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The influence of gender on the relationship between emotional intelligence and psychological well-being in Spanish university students

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Abstract

Background Numerous studies have shown that emotional intelligence could play a role in satisfaction with life and eudaimonic well-being. Several theories hold that emotional intelligence is a construct that can be measured and that can be improved. Emotional intelligence depends on various variables such as age, sex, sociocultural status, environmental factors, and learning history; emotional intelligence should be made a priority subject to teach students to perceive, understand, and regulate emotions from an early age. Teaching of emotional skills at university can have a positive effect on academic performance, psychological well-being, and satisfaction with life.

Methods The aim of this study is twofold: 1) to analyse differences in emotional intelligence and psychological well-being between sexes among Spanish university students; and 2) to analyse whether emotional intelligence can be used to predict satisfaction with life and eudaimonic well-being in the sample. The instruments used were Schutte's emotional intelligence scale, the satisfaction with life scale, and the eudaimonic well-being scale. The sample comprised 721 Spanish university students (293 men, 40.64% and 428 women, 59.36%).

Results The results suggest that women yield higher scores in emotional intelligence factors related to attention to the emotions of others, the expression of emotions, and the regulation of the emotions of others. No significant differences were found concerning satisfaction with life and eudaimonic well-being. The results also indicate that both men and women perceive the regulation of one's own emotions as a key factor in satisfaction with life. Women tend to link eudaimonic well-being with emotional skills associated with interpersonal relations, while men tend to associate it with emotional skills pertaining to the individual.

Conclusions The results suggest that, among all emotional intelligence-related factors, the regulation of one's own emotions is the most valuable predictor of satisfaction with life and eudaimonic well-being. The results also emphasise the importance of teaching emotional intelligence as a way to improve levels of well-being, irrespective of sex, although sex-related differences need to be examined more in depth in order to gain a better understanding of the role played by emotional intelligence, satisfaction with life, and eudaimonic well-being in the psychological and personal development of our students.

Keywords Emotional intelligence, Psychological well-being, Satisfaction with life, Eudaimonic Well-being, Sex

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Emotions are complex psychophysiological responses to internal or external stimuli that involve changes in subjective experience, behavioral expression, and physiological activation. These responses serve adaptive functions by influencing decision-making, behaviour regulation, and social interaction [1, 2]. Analysing the relationship between emotional intelligence and psychological well-being among university students is a good starting point to examine the role played in personal and academic development. Sound emotional management, solving problems effectively, the choice of good strategies to cope with stressing scenarios, a good degree of self-understanding, and healthy interpersonal relations can contribute to improve academic performance, quality of life, and even improve the mental health of students, helping them to achieve academically and professionally [3–5].

The study of emotions is a dynamic field. Many studies have shown that emotions play a significant role in human behaviour [6–10].

This debate revolves around two major conceptual frameworks: 1) Theoretical models that argue that emotional intelligence can be trained and improved [11–13]. According to this ability model, emotional intelligence is defined as the ability to perceive, assimilate, understand, and regulate one's own and others' emotions to promote personal and social growth. This model holds that emotions affect cognition, that cognitive processes (perception, attention, reasoning, memory) can have a direct effect on how individuals experience and regulate their emotions, and that individuals can use emotional information to improve their cognitive processes [11–16]; and 2) Trait-based or mixed models, which understand emotional intelligence as stable traits that regulate behaviour, personality, and social skills, and as adjustment factors [17–21].

Emotional intelligence can evolve during the life cycle, and this development depends on multiple variables, such as age, sex, biological factors, personal trajectory, learning opportunities, and social, cultural, and academic context [7, 21–25]. Growing social and emotional experience contributes to enhance the self-regulation of emotions. As they age, individuals veer towards increasingly empathetic and self-regulated behaviours, a more balanced management of emotions, and less acute emotional fluctuations [26–29].

This study, which aims to establish differences in emotional intelligence by sex among university students, adopts Malouff et al.'s [30], broad definition of emotional intelligence: the skills used to perceive, understand, and regulate emotions, so that they can be processed and used adaptively. This definition is very similar to Schutte et al.'s [31] and Mayer et al.'s [15], who defined emotional intelligence as the ability to perceive, understand, regulate, and steer our emotions and those of others.

It is widely held that emotional intelligence could play an important role in interpersonal relations, and that it could also be related to satisfaction with life and eudaimonic well-being [32–34]. This idea emerged from studies on subjective well-being [35], which has historically been explained from two main perspectives: hedonic and eudaimonic [36, 37]. The hedonic perspective focuses on pleasure and the subjective perception of pleasure, regardless of its sources, while understanding subjective well-being as an internal state that comprises various evaluations of quality of life, understood from a broad perspective [38]. The hedonic approach emphasises participation in activities that generate positive personal experiences, that operate in the absence of negative mindsets, and that generate a perception of satisfaction with life [39].

In contrast, the eudaimonic approach is focused on realising potential and on the factors that foster personal growth. From this perspective, subjective well-being is regarded as a positive long-term psychological trait, related to the meaning of life and the individual's response to existential challenges [40]. In other words, hedonic well-being is obtained when individuals get what they want, while eudaimonic well-being also considers the individuals' goals. Waterman [41] argues that eudaimonia is not possible without hedonic well-being. However, although hedonic and eudaimonic values are strongly correlated, they are also clearly distinct. Eudaimonic activities are related to clear goals, characterised by a balance between challenges and skills; they demand significant effort and concerned with opportunities that allow individuals to achieve their potential. Hedonic activities tend to disregard personal problems, and are directly related to feeling relaxed, excited, or happy. Waterman [41] claims that it is better to focus on eudaimonic well-being, because it offers opportunities for individuals to develop their potential and is based on a philosophical perspective that revolves around self-realisation.

Emotional intelligence, satisfaction with life, eudaimonia, and sex

Several studies have analysed the relationship between sex and emotional intelligence. The results are contradictory, as they are influenced by socialisation profiles, expectations, context, methodology, biological factors, and gender stereotypes [42–48]. Some studies argue that women yield higher scores in emotional well-being, self-confidence, self-awareness, empathy and, in general, interpersonal and intrapersonal relations than men [49–55]; men, for their part, appear as more emotionally able

to cope with stressful situations [56–58]. Other studies found no significant sex-related differences in these variables [59].

Biological and genetic differences between men and women in terms of emotional intelligence are a complex issue that involves multiple variables, including hormonal, cerebral, and evolutive factors [60–65]. Although some studies argue that men and women process and express their emotions differently, it is important to emphasise that these differences are crucially mediated by social and cultural factors. Concerning socialisation profiles [66], women tend to be identified with expressive traits (sociability, attention to the needs of others, sensitivity, and empathy), while men are most likely identified with instrumental traits (independence, assertiveness, task-orientation, and ambition). Some authors argue that the adoption of expressive or instrumental traits depends on social and professional roles, not sex [67, 68]. Stereotyped expectations affect the way both men and women define themselves, not only a reflection of their actual differences but also of the way they are treated by others. Indeed, recent studies have shown that emotional skills can be influenced by sexual identity and the stereotypes that assign different traits to each sex [69–71], affecting how people interpret and remember information about themselves and others [72, 73].

Another variable addressed in this study is satisfaction with life, defined as the global cognitive evaluation that individuals make of their own life [39]. The most significant predictors of this construct for both men and women are self-esteem and social support [74]. Highly adaptable individuals with greater social support tend to face changes in their social environment more effectively, leading to greater satisfaction with life [75]. Several studies suggest that women tend to yield lower scores than men in terms of satisfaction with life, which may have to do with social expectations, workloads, and domestic responsibilities. Women are more prone to suffer stress and anxiety because of the social and cultural expectations that they face. On the other hand, although men score higher in satisfaction with life, they are less likely to express their emotions or seek help, which may have an impact on their perception of well-being [76, 77]. However, recent studies indicate that these differences are narrowing in societies in which the gender gap is less pronounced, in which mental health, access to resources, and socioeconomic conditions play a key role in satisfaction with life for both men and women [78, 79].

Eudaimonic well-being is also related to sex. Several studies suggest that men and women may experience and value eudaimonic well-being differently, partially because of social and cultural factors [80, 81]. Women are often socialised to prioritise interpersonal relations and care roles, and thus can find the most eudaimonic satisfaction in social links and the attention for others [82]. In contrast, men tend to focus on achieving autonomy and meeting personal goals, particularly in professional and individual activities [83, 84]. However, like with the other variables (emotional intelligence and satisfaction with life), in contexts in which the gender gap is narrower, these differences tend to diminish, and men and women held more similar views about meaning and self-realisation.

This study aimed to examine the relationships between emotional intelligence, life satisfaction, and eudaimonic well-being, as well as to explore potential sex differences in these variables. Although emotional intelligence has been positively linked to both life satisfaction and well-being [85–87], findings on sex-related differences remain inconclusive [88, 89]. Some research suggests that women score higher on interpersonal and emotional competencies [49–55], whereas men may report greater emotional self-efficacy in stressful contexts [56–58]. However, other studies have found no significant differences [59]. Notably, the role of sex in the relationship between emotional intelligence and eudaimonic well-being remains underexplored, highlighting the need for further investigation.

The study's two starting hypotheses were: 1) Women display greater emotional intelligence, satisfaction with life, and eudaimonic well-being than men; and 2) emotional intelligence can be used to predict satisfaction with life and eudaimonic well-being, regardless of sex.

Methodology

Participants and protocols

Before the study, the University of Zaragoza, Spain, was contacted to seek their cooperation. The schools targeted were chosen by simple random sampling. The aims of the study were explained to participants, and the importance of addressing all items was emphasised. Participants were given 20 min to answer the questionnaire and sign an informed consent form. The participants were informed that the answers would be treated anonymously and confidentially.

The questionnaire was handed over to 721 participants (293 men, 40.64%, and 428 women, 59.36%), with an average age of 23.17 years (s.d. = 4.432); their ages ranged from 18 to 28 years. Participants that displayed difficulties reading the questionnaire or answering the questions, as well as those that handed over incomplete questionnaires, were excluded from the study ($n = 14$). All participants were volunteers and signed an informed consent form, following the ethical guidelines of the Declaration of Helsinki and standard protocols in research on human beings. In order to ensure the intelligibility of the questionnaire, a small sample of participants ($n = 55$)

was contacted to confirm that all items could be easily understood. The questionnaires were filled in the presence of the research team and collected individually in order of completion, so that errors and unanswered items could be detected. In Ato and Vallejo's [90] definition, the study is a prospective ex post-facto survey with a simple descriptive design. The results were processed anonymously. The representativeness of the sample yielded a level of confidence of 99%, suggesting that the sample is representative of the student population of Zaragoza, Spain. The following basic random sampling formula was used:

$$n = Z^2 \cdot p \cdot (1 - p)/E^2$$

where n is the size of the sample, Z the level of confidence, p the estimated proportion of the total population, and E the admissible margin of error.

Instruments

Schutte's emotional intelligence scale (EIS) [59]. The Spanish version of the EIS [91] was chosen because it assesses the emotional skills of individuals to perceive, understand, and regulate emotions, both inter- and intrapersonally, reflecting the individuals' emotional intelligence. Its self-reporting format is similar to that of the scales used to measure satisfaction with life and eudaimonic well-being. The scale comprises 33 items, with responses in a five-point Likert scale with values ranging from 5 (totally agree) to 1 (totally disagree). The scale revolves around six factors that measure both interpersonal and intrapersonal aspects in relation to emotional intelligence: attention to one's own emotions; attention to the emotions of others; regulation of one's own emotions; expression of emotion; regulation of the emotions of others; emotions in problem-solving.

The score of each factor is obtained by adding the responses to each positive item and subtracting the score of negative items, with a maximum score of 25 points. Each factor can be analysed separately. The scale yielded a Cronbach's Alpha value of 0.88 in this study.

Satisfaction with life scale [92]. The scale was designed to measure subjective well-being. The Spanish version was used in this study [93]. The scale measures how a person assesses their life, including factors such as family relations, work, and quality of life. The questionnaire is typically filled in under a minute and includes five items with responses in seven-point Likert scale ranging from 7 (totally agree) to 1 (totally disagree); final scores range from 5 to 35, where higher scores indicate higher life satisfaction. The scale yielded a Cronbach's Alpha value of 0.87 in this study.

Eudaimonic well-being questionnaire [41]. This questionnaire measures how individuals perceive their ability to meet their personal goals. The Spanish version was used in this study [94]. Eudaimonic well-being is related to the meeting of long-term goals, connection with others, and the individual's contribution to the community. It comprises 21 items, including seven negative items, whose scores are subtracted from the final score. In this instance, a six-point Likert scale was adopted for the responses, ranging from 6 (totally agree) to 1 (totally disagree), whether higher scores indicate higher eudaimonic well-being. The scale yielded a Cronbach's Alpha value of 0.84 in this study.

In addition to these instruments, participants filled an ad-hoc questionnaire to collect information concerning the sociodemographic characteristics of the sample (age, sex, university course, place of residence) and to ensure that all participants displayed comparable psychological conditions, facilitating the tabulation and comparison of the responses.

Data analysis

The data was collected in September and October 2023. The statistical analysis was undertaken with the aid of SPSS 29.0 software [95]. Following standard tests (normality, independence, homoscedasticity, sampling linearity), parametric techniques were chosen. First, preliminary analyses, including descriptive statistics to test premises concerning sex, were carried out. To assess sex-related differences in emotional intelligence, satisfaction with life, and eudaimonic well-being (Hypothesis 1), unidirectional variance analysis (ANOVA) was undertaken, using sex as independent variable. For the analysis, direct scores were used, following the guidelines of the questionnaires use manuals. Finally, regression analysis was undertaken to examine the relationship between emotional intelligence, satisfaction with life, and eudaimonic well-being (Hypothesis 2), using sex as the moderating variable. The aim was to identify relationships between variables, assess the relative impact of each variable, and predict two of these variables (satisfaction with life and eudaimonic well-being) based on emotional intelligence and sex.

Results

ANOVA analysis was used to establish the relationship between emotional intelligence, satisfaction with life, and eudaimonic well-being, as well as the effect of sex on this relationship (Hypothesis 1) (Table 1). The results suggest that sex plays a significant role in the following factors: attention to the emotions of others $F(1,721) = 11.018$, $p = 0.001$; expression of emotions $F(1,721) = 7.452$, $p = 0.007$; and regulation of the emotions of others $F(1,721) = 5.981$, $p = 0.015$. No significant effects on satisfaction with life or eudaimonic well-being were attested.

Table 1 Averages, deviations and average differences according to gender

	Males		Females			
	Mean	***s.d***	**Mean**	***s.d***	***F***	**Sig**
Attention to their own emotions	23.22	2.60	23.13	3.20	.065	.798
Attention to the emotion of others	10.05	2.03	10.81	1.79	11.018	.001
Regulation of their own emotions	24.82	2.64	24.64	3.40	.201	.654
Expression of emotion	14.00	2.80	14.81	2.23	7.452	.007
Regulation of the emotion of others	19.01	2.89	19.79	2.45	5.981	.015
Emotions related to problem solving	15.68	2.10	15.97	2.21	1.177	.279
Life satisfaction	25.33	4.48	24.69	5.16	1.133	.288
Eudaimonic well-being	79.58	8.11	80.08	8.97	.262	.609

This suggests significantly different results in the self-reporting of emotional intelligence between men and women.

In order to assess the relationship between variables, correlation coefficients between the emotional intelligence, satisfaction with life, and eudaimonic well-being scores, divided by sex, were calculated (Table 2). No significant differences between sexes were found. However, the scores concerning emotional intelligence and satisfaction with life suggest significant differences. Among men, satisfaction with life was found to be correlated with attention to the emotions of others ($r=0.253$, $p=0.002$), the regulation of one's own emotions ($r=0.272$, $p<0.001$), and regulation of the emotions of others ($r=0.229$, $p=0.004$). Among women, satisfaction with life was found to be correlated with attention to one's own emotions ($r=0.316$, $p<0.001$), the regulation of one's own emotions ($r=0.489$, $p<0.001$), expression of emotion ($r=0.158$, $p=0.008$), and the use of emotions in problem solving ($r=0.293$, $p<0.001$). Finally, eudaimonic well-being was shown to be correlated with all the remaining variables, in both men and women.

This was followed by hierarchical linear regression to establish the impact of emotional intelligence on satisfaction with life (Table 3) and eudaimonic well-being (Table 4), using sex as moderating variable,

Table 2 Correlations of emotional intelligence and life satisfaction factors

		1	**2**	**3**	**4**	**5**	**6**	**7**
Males								
1	Attention to their own emotions							
2	Attention to the emotion of others	.392[b]						
3	Regulation of their own emotions	.529[b]	.292[b]					
4	Expression of emotion	.455[b]	.510[b]	.467[b]				
5	Regulation of the emotion of others	.364[b]	.402[b]	.534[b]	.376[b]			
6	Emotions related to problem solving	.541[b]	.445[b]	.552[b]	.353[b]	.588[b]		
7	Life satisfaction	.060	.253[a]	.272[b]	.166	.229[b]	.137	
8	Eudaimonic well-being	.337[a]	.357[b]	.519[b]	.459[b]	.374[b]	.399[b]	.294[b]
Females								
1	Attention to their own emotions							
2	Attention to the emotion of others	.320[b]						
3	Regulation of their own emotions	.566[b]	.207[b]					
4	Expression of emotion	.362[b]	.467[b]	.318[b]				
5	Regulation of the emotion of others	.330[b]	.471[b]	.319[b]	.316[b]			
6	Emotions related to problem solving	.564[b]	.369[b]	.559[b]	.296[b]	.421[b]		
7	Life satisfaction	.316[b]	.140	.489[b]	.158[b]	.085	.293[b]	
8	Eudaimonic well-being	.543[b]	.259[b]	.630[b]	.259[b]	.280[b]	.518[b]	.454[b]

[a] The correlation is significant at the level 0.05 (bilateral)

[b] The correlation is significant at the level 0.01 (bilateral)

Table 3 Relationship between emotional intelligence and satisfaction of life with gender as a moderator

	Variable	*Beta*	*e.t*	R^2	*t*	Sig
Model 1	Constant	10.123	2.345		10.123	10.123
	Attention to their own emotions	-.492	.386		-1.277	.202
	Attention to the emotion of others	.151	.143		1.053	.292
	Regulation of their own emotions	.696	.076		9.169	< 0.001
	Expression of emotion	-.023	.120		-0.193	.846
	Regulation of the emotion of others	-.204	.100		-2.033	.042
	Emotions related to problem solving	-.028	.155	.2212	-.181	.856
Model 2 (moderating sex)	Attention to their own emotions	.041	.055		.752	.452
	Attention to the emotion of others	-.026	.049		-.544	.586
	Regulation of their own emotions	.132	.107		1.233	.218
	Expression of emotion	.059	.249		.238	.811
	Regulation of the emotion of others	-.216	.217		-.993	.321
	Emotions related to problem solving	.045	.338	0.2215	.134	.893

Table 4 Relationship between emotional intelligence and eudaimonic well-being with gender as a moderator

	Variable	*Beta*	*e.t*	R^2	*t*	*Sig*
Model 1	Attention to their own emotions	-.598	.172		-3.470	.007
	Attention to the emotion of others	.154	.121		1.272	.221
	Regulation of their own emotions	.783	.089		8.726	< 0.001
	Expression of emotion	-.022	.145		-.154	.883
	Regulation of the emotion of others	-.312	.112		-2.781	.018
	Emotions related to problem solving	-.034	.162	.455	-.213	.837
Model 2 (moderating sex)	Attention to their own emotions	.036	.110		.331	.748
	Attention to the emotion of others	-.045	.098		-.464	.657
	Regulation of their own emotions	.127	.101		1.263	.222
	Expression of emotion	.055	.138		.399	.696
	Regulation of the emotion of others	-.218	.133		-1.645	.107
	Emotions related to problem solving	.044	.153	.459	.287	.779

emotional intelligence-related factors as predictors, and satisfaction with life and eudaimonic well-being as criteria variables. Table 3 shows the results of the regression analysis of emotional intelligence as a predictor of life satisfaction, $F(1,721) = 44.126$, $p < 0.001$, with $R^2 = 0.221$. The final model reached an $R^2 = 0.2215$, indicating that the included variables explain approximately 22.15% of the variance in life satisfaction. The results indicate that Regulation of their own emotions has a positive and significant relationship with Life satisfaction ($\beta = 0.696$, $p < 0.001$), meaning that higher levels of this factor are associated with higher life satisfaction scores. In contrast, Regulation of the emotion of others shows a significant negative relationship with Life satisfaction ($\beta = -0.204$, $p = 0.0427$), suggesting that as this factor increases, life satisfaction tends to decrease. Regarding the interactions with sex, none were statistically significant (all $p > 0.05$), indicating that the relationship between the independent variables and Life satisfaction does not depend on the individual's sex. This finding suggests that the impact of both Regulation of their own emotions and Regulation of the emotion of others on Life satisfaction is consistent across genders. Although some individual predictors were not significant, the inclusion of Regulation of their own emotions and Regulation of the emotion of others reinforces the importance of these factors in predicting life satisfaction. In summary, the study highlights Regulation of their own emotions as a strong positive predictor of Life satisfaction, while Regulation of the emotion of others serves as a negative factor. The role of sex as a moderator was not supported by the data, indicating that these associations are independent of sex. Future research should explore other possible moderators or additional variables to enhance the model's predictive power.

Table 4 illustrates the steps followed to incorporate the explanatory variables into the relationship between emotional intelligence and eudaimonic well-being, using sex as a moderating variable. The results of the regression analysis indicate a significant relationship between emotional intelligence and eudaimonic well-being, $F(1,721)=64.823$, $p<0.001$, with $R^2=0.459$. In particular, the emotional intelligence factors explain 45.9% of the variance in eudaimonic well-being. The procedure first involved including the simple variables (Model 1) and then adding the interaction terms obtained by multiplying each independent variable by sex (Model 2). The results showed that, among the simple variables, Attention to their own emotions, Regulation of their own emotions, and Regulation of the emotion of others stand out as significant predictors of eudaimonic well-being. Specifically, Regulation of their own emotions shows a positive and significant relationship ($\beta=0.783$, $p<0.001$), indicating that higher levels of this factor are associated with an increase in eudaimonic well-being. On the other hand, Attention to their own emotions ($\beta=-0.598$, $p=0.007$) and Regulation of the emotion of others ($\beta=-0.312$, $p=0.018$) are negatively associated with eudaimonic well-being, suggesting that as these factors increase, eudaimonic well-being tends to decrease. Meanwhile, the remaining variables displayed less relevant or non-significant coefficients. With regard to interactions with sex, none reached statistical significance (all $p>0.05$), implying that the relationship between emotional intelligence factors and eudaimonic well-being does not vary according to the individual's sex. This finding suggests that the impact of these factors on eudaimonic well-being is consistent in both groups, regardless of gender. Although not all individual predictors were significant, the inclusion of key variables such as Regulation of their own emotions, Regulation of the emotion of others and Attention to their own emotions reinforces the importance of these factors in predicting eudaimonic well-being. These results suggest that, although certain emotional intelligence factors are relevant for explaining eudaimonic well-being, the moderating role of sex does not appear to influence these relationships. It is recommended that future studies explore other possible moderators or include additional variables to improve the predictive capacity of the model.

Discussion

The two main aims of this study were: 1) To analyse the relationship between emotional intelligence, satisfaction with life, and eudaimonic well-being; and 2) To establish if emotional intelligence can be used to predict satisfaction with life and eudaimonic well-being in men and/or women. The first hypotheses held that women would score higher in terms of emotional intelligence, satisfaction with life, and eudaimonic well-being.

Women scored higher in attention to the emotions of others, expression of emotions, and regulation of the emotions of others. This can be related to biological, social, and cultural factors that influence the emotional development and behaviour of women [60–64, 66–68]. Women are socialised to be more sensitive to the emotional needs of others, fostering empathy and the ability to read the emotions of those around them [52, 53]. In addition, women are typically granted greater leeway to express their emotions compared to men, who are often socialised to repress the expression of some emotions [65]. Concerning the regulation of the emotions of others, the higher score yielded by women could be explained by evolutive theory [67]. Historically, women have played a key part in care roles, which imply managing and regulating the emotions of others to promote the well-being of the group [68].

These results are partially consistent with earlier studies that suggest that women tend to score higher in emotional intelligence [10, 52, 87]. In our study, however, this only applies to some of the factors of emotional intelligence. Men and women scored roughly level in the attention to one's own emotions, the regulation of one's own emotions, and problem-solving. This could indicate that, through life, men and women learn to identify and recognise their emotions [69, 72]. Both sexes are socialised to keep emotional balance, which explains the similar scores in terms of regulation of one's own emotions. Also, the similar scores concerning emotions in problem-solving suggest that the ability to use emotions efficiently depends not on sex but on personal experience and personal maturity [73] and perhaps also on other variables such as age, socioeconomic status, and academic context [22, 24–29]. The results may also reflect the fact that the scale used was designed not to be affected by sex-related norms.

Different authors have pointed out that sex-related differences in emotional intelligence could be the result of sex-identity, which means that the higher scores yielded by women could be a cultural rather than a natural response [96]. Should this be confirmed, it would only confirm the need to introduce emotional education in school curricula [97].

This study also examined sex-related differences in satisfaction with life and eudaimonic well-being. Our results suggest that no significant differences between sexes exist, in line with previous studies [78, 98–100].

Concerning satisfaction with life, changes in sex roles, greater equality of opportunity, a similar perception of quality of life, and social expectations could be having an effect on these results. The population group analyzed in

this study, university students, is likely more knowledgeable or experienced in these topics compared to the general population, which could have influenced the results [24, 26].

With regard to eudaimonic well-being, where no significant differences by sex were found, the results could be explained, especially considering the nature of the sample, by a greater focus on self-realisation and meaning of life, shared expectations in terms of self-realisation, and similar sources of personal well-being [81, 82, 84].

The second hypothesis held that emotional intelligence plays an important role in satisfaction with life and eudaimonic well-being, and that this relationship could be mediated by sex. The results suggest that, in both sexes, only two factors of emotional intelligence, according to Schutte's scale [59]—those related to the regulation of emotions (both one's own and others')—can be used to predict life satisfaction. Emotional regulation can help individuals to cope with stress, curb negative emotions, and lead to a greater satisfaction with life [76, 101, 102]. It was found that this factor of emotional intelligence plays a greater role in satisfaction with life among women, probably because women often face additional social and emotional pressures, and the regulation of these helps them to achieve a greater degree of emotional balance, increasing their perception of satisfaction with life [56, 103, 104].

On the other hand, other factors such as attention to one's own emotions, attention to the emotions of others, the expression of emotions and emotions in problem-solving cannot be used to effectively predict satisfaction with life. A possible explanation of this is that satisfaction with life is most closely related to internal emotional regulation, and some of these factors (attention to one's own emotions or expression of emotions) concern intrapersonal and social well-being [78, 101, 105]. However, owing to the potential effects of data processing, it is argued that more data is needed to establish the effect of sex on these constructs and their potential interactions.

Concerning eudaimonic well-being, the factors that concern the regulation and expression of one's own emotions were identified as potential predictors among men. A possible explanation of this is that good emotional skills enhance the feeling of purpose and self-realisation, allowing individuals to cope with adversity and achieve their goals, a key element of eudaimonic well-being [80, 101, 102].

Among women, the factors of emotional intelligence that can be used to predict eudaimonic well-being are the regulation of one's own emotions, attention to one's own emotions, and emotions in problem-solving. These results can be explained by the fact that these skills are closely related to the ability to manage emotional experiences, face challenges effectively and give meaning and purpose to life [81, 84, 105].

These findings suggest that, among women, emotional skills related to interpersonal relations and social cohesion contribute to a deeper sense of purpose and self-realisation. Among men, eudaimonic well-being is more closely tied to autonomy, competence, and personal success due to the influence of traditional gender roles and the social expectations that men face from an early age. In many cultures, they are socialized to seek independence, autonomy, and personal success, which is reflected in their subjective well-being [83, 106]. Although some authors had pointed out the influence of gender in this relationship [107, 108], no evidence was found that sex moderates these relationships, since in the present study, the impact of these factors on eudaimonic well-being was consistent across both groups, which would indicate that these associations are independent of gender, in line with previous studies [11, 109], making it necessary to deepen the analysis in future research.

This study has several limitations: although the sample is large, it consists solely of university students, whose scores in emotional intelligence, satisfaction with life, and eudaimonic well-being may be above average. In addition, it has been shown that these variables change over time, and since the sample comprises only young people this may introduce some bias in the results. It would, therefore, be necessary to undertake studies with wider and more diverse population groups. In addition, the design of the study is merely observational, so the results would benefit from an experimental approach that incorporates new variables, such as self-concept, empathy, self-esteem, and personality, which may also be related to the variables under examination. In addition, self-reporting could introduce some bias; however, regression analysis helps us validate the relationship between variables and provides a clearer understanding of how these variables relate in practice.

In the future, we aim to emphasise the need to implement specific programmes (educational, emotional intelligence training, emotional education, and leadership) to work these all-important constructs throughout the life-cycle. Emotional intelligence and, especially, satisfaction with life play a key role in eudaimonic well-being [31, 55, 101, 110–113]. Our results bring out new questions to the fore, and encourage us to find answers that can be used to improve people's personal development. These results provide preliminary evidence about the relationship between emotional intelligence—especially in its factors of regulating both one's own and others' emotions—and life satisfaction and eudaimonic well-being in both men and women. The research also contributes to a more efficient evaluation of these constructs in both

sexes, providing education and health professionals with clearer guidelines to improve the well-being of their students/patients, through the design of specific assessment instruments, personalized and preventive interventions, the creation of environments that promote well-being, and professional training. This is important, as well-being should be a priority for everyone working in the fields of education and healthcare.

Conclusions

Although our results are a step in the right direction, they also suggest that more research is necessary to establish sex-related differences in the relationship between emotional intelligence, satisfaction with life, and eudaimonic well-being. This conclusion is interesting in itself. There is widespread consensus about the challenge posed by this question, and previous studies have come up with contradictory results. For instance, while some authors argue that women score higher in emotional intelligence, others suggest that men believe to outscore women in this regard. Our study has found that women pay more attention to the emotions of others and regulate them better, and also that they are better at expressing their own emotions. No significant differences were found with regard to other factors of emotional intelligence. Similarly, no significant sex-related differences were found in connection with satisfaction with life and eudaimonic well-being. However, no previous study has analysed sex-related differences between emotional intelligence, satisfaction with life, and eudaimonic well-being.

The study found that emotional regulation can be used to predict life satisfaction in both men and women, but slightly more in the latter. This could be because emotional regulation helps women to face emotional and social pressures, improving their perception of life satisfaction. Concerning eudaimonic well-being, the results suggest that, among women, interpersonal relations play a key role, while for men the main drivers of eudaimonic well-being are related to individual achievement [104]. We must continue exploring concepts such as those put forth by Vantieghem et al. [114], who hold that the theory of sex identity can be a useful tool to better understand sex in education, and that sex identity may be related to some behaviours. The impact of identity on academic performance, and the relationship of sex identity on emotional intelligence, satisfaction with life, and eudaimonic well-being need to be studied further.

In conclusion, the study presents strong empirical support to the model adopted, emphasising the significant role played by sex in emotional intelligence, satisfaction with life, and eudaimonic well-being, which are key factors in emotional regulation and subjective perceptions of well-being.

Abbreviations

EIS	Schutte Emotional Intelligence Scale
MSCEIT	Mayer-Salovey-Caruso Emotional Intelligence Test
QWEB	Eudaimonic Well-being Questionnaire
SPSS	Statistical Package for the Social Sciences
SWLS	Life Satisfaction Scale

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Informed consent statement

All respondents were volunteers and signed an informed consent form.

Institutional review board statement

The study obtained the approval of the Research Ethics Committee of the Community of Aragon (Spain), with the protocol number P121/526 and the standards of the Helsinki declaration were met.

Authors' contributions

All authors (Eva Urbón, Carlos Salavera and Pablo Usán) have worked and developed the Conceptualization, methodology, formal analysis, research, data curation, writing—preparation of the original draft, and writing—review and editing. All authors have read and accepted to the final version of the manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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