General de Comunicación Social. (2022). Los mexicanos, los más estresados en el mundo. UNAM. https://www.dgcs.unam.mx/boletin/bdboletin/2022_305.html
- Dominguez-Lara, S. (2018). Magnitud del efecto, una guía rápida. *Educación Médica*, 19(4), 251–254. <https://doi.org/10.1016/j.edumed.2017.07.002>
- Esmailmotlagh, M., Oveisi, K., Alizadeh, F., & Asadollahi Kheirabadi, M. (2018). An Investigation on coping skills training effects on mental health status of university students. *Journal of Humanities Insights*, 2(1), Article 430. <https://doi.org/10.22034/jhi.2018.61430>
- Fernández, D.E.L., Briceño, O.B.S., & Selye, H. (2020). Estrategias de afrontamiento como intervención al estrés en futbolistas Coping strategies as stress intervention in soccer players. *Retos*, 36, 613–619. <https://doi.org/10.47197/retos.v38i38.75724>

- Fernández-Barradas, E.Y., & Herrera-Meza, S. (2022). Educación en el deporte: Una píldora para eliminar el estrés. *Eduscientia. Divulgación de la Ciencia Educativa*, 5(9), Article 12.
- Ferradás-Canedo, M.D.M., Freire-Rodríguez, C., & González-Rico, P. (2021). Flexibilidad en el afrontamiento del estrés y fortalezas personales en estudiantes universitarios. *European Journal of Child Development, Education and Psychopathology*, 14, Article 400. <https://doi.org/10.32457/ejep.v14i1.1400>
- Figueroa, M.I., Contini, N., Lacunza, A.B., & Levín, M. (2005). Las estrategias de afrontamiento y su relación con el nivel de bienestar psicológico. Un estudio con adolescentes de nivel socioeconómico bajo de Tucumán (Argentina). *Anales de Psicología*, 21(1), 66–72. <https://revistas.um.es/analesps/article/view/27171>
- García-Moran, M.C., & Gil-Lacruz, M. (2016). El estrés en el ámbito de los profesionales de la salud. *Persona*, 19, Article 968. <https://doi.org/10.26439/persona2016.n019.968>
- García-Puello, F., Herazo-Beltrán, Y., Vidarte-Claros, J.A., García-Jimenez, R., & Crissien-Quiroz, E. (2018). Evaluación de los niveles de actividad física en universitarios mediante método directo. *Revista de Salud Pública*, 20(5), 606–611. <https://doi.org/10.15446/rsap.v20n5.59003>
- Gouttebarge, V., Castaldelli-Maia, J.M., Gorczynski, P., Hainline, B., Hitchcock, M.E., Kerkhoffs, G.M., Rice, S.M., & Reardon, C.L. (2019). Occurrence of mental health symptoms and disorders in current and former elite athletes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(11), 700–706. <https://doi.org/10.1136/bjsports-2019-100671>
- Hair, J.F., William, B., Barry, B., & Rolph, A. (Eds.). (2010). *Multivariate data analysis: A global perspective* (7th ed.). Pearson.
- Hogrefe, S., Ruiz, R., & Molinero, O. (2018). Ansiedad y estrategias de afrontamiento en judokas de competición. *Revista de artes marciales asiáticas*, 13(2), Article 501. <https://doi.org/10.18002/rama.v13i2s.5501>
- Huamán, D.R.T., & Huamán, A.L.T. (2019). Estilos de afrontamiento y bienestar psicológico en estudiantes de postgrado. *Revista de Investigación Psicológica*, 21(1), 37–56.
- Instituto Nacional de Estadística y Geografía. (2021). *Encuesta nacional de bienestar autorreportado (ENBIARRE) 2021*. (N.º 772, pp. 1–24).
- Instituto Nacional de Estadística y Geografía. (2022). *Módulo de Práctica Deportiva y Ejercicio Físico 2021* (N.º 31, p. 22).
- Jiménez, M.G., & Martínez, P. (2008). Bienestar psicológico y hábitos saludables: ¿están asociados a la práctica de ejercicio físico? *International Journal of Clinical and Health Psychology*, 8(1), Article 19.
- Juarros, A. (2016). Influencia del perfil resiliente, optimismo disposicional, estrategias de afrontamiento y carga de entrenamiento en los niveles de estrés-recuperación en nadadores. *Kronos*, 15(1), Article 12.
- Kellmann, M. (2010). Preventing overtraining in athletes in high-intensity sports and stress/recovery monitoring: Preventing overtraining. *Scandinavian Journal of Medicine & Science in Sports*, 20, 95–102. <https://doi.org/10.1111/j.1600-0838.2010.01192.x>
- Kellmann, M., & Kallus, K.W. (2016). The recovery-stress questionnaires: User manual. In *The recovery-stress questionnaire for athletes* (pp. 86–131). K.W. Kallus & M. Kellmann.
- Lazarus, R.S. & Folkman, S. (1986). *Estrés & procesos cognitivos*. Martínez Roca.
- Lemos, M. (2018). Estrés y Salud Mental en Estudiantes de Medicina: Relación con Afrontamiento y Actividades Extracurriculares. *Archivos de Medicina*, 14(2), Article 8.
- Mantilla Toloza, S.C., & Gómez-Conesa, A. (2007). El Cuestionario Internacional de Actividad Física. Un instrumento adecuado en el seguimiento de la actividad física poblacional. *Revista Iberoamericana de Fisioterapia y Kinesiología*, 10(1), 48–52. [https://doi.org/10.1016/S1138-6045\(07\)73665-1](https://doi.org/10.1016/S1138-6045(07)73665-1)

- Mariani, A.M., Melchiori, F.M., & Marcolongo, F. (2020). The influence of physical activity in resilience and coping strategies in adulthood. *Giornale Italiano Di Educazione Alla Salute, Sport e Didattica Inclusiva*, 4(1), Article 159. <https://doi.org/10.32043/gsd.v4i1.159>
- Matalinares, M.L., Díaz, G., Raymundo, O., Baca, D., Uceda, J., & Yaringaño, J. (2016). Afrontamiento del estrés y bienestar psicológico en estudiantes universitarios de Lima y Huancayo. *Persona*, 19(2), Article 123. <https://doi.org/10.26439/persona2016.n019.975>
- Maugeri, G., Castrogiovanni, P., Battaglia, G., Pippi, R., D'Agata, V., Palma, A., Di Rosa, M., & Musumeci, G. (2020). The impact of physical activity on psychological health during Covid-19 pandemic in Italy. *Heliyon*, 6(6), e04315. <https://doi.org/10.1016/j.heliyon.2020.e04315>
- Medina, C., Barquera, S., & Janssen, I. (2013). Validity and reliability of the international physical activity questionnaire among adults in Mexico. *Rev Panam Salud Publica*, 21(8), Article 8.
- Mella-Norambuena, J., Celis, C., Sáez-Delgado, F., Aeloiza, A., Echeverría, C., Nazar, G., & Petermann-Rocha, F. (2019). Revisión sistemática de práctica de actividad física en estudiantes universitarios. *Revista Iberoamericana de Ciencias de la Actividad Física y el Deporte*, 8(2), Article 452. <https://doi.org/10.24310/riccafd.2019.v8i2.6452>
- Molinero, O., & Salguero, A. (2012). Estrés-recuperación en deportistas y su relación con los estados de ánimo y las estrategias de afrontamiento. *Revista de Psicología del Deporte*, 21, 163–170.
- Morales-Beltrán, R.A., Hernández-Cruz, G., González-Fimbres, R.A., Rangel-Colmenero, B.R., Zazueta-Beltrán, D.K., & Reynoso-Sánchez, L.F. (2022). La actividad física como moderador en la ansiedad asociada al COVID-19 en estudiantes universitarios (Physical activity as a moderator in anxiety associated to COVID-19 in university students). *Retos*, 45, 796–806. <https://doi.org/10.47197/retos.v45i0.92974>
- Oblitas, L. (2010). *Psicología de la salud y calidad de vida*. 3e. Cengage Learning.
- Oficina de Información Científica y Tecnológica para el Congreso de la Unión. (2018). *Salud mental en México* (N.º 007, p. 6).
- Organización Mundial de la Salud. (2013). *Plan de Acción Integral sobre la Salud Mental 2013–2020*.
- Paris, L., & Omar, A. (2009). Estrategias de afrontamiento del estrés como potenciadoras de bienestar. *Psicología y Salud*, 19(2), Article 10.
- Piemontesi, S.E., Heredia, D.E., & Furlan, L.A. (2012). Ansiedad ante los exámenes y estilos de afrontamiento ante el estrés académico en estudiantes universitarios. *Anales de psicología*, 28, 89–96. <https://doi.org/10.6018/140562>
- Pozos-Radillo, B.E., Preciado-Serrano, M.L., Rosa, A., & Campos, P. (2015). Estrés académico y síntomas físicos, psicológicos y comportamentales en estudiantes mexicanos de una universidad pública. *Ansiedad y Estrés*, 21(1), 35–42.
- Quiroz, C.N., & Méndez, P.O. (2010). Inventario de estrategias de afrontamiento: Una replicación. *Psicología y Salud*, 20(2), 213–220.
- Rearte, S.D. (2013). *Factores causales del estrés en los estudiantes universitarios*. <https://www.aacademica.org/000-054/466.pdf?view>
- Reynoso-Sánchez, L.F., Pérez-Verduzco, G., Celestino-Sánchez, M.Á., López-Walle, J.M., Zamarripa, J., Rangel-Colmenero, B.R., Muñoz-Helú, H., & Hernández-Cruz, G. (2021). Competitive recovery–stress and mood states in Mexican youth athletes. *Frontiers in Psychology*, 11, Article 627828. <https://doi.org/10.3389/fpsyg.2020.627828>
- Rice, S.M., Gwyther, K., Santesteban-Echarri, O., Baron, D., Gorczynski, P., Gouttebarge, V., Reardon, C.L., Hitchcock, M.E., Hainline, B., & Purcell, R. (2019). Determinants of anxiety in elite athletes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(11), 722–730. <https://doi.org/10.1136/bjsports-2019-100620>

- Rodríguez-Rodríguez, F., Cristi-Montero, C., Villa-González, E., Solís-Urra, P., & Chillón, P. (2018). Comparación de los niveles de actividad física durante la vida universitaria. *Revista médica de Chile*, 146(4), 442–450. <https://doi.org/10.4067/s0034-98872018000400442>
- Rull, M.A.P., Sánchez, M.L.S., Cano, E.V., & Méndez, M.T.C. (2011). Estrés académico en estudiantes universitarios. *Psicología y Salud*, 21(1), Article 7.
- Secades, G., Barquín, R., & Rosa, M. (2015). El papel del perfil resiliente y las estrategias de afrontamiento sobre el estrés-recuperación del deportista de competición. *Kronos*, 14, Article 13.
- Tobin, D.L., Holroyd, K.A., Reynolds, R.V., & Wigal, J.K. (1989). The hierarchical factor structure of the coping strategies inventory. *Cognitive Therapy and Research*, 13(4), 343–361. <https://doi.org/10.1007/BF01173478>
- Toribio-Ferrer, C., & Franco-Bárceñas, S. (2016). Estrés académico: El enemigo silencioso del estudiante. *Salud y Administración*, 3(7), Article 8.
- Vidal-Conti, J., Muntaner-Mas, A., & Palou-Sampol, P. (2018). Diferencias de estrés y afrontamiento del mismo según el género y cómo afecta al rendimiento académico en estudiantes universitarios. *Contextos Educativos. Revista de Educación*, 22, Article 181. <https://doi.org/10.18172/con.3369>
- World Health Organization. (2010). *Entornos laborales saludables: Fundamentos y modelo de la OMS: Contextualización, prácticas y literatura de apoyo*. Organización Mundial de la Salud. <https://apps.who.int/iris/handle/10665/44466>
- Zimmer-Gembeck, M.J., & Skinner, E.A. (2016). The development of coping: Implications for psychopathology and resilience. In D. Cicchetti (Ed.), *Developmental psychopathology* (pp. 1–61). John Wiley & Sons, Inc. <https://doi.org/10.1002/9781119125556.devpsy410>