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Emotional intelligence as a predictor of mental health in undergraduate students

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Abstract

Background The aim of this study was to analyze whether trait emotional intelligence statistically predicts mental health outcomes in university students.

Method Six hundred forty-seven undergraduate students from the Community of Madrid participated. The Trait Meta Mood Scale-24 (TMMS-24) was used to assess emotional intelligence, and the Global Health Questionnaire (GHQ-12) was used to assess mental health. Student's t-analysis and ANOVA were performed for the comparative study, as well as multiple regression for the predictive analysis of emotional intelligence on mental health.

Results A multiple regression model was calculated to predict mental health in the total sample [$F(4, 642) = 58.94$, $p \leq .001$] with an $R^2 = .269$. For males [$F(3, 175) = 33.01$, $p \leq .001$] with an $R^2 = .361$. For females [$F(4, 463) = 33.84$, $p \leq .001$, $R^2 = .213$] with an.

Conclusions The dimensions that make up emotional intelligence (attention, clarity, and emotional repair) predict mental health in university students in the Community of Madrid.

Keywords Emotional Intelligence, Mental Health, University Students, TMMS-24, GHQ-12

Introduction

Understanding mental health is integral to comprehending its role in an individual's overall well-being, surpassing the mere absence of pathologies. The World Health Organization (WHO) underscores this holistic approach in its Constitution, emphasizing the importance of physical, mental, and social well-being [1].

In Spain, recent research [2] indicates prevalent worries about mental health, with 18.9% of the population using psychotropic drugs, predominantly anxiolytics (61.9%)

and antidepressants (47.2%). Additionally, recent global reports emphasize the growing prevalence of mental health disorders among young adults. The World Health Organization [3] indicates that approximately one in eight individuals worldwide lives with a mental disorder, disproportionately affecting younger populations. Similarly, the OECD [4] highlights that anxiety and depression rates among European young adults have continued to increase following the COVID-19 pandemic. Epidemiological studies by Alonso et al. [5] reveal prevalent mental disorders, particularly among women, the unemployed, and individuals with disabilities. Younger populations are more susceptible, as demonstrated by Campbell et al. [6], indicating gender gaps and associations with GDP per capita.

University students, in a significant life transition, face challenges transitioning from a structured high school to an unstructured university environment [7]. This period, recognized as one of the most stressful [8], may contribute to a higher prevalence of mental health

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disorders, notably anxiety and depression [9]. Moreover, the COVID-19 pandemic and subsequent economic crisis have intensified global mental health challenges, evidenced by higher rates of stress, anxiety, and depression [10].

Studies on university students, including Auerbach et al. [11] and Alonso et al. [12], highlight the impact of mental health disorders, with a substantial proportion reporting severe disability and the need for professional help. Emotional intelligence plays a crucial role in mental health, reducing stress and predicting low anxiety and depression [13]. Trait emotional intelligence, assessed by the Trait Meta Mood Scale (TMMS), correlates with positive mental health outcomes [14]. Higher emotional intelligence is associated with better mental health, with trait emotional intelligence showing the strongest positive relationship [15]. From a theoretical perspective, trait emotional intelligence is conceptualized as a set of self-perceptions related to the ability to monitor, understand, and manage one's own emotions [16]. Emotional clarity and emotional repair are particularly relevant for adaptive emotional regulation, helping individuals to buffer stress and recover from negative emotional states [17]. Conversely, excessive emotional attention without sufficient clarity and repair may increase vulnerability to anxiety and depression. Therefore, each dimension of emotional intelligence may differently impact mental health outcomes, depending on the balance between emotional awareness and regulation capacities.

Studies with university students, such as Ciarrochi et al. [18] and Moeller et al. [19], emphasize emotional intelligence's role in understanding the stress-mental health relationship and its contribution to student well-being. Longitudinal studies, like Persich et al. [20], indicate that emotional intelligence protects against adverse mental health factors.

The present study analyzes whether trait emotional intelligence (attention, clarity, and emotional repair) are statistically associated with mental health outcomes in university students in the Community of Madrid. To account for sociodemographic variables, studies of differences were conducted to assess their impact. Specific objectives include analyzing gender differences, determining variations based on academic year, and assessing differences depending on the student's major area of study.

Method

Participants

The sample for this study was composed of 647 traditional-aged university students from the Community of Madrid. A total of 179 (27.7%) participants were

male (20.11 ± 1.72 years) and 480 (72.3%) were female (20.27 ± 1.86 years).

Instruments

Trait meta-mood scale (TMMS-24) [21]

This tool is based on the original scale Trait Meta-Mood Scale 48 (TMMS-48) developed by [16]. This self-report instrument contains 24 items using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). It consists of three dimensions (8 items each dimension): 1) emotional attention: assesses people's ability to attend to their feelings (example of item: "I pay a lot of attention to my feelings"); 2) emotional clarity: how people understand their feelings (example of item: "I can often define my feelings"); 3) and emotional repair: people's ability to regulate their emotional states appropriately (example of item: "Although I sometimes feel sad, I usually have an optimistic outlook"). Our results show good internal consistency, similar across the three subscales: AE, $\alpha = 0.89$; CE, $\alpha = 0.9$; and RE, $\alpha = 0.86$.

Global health questionnaire (GHQ-12), developed by Goldberg and Williams [22]

The GHQ-12 is a self-administered screening instrument aimed at detecting psychological morbidity and possible cases of psychiatric disorders, in settings such as primary care or the general population. The GHQ-12 is one of the most widely used validated screening instruments and is widely recommended for use in health surveys. In our study, internal consistency was higher ($\alpha = 0.85$) than that found in the Spanish reference population ($\alpha = 0.76$) [23].

The GHQ-12 consists of 12 items—six related to the inability to perform normal functions (example item: "Have your worries made you lose a lot of sleep?") and six related to the presence of new distressing experiences (example item: "Have you lost self-confidence?"). Each item describes a symptom related to psychological distress, anxiety, and depression. Each item has four possible responses presented on a 4-option Likert-type scale ("not at all", "no more than usual", "somewhat more than usual" and "much more than usual"). The responses obtained are quantified using the GHQ score, which offers the best psychometric properties for the detection of vulnerability to mental disorders.

With the GHQ score, the response options of the Likert-type scale are transformed into a dichotomous-type scale (0–0–1–1). When the item is worded in a way that expresses a symptom, the responses "not at all" and "no more than usual" take the value 0, and the responses "somewhat more than usual" and "much more than usual" take the value 1. The total score is the sum of all the values obtained for each item; it is understood that as the scores increase, the level of mental health decreases.

According to studies validating the GHQ-12 against standardized psychiatric interviews [22], scores that reach or exceed 4 points are considered cases or threshold of pathological state.

Procedure

For the collection of information, a questionnaire was designed that unified the questionnaires described above. This questionnaire was carried out using the Google Forms application. The first screen of the questionnaire included an explanation of the research, as well as the informed consent.

In addition, participants were informed of the inclusion criteria for participation, which were as follows:

- Being a university undergraduate student.
- Studying an undergraduate degree in person.
- Studying at any university in the Community of Madrid.
- Be traditional college age (between 17 and 25 years old).

To send the questionnaires to the target sample, a total of 150 university lecturers from the Community of Madrid were contacted by email so that they could send the information to their students. A total of 32 lecturers replied in the affirmative way. The students who decided to participate, anonymously and voluntarily, filled out the questionnaire between January 8th and February 15th 2023. The questionnaire was organized as follows: 1) Explanation and informed consent; 2) Sociodemographic variables questionnaire; 3) TMMS-24 questionnaire; and 4) GHQ-12 questionnaire.

Ethics declarations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (Ethical Committee of Universidad Francisco de Vitoria, 40/2018) and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Data analysis

The results of the questionnaire were analyzed using the statistical package for social sciences (SPSS v26). Cronbach's Alpha coefficient was estimated for each instrument used.

Subsequently, the objectives of the study were answered. The Kolmogorov–Smirnov test was used to check the normality of the study variables in general and were segmented by gender. The results indicated that the study sample behaved normally, which justified the use of parametric tests. Homoscedasticity was tested using

Levene's statistic. As well as the assumptions of linearity, independence of residuals and non-collinearity. As a regression assumption, the correlation matrix is presented in the results.

In the case of the study of differences according to gender (specific objective A), Student's t-test for independent samples was used. To analyze differences according to course or area of knowledge (specific objectives B and C), ANOVA analyses were carried out, and Tukey's or Games Howell's post-hoc tests were performed according to homoscedasticity. Finally, to study the predictive power of the independent variables on mental health, multiple regression models were carried out according to the total population and segmented by gender (specific objective D).

Results

Gender differences

In relation to objective A, when looking at gender differences, the results found that females ($M=29.84$, $SD=6.05$) showed significantly higher values ($t(645)=-4.73$, $p<0.001$) in emotional attention compared to males ($M=27.30$, $SD=6.25$). In the case of mental health, females ($M=4.06$, $SD=3.30$) showed significantly higher values ($t(645)=-2.62$, $p<0.001$) compared to males ($M=3.29$, $SD=3.51$).

Differences by academic year and area of study

Regarding objective B, no statistically significant results were found as a function of grade. In relation to the area of knowledge (objective C), statistically significant differences were found only in the dimension of emotional clarity in the total sample [$F(4, 642)=4.957$, $p<0.001$]. The post-hoc analyses indicated that those students belonging to degrees of health sciences ($M=28.89$, $SD=5.70$) showed significantly higher emotional clarity values than those in arts and humanities ($M=26.58$, $SD=6.23$) and science ($M=24.59$, $SD=5.77$). For females, statistically significant differences were also found in the emotional clarity dimension [$F(4, 463)=3.355$, $p=0.010$]. The post-hoc analyses indicates that those female students belonging to health sciences ($M=28.72$, $SD=5.74$) showed significantly higher values than those from science ($M=24.54$, $SD=4.55$). However, these results were not observed in males.

Predictive analysis of emotional intelligence on mental health

To answer objective D, a correlation analysis was carried out. Table 1 shows the correlation values between the different study variables at a general level and segmented according to gender. The most relevant results at the general level indicated that the higher the age, the

Table 1 Correlation analysis between total and gender variables

Total	Age	Course	Failures	SA	EA	EC	ER	M	SD
Age								20.23	1.82
Course	.682**							2.4	1.179
Failures	.189**	.107**						0.59	1.223
SA	-.104**	-.054	-.458**					2.71	0.70
EA	.047	.016	-.027	-.017				29.14	6.21
EC	.136**	.080*	-.077*	.209**	.164**			27.32	6.11
ER	.059	.017	-.090*	.183**	.101*	.385**		27.35	6.21
GHQ-12	-.001	.013	.109**	-.226**	.147**	-.350**	-.405**	3.85	3.37
Men	Age	Course	Failures	SA	EA	EC	ER	M	SD
Age								20.11	1.72
Course	.735**							2.38	1.17
Failures	.13	.076						0.65	1.26
SA	-.031	-.027	-.362**					2.76	0.66
EA	.029	.079	-.164*	-.015				27.3	6.25
EC	.065	-.005	-.275**	.295**	.189*			27.79	6.10
ER	.05	-.002	-.121	.263**	.182*	.400**		27.52	6.19
GHQ-12	-.038	.052	.054	-.286**	.095	-.440**	-.491**	3.29	3.51
Women	Age	Course	Failures	SA	EA	EC	ER	M	SD
Age								20.27	1.86
Course	.664**							2.41	1.18
Failures	.213**	.120**						0.56	1.21
SA	-.126**	-.063	-.496**					2.69	0.71
EA	.045	-.011	.037	-.007				29.84	6.50
EC	.164**	.113*	-.001	.177**	.170**			27.14	6.11
ER	.063	.024	-.079	.155**	0.076	.379**		27.28	6.23
GHQ-12	.007	-.005	.138**	-.200**	.146**	-.310**	-.372**	4.06	3.30

SA Self-perceived academic performance, EA Emotional attention, EC Emotional clarity, ER Emotional repair, M Mean, SD Standard deviation

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

higher the emotional clarity score ($r = 0.136$; $p < 0.001$). In relation to the dimensions of emotional intelligence and mental health, all were significant. The more emotional attention, the worse mental health ($r = 0.147$; $p < 0.001$); the more emotional clarity, the better mental health ($r = -0.350$; $p < 0.001$); and the more emotional repair, the better mental health ($r = -0.405$; $p < 0.001$). Furthermore, the worse the self-perception of academic performance, the worse the mental health ($r = -0.226$; $p < 0.001$).

For the male undergraduate students, we can highlight the moderate correlations of emotional clarity with mental health ($r = -0.440$; $p < 0.001$), as well as emotional repair with mental health ($r = -0.491$; $p < 0.001$). That is, the more clarity or emotional repair, the better the mental health. Furthermore, the worse the self-perception of academic performance, the worse the mental health ($r = -0.286$; $p < 0.001$). Similar to male students, there are moderate correlations of emotional clarity with mental health ($r = -0.310$; $p < 0.001$), as well as of emotional repair with mental health ($r = -0.372$; $p < 0.001$) in the

female undergraduate students. That is, the more clarity or emotional repair, the better the mental health. There is also a direct correlation between emotional attention and mental health ($r = 0.146$; $p < 0.001$), so the more emotional attention, the worse mental health. Furthermore, the lower the self-perception of academic performance, the larger negative impact on mental health ($r = -0.200$; $p < 0.001$). The higher the number of failures, the worse the mental health ($r = 0.138$; $p < 0.001$).

Finally, with respect to objective D, it was observed that the factors that explain mental health are the dimensions of emotional intelligence. Either in general or segmented by gender. Table 2 shows the results of the regression analyses and their respective models.

For the overall sample, emotional repair ($\beta = -0.313$), emotional clarity ($\beta = -0.24$), emotional attention ($\beta = 0.216$) and self-perceived academic performance ($\beta = -0.115$) explain 26.9% of the participants' mental health [$F(4, 642) = 58.94$, $p \leq 0.001$]. Specifically for male students, emotional repair ($\beta = -0.404$), emotional

Table 2 Multiple regression analysis for the prediction of mental health

Total			R^2	Change in R^2	B	T	F
Model							
1		(Constant)				18.00**	126.72
	ER		.164	.164	-.405	-11.26**	
2		(Constant)				18.69**	84.69
	ER		.208	.044	-.318	-8.36**	
	EC				-.227	-5.98**	
3		(Constant)				11.89**	73.84
	ER		.256	.048	-.328	-8.88**	
	EC				-.26	-6.99**	
	EA				.222	6.44**	
4		(Constant)				12.30**	58.94
	ER		.269	.012	-.313	-8.51**	
	EC				-.24	-6.43**	
	EA				.216	6.29**	
	SA				-.115	-3.30**	
Men			R^2	Change in R^2	B	T	F
Model							
1		(Constant)				10.45**	56.14
	ER		.241	0.241	-.491	-7.49**	
2		(Constant)				11.46**	39.77
	ER		.311	0.07	-.375	-5.49**	
	EC				-.29	-4.24**	
3		(Constant)				8.31**	33.01
	ER		.361	0.05	-.404	-6.08**	
	EC				-.322	-4.84**	
	EA				.23	3.71**	
Women			R^2	Change in R^2	B	T	F
Model							
1		(Constant)				14.80**	74.66
	ER		.138	0.138	-.372	-8.64**	
2		(Constant)				14.93**	48.09
	ER		.171	.033	-.297	-6.511**	
	EC				-.197	-4.32**	
3		(Constant)				9.03**	41.95
	ER		.213	.042	-.3	-6.74**	
	EC				-.231	-5.14**	
	EA				.208	4.98**	
4		(Constant)				9.46**	33.84
	ER		.226	.013	-.288	-6.48**	
	EC				-.215	-4.76**	
	EA				.203	4.9**	
	SA				-.116	-2.77**	

SA Self-perceived academic performance, EA Emotional attention, EC Emotional clarity, ER Emotional repair, M Mean, SD Standard deviation

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

clarity ($\beta = -0.322$), emotional mindfulness ($\beta = 0.23$) explained 36.1% of mental health [$F(3, 175) = 33.01$, $p \leq 0.001$]. For female students, emotional repair

($\beta = -0.288$), emotional clarity ($\beta = -0.215$), emotional attentiveness ($\beta = 0.203$) and self-perceived academic performance ($\beta = -0.116$) explain 22.6% of mental health [$F(4, 463) = 33.84$, $p \leq 0.001$].

Discussion

The present study investigated the statistically association between emotional intelligence dimensions and mental health outcomes in university students from the Community of Madrid. To respond to this general objective, a comparative analysis was carried out according to gender. The results indicated that there are gender differences in relation to emotional intelligence and mental health. Females showed significantly higher emotional intelligence values compared to male students.

These results are partially in line with previous research that found similar results in emotional attention but also found differences in relation to the dimensions of emotional clarity and emotional repair in favor of men. However, these findings should be interpreted with caution, considering the cross-sectional nature of the study and potential confounding factors such as socialization processes or reporting biases. Previous studies have suggested that women may report higher emotional attention due to gendered socialization patterns emphasizing emotional awareness [14], while emotional clarity and regulation abilities may develop differently across genders depending on context and coping strategies [24]. Therefore, alternative explanations such as differential emotional processing styles, rather than inherent gender differences, should also be considered when interpreting these results. In any case, even though the interpretation criteria of the questionnaire described these results as adequate emotional attention [21], research such as Johnson and Blanchard [14], describe how the greater the emotional attention, the worse the emotional adjustment, which would have repercussions for poorer mental health. It should be noted that this would be in line with our correlation results. On the other hand, the results do not coincide with those of previous research that showed higher levels of emotional intelligence in women [24]. These differences may be due to differences in the assessment of emotional intelligence, as these studies assessed emotional intelligence as a skill.

When comparing the results according to academic year, no differences were found. Assuming that academic year is related to age, these results are contrary to the idea that emotional intelligence is related to age. In fact, as expressed by Salavera et al. [25], age is a key factor in understanding emotional intelligence. This may be because four years is not a sufficient period to find significant differences, in fact, authors such as Shabani et al. [26], who found relationships between emotional intelligence and mental health in university students, did not find age relevant either. However, the analysis to determine whether there are differences depending on the area of knowledge, yields results in favor of students of

degrees in the area of health sciences in emotional clarity. However, it is an understudied area in this field.

A study by Fortes-Vilaltella et al. [27] did find differences according to subject area, with the health sciences area scoring worse. These results are not conclusive and should be treated with caution, although the fact of working in health sciences implies working in affective dynamics, which could be related to a better knowledge of the subject since they work directly with emotional vocabulary, and it is considered in the different models of emotional intelligence.

As for the prediction model of mental health based on the dimensions of emotional intelligence, our results show that whether with the whole sample or segmented by gender, the dimensions of emotional intelligence explain part of the variability of mental health in university students in the Community of Madrid.

In order of importance, the variable that best explains mental health is emotional repair, followed by emotional clarity and emotional attention, in the three models presented.

These results are partially in line with the findings of a study performed by Lizeretti et al. [28], which indicated that the group of individuals with clinical symptoms had significantly more emotional attention and worse emotional repair. Specifically, the predictive model of emotional intelligence on the mental health of the total sample explained 25.6%, that of women 21.3% and that of men 36.1%. These data are much higher than those reported in a meta-analysis by Martins et al. [15], with 19,815 participants that reported an effect size of 13%. These differences may be due to the impact that COVID-19 has had on the mental health of the population [10], as well as the vulnerability of university students [9]. On the other hand, a study by Davis & Humphrey [29] found that emotional intelligence was the best predictor of mental health over personality and cognitive ability. Zeidner and Matthews [17] went further and investigated emotional intelligence ability in university students, the results indicated that the prediction of emotional intelligence on mental health was mediated by people's social support. In line with this work, Delhom et al. [30] indicated that emotionally intelligent people make greater use of problem-focused strategies, and benefit from them to achieve a positive mood and thus better psychological adjustment.

The main conclusion of this study is that the dimensions that make up emotional intelligence are statistically associated with mental health outcomes in university students in the Community of Madrid, independent of age or academic year. Specifically, emotional repair and clarity and attention explained 26.9% of the variability in mental health. In the case of females, these variables

explained 21.3% and in the case of men 36.1% of this variability. On the other hand, significant differences were confirmed in relation to gender in emotional attention and mental health, with women presenting greater emotional attention and worse mental health compared to men.

This study has certain limitations that should be considered. First, due to the cross-sectional design, it is not possible to infer causal relationships from the variables analyzed. The associations identified between emotional intelligence dimensions and mental health outcomes should therefore be interpreted as correlational. In addition, the recruitment method, based on voluntary participation through university lecturers, may have introduced a selection bias, potentially limiting the representativeness of the sample and the generalizability of the findings to the broader university student population. Although the sample size was large, it was not representative of all university students, and the results should be interpreted with caution when generalizing. Nevertheless, it is important to acknowledge that self-report measures are susceptible to response biases, particularly social desirability bias, which may have led participants to portray themselves in a more favorable light regarding their emotional skills or mental health status. This could result in an underestimation of mental health difficulties or an overestimation of emotional competencies. Additionally, self-perceived academic performance was used as a subjective indicator rather than objective academic achievement, which may introduce further bias into the interpretation of academic-related findings. Future studies should consider incorporating objective academic records and observer-rated measures of emotional intelligence to mitigate these limitations.

In relation to future lines of research, it would be advisable to conduct longitudinal studies to examine how emotional intelligence and mental health evolve over time, and to better understand the directionality of their association. Experimental designs could also be applied to university students with mild psychopathological symptoms, including interventions that promote emotional intelligence, such as those proposed by Meng and Qi [31]. These interventions could involve an experimental group receiving EI training and a control group without it, allowing for the evaluation of real impacts on student well-being. Furthermore, the use of mixed-methods approaches could provide more in-depth insights into the subjective and contextual factors influencing these variables. Cross-cultural replication studies are also recommended to assess the generalizability of these findings across different educational and cultural contexts. It is important to note the particular vulnerability of this group. García et al. [2] showed that the age group

most likely to seek psychological help in Spain is between 18 and 34 years old. However, a significant portion of younger individuals (18–24) often do not seek care due to economic reasons. This situation highlights a serious gap in mental health access that affects university students directly. Therefore, future research should continue to explore not only the mechanisms underlying this vulnerability but also possible institutional strategies for early identification and effective prevention of mental health problems in university settings.

Authors' contributions

Conceived and designed the experiments: J.A-S., A.G-N., R.C. & S. G-M. Performed the experiments: J.A-S., A.G-N., R.C. & S. G-M. Analyzed the data: J. A-S. & S. G-M. Contributed reagents/materials/analysis tools: J.A-S., A.G-N., R.C. & S. G-M. Wrote the paper: J.A-S., A.G-N., R.C. & S. G-M.

Funding

This work is part of the research project "Physical activity and sport in the workplace: Relationships with psychological variables, mental health, and organizational behavior", within the 2025 Research Projects Call funded by Universidad Francisco de Vitoria, Madrid.

Data availability

Data is provided within the manuscript. However, datasets may be shared upon duly justified request to the corresponding author.

Declarations

Competing interests

The authors declare no competing interests.

Received: 8 May 2024 Accepted: 30 July 2025

Published online: 10 October 2025

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