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Patterns of adverse childhood experiences and associations with lower mental well-being among university students

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ABSTRACT

Background: University students report high levels of adverse childhood experiences (ACEs), which can lead to severe mental health problems. Understanding how ACEs impact well-being in this population is essential, yet research to date is limited.
Objective: To explore ACE patterns and their association with lower well-being in university students.
Participants and setting: 1023 Spanish students (71.6 % female) aged between 18 and 64 years old (M = 20.10, SD = 3.93) completed a self-report questionnaire.
Methods: This study used a cross-sectional design. The ACE International Questionnaire (ACE-IQ) and the Short Warwick-Edinburgh Mental Well-being Scale were used to assess, respectively, childhood adversities and mental well-being. Latent Class Analysis and regression modeling were conducted to analyze the link between ACEs and lower mental well-being, considering the covariates of age, country of origin, sexual orientation, and mental illness.
Results: Four ACE classes were identified: Low ACEs (49.5 %), Dysfunctional Household (12.3 %), Household and Peer Abuse (31.0 %), and High ACEs (7.2 %). The regression analysis ($F(3, 1007) = 19.2$, $p < .001$, $R^2_{adj} = 0.054$) successfully predicted well-being scores based on ACE classes. When compared with the Low ACE class, all other classes exhibited lower levels of well-being. Age, sexual orientation, and mental illness were also related to lower well-being, with mental illness having the strongest negative effect ($\beta = -0.635$, $t(1015) = -6.49$, $p < .001$).
Conclusions: These findings underscore the relationship between childhood adversity and mental health, offering insights for future prevention efforts and enriching our understanding of ACEs and their impact on well-being.

1. Introduction

For over two decades, the literature has consistently shown that adverse childhood experiences (ACEs) have detrimental effects on both mental and physical health (Felitti et al., 1998; Felitti & Anda, 2010; Hughes et al., 2017). The conclusion of recent meta-analytic studies is that exposure to ACEs can lead to epigenetic changes in brain functioning and structure, making victims more vulnerable to

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the development of severe mental health problems later in life (Antoniou et al., 2023; Tan & Mao, 2023; Vyas et al., 2023).

Investigations conducted worldwide with samples of university students have found a high prevalence of ACEs in this population (Ho et al., 2019; Karatekin & Ahluwalia, 2020; Khrapatina & Berman, 2017; Tran et al., 2015), challenging the idea that higher education students are likely to have experienced less victimization during childhood than young adults with a less formal educational background (Khrapatina & Berman, 2017; Windle et al., 2018). In this context, studies have found that university students who have experienced a higher number of ACEs are more prone to displaying symptoms associated with depression, anxiety, attention-deficit/hyperactivity disorder, and post-traumatic stress disorder (Merians et al., 2019; Tran et al., 2015; Windle et al., 2018).

Research in our country, Spain, has similarly identified a high prevalence of childhood adversities among university students (Aizpurua et al., 2021). However, in studies comparing ACE prevalence among students from different countries, rates among Spanish students appear to be significantly lower in comparison with their peers elsewhere (Kaminer et al., 2022). This highlights the importance of further investigation in the Spanish population.

It should also be noted that despite the large amount of research in this field in English-speaking countries, only a small number of studies have explored the effects of ACEs in Spain. Furthermore, these Spanish studies are either focused primarily on specific forms of childhood adversity (such as bullying or sexual victimization) or do not study its negative impact on psychological well-being (Blanco et al., 2022; Sánchez et al., 2017; Villacampa & Pujols, 2017; Villora et al., 2021; Yubero et al., 2021), thus leaving many important aspects unexplored. It appears, however, that the number of ACEs is a highly influential factor in predicting adverse mental health outcomes, and the few studies that have analyzed this association in samples of Spanish students have found negative psychological consequences among those who had experienced ACEs (Gomis-Pomares & Villanueva, 2020; Kaminer et al., 2022). This further underlines the need to explore the impact of ACEs in this population.

1.1. The co-occurrence of ACEs

Research into ACEs has usually been conducted using the cumulative risk approach, which has effectively demonstrated the relationship between poly-victimization and mental distress and deepened our understanding of childhood trauma (Finkelhor et al., 2007). However, this method assumes that childhood adversity indicators can be combined into a single measure of risk. Consequently, it does not fully capture specific individual adversities (Lian et al., 2022), potentially hampering an understanding of why moderate (as opposed to high) scores on ACEs can be associated with more severe consequences in certain areas (Hinojosa et al., 2019). As a result, latent class analysis (LCA) has been recommended and adopted by numerous studies in the field of childhood victimization, all of which consider that a multi-dimensional approach provides a more comprehensive understanding of ACEs (Weller et al., 2020).

Investigations using this type of analysis in samples of young adults have consistently identified distinct classes of ACEs, such as high prevalence, low prevalence, and dysfunctional household. Researchers have also been able to relate different patterns of ACEs to specific outcomes (Frøyland & Andersen, 2023; Ho et al., 2019; Kim et al., 2023; Wang et al., 2021).

Well-Being: Beyond the Idea of Mental Health.

While there is a significant amount of research on mental illness as an indicator of mental health among university students, far fewer studies have focused specifically on the negative impact of ACEs on the well-being of this population (Hughes et al., 2017; Karatekin & Ahluwalia, 2020). This can be attributed to the historical perspective whereby mental health was primarily understood as the absence of mental illness. In recent decades, however, the concept has evolved to encompass broader dimensions of the person, such as self-realization, self-awareness, resilience, meaningful engagement or social connection (Tennant et al., 2007; WHO, 2004). Moreover, studies have repeatedly shown that the presence or absence of mental illness alone does not directly determine one's mental health (WHO, 2022). Consequently, researchers have begun to explore the effects of ACEs by adopting a comprehensive approach to mental health, focusing specifically on mental well-being (Chen et al., 2021; Hughes et al., 2016; Villora et al., 2021).

To date, research conducted worldwide has found a general decrease in mental well-being among people with higher rates of ACEs (Chen et al., 2021; Hughes et al., 2016; Hughes et al., 2017). Furthermore, a recent systematic review found that as the number of ACEs experienced by parents increases, so too does the likelihood of negative effects on their children's well-being (Arnold et al., 2023), thus showing how ACEs may have profound intergenerational consequences. These findings underscore the importance of ongoing research into mental well-being, emphasizing the need to deepen our understanding of ACEs so as to more effectively prevent their long-lasting impact on future generations.

1.2. The present study

The aim of this study was to identify patterns in the co-occurrence of different ACEs during childhood and to explore the association with lower mental well-being among university students in the cultural context of south-western Europe. In addition, this study aims to fill the existing gap in research in Spain regarding Adverse Childhood Experiences (ACEs) among university students, employing a methodology that delves deeper into the interrelationships of these experiences. Additionally, this research is significant as it addresses two aspects of mental health that have been rarely investigated in conjunction: mental disorders and lower well-being.

Latent class analysis was used to identify homogeneous groups of participants with similar patterns of ACEs. By considering not only the number of experiences but also how they are related, this person-centered analysis, which acknowledges that ACEs involve multiple and unique facets (Lian et al., 2022), is able to provide greater insight into the link between traumatic experiences and mental health. The study also brings to the fore a significant yet often overlooked aspect of mental health, namely well-being (Hughes et al., 2017).

A sample of mostly young adults attending university was used to test three primary hypotheses: a) we expected to identify at least

three classes of ACEs, corresponding to low ACEs, high ACEs, and a class representing a group of people who have mostly experienced household dysfunction during their childhood; b) we expected to find that individuals who experienced a higher number of ACEs present lower levels of mental well-being than do those who report a low number of ACEs; and c) we expected to find that individuals with a psychiatric diagnosis report lower levels of mental well-being than do those without such a diagnosis.

2. Method

2.1. Participants

Table 1 shows the sample characteristics. The sample comprised 1023 university students (28.4 % male and 71.6 % female) aged between 18 and 64 years ($M = 20.10$, $SD = 3.93$). A total of 1027 participants were initially recruited, but four students (0.39 % of the original sample) were excluded from the analysis due to incomplete responses on the measure of ACEs. A further two cases had missing data (0.19 % of the original sample), specifically concerning their sexual orientation, but as this did not significantly affect the study results these cases were retained.

Most of the participants (88.9 %) were born in Spain, with the remainder coming from America (5.6 %), other European countries (2.8 %), Asia (1.8 %), and Africa (0.9 %). Regarding sexual orientation, 76.4 % of the sample identified as heterosexual, while 22.6 % identified as sexual and gender minorities.

A diagnosis of mental illness was reported by 11.0 % ($n = 113$) of participants. Disorders were classified using DSM-5 (American Psychiatric Association, 2022) as a reference. The most frequently reported diagnoses were anxiety disorders (44.2 %), mood disorders (20.4 %; predominantly depression, with one case of bipolar disorder), eating disorders (23.9 %), obsessive-compulsive disorder (2.7 %), and personality disorders (2.7 %; primarily borderline disorder). All other reported disorders accounted for <2 % of cases and included adaptation disorders, learning disorders, attention-deficit/hyperactivity disorder, and Asperger's syndrome. Among individuals with a psychiatric diagnosis, 30.1 % were taking medication specifically for their mental health problems.

2.2. Measures

2.2.1. Adverse Childhood Experiences International Questionnaire (ACE-IQ)

The international version (World Health Organization, 2018) of the ACE questionnaire (Felitti et al., 1998) was translated into Spanish by the research team with the permission of the World Health Organization (WHO) Regional Office for Europe. The ACE-IQ evaluates the presence of 13 categories of adverse childhood experiences in adults, grouped into four dimensions to code the questions and facilitate comparisons across research: abuse questions (physical, emotional, and sexual abuse); parent/guardian questions (physical and emotional neglect); family questions (such as having grown up with a drug abuser in the household or with a chronically depressed household member); and violence questions (such as bullying, community violence, and collective violence). It yields a total score ranging from 0 to 13. The instrument has been validated in several international contexts (Ford et al., 2014; Ho et al., 2019; Kazeem, 2015; Kidman et al., 2019; Pereira & Viana, 2021; Tarquinio Camille et al., 2023; Téllez et al., 2023) and has shown acceptable levels of reliability and validity. Ho et al. (2019) reported strong test-retest reliability for both the ACE-IQ as a whole (ICC =

Table 1
Descriptive statistics for the overall sample and by ACE classes.

Variable	Total sample (N = 1023)		Low ACEs (n = 506)		Dysfunctional household (n = 126)		Household and peer abuse (n = 317)		High ACEs (n = 74)		Statistics	
	n	%	n	%	n	%	n	%	n	%	χ^2 (df)	Cramer's V
Sex											3.22 (3)	0.056
Male	291	28.4	147	29.1	40	31.7	89	28.1	15	20.3		
Female	732	71.6	359	70.9	86	68.3	228	71.9	59	79.7		
Age Mean (SD)	20.10 (3.93)		19.5* (2.68)		21.0* (5.66)		19.9* (3.31)		23.5* (7.01)			
Country of origin											19.4 (3)*	0.138
Spain	909	88.9	468	92.5	110	87.3	274	86.4	57	77.0		
Other	114	11.1	38	7.5	16	12.7	43	13.6	17	23.0		
Sexual orientation											31.0 (6)*	0.123
Heterosexual	780	76.4	418	82.8	98	77.8	217	68.7	47	63.5		
LGBTQ+	231	22.6	82	16.2	27	21.4	95	30.1	27	36.5		
Not defined	10	1.0	5	1	1	0.8	4	1.3	0	0.0		
Religious affiliation											13.2 (12)	0.066
Catholic	166	16.6	95	19.2	21	17.2	44	14.1	6	8.3		
Muslim	10	1.0	4	0.8	1	0.8	4	1.3	1	1.4		
Other	7	0.7	3	0.6	1	0.8	2	0.6	1	1.4		
No religious affiliation	816	81.7	392	79.4	99	81.1	261	83.9	64	88.9		
Psychiatric diagnosis											52.6 (3)*	0.227
No	910	89.0	479	94.7	105	83.3	275	86.8	51	68.9		
Yes	113	11.0	27	5.3	21	16.7	42	13.2	23	31.1		

Note: *$p < .001$.

0.90) and for each of its domain subscales (ICC = 0.78–0.90). The ACE questionnaire yielded a moderate Cronbach's alpha of 0.65. Notably, similar studies with comparable values have shown satisfactory internal consistency and reliability (Kovács-Tóth et al., 2023).

2.2.2. Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS)

The Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS; Tennant et al., 2007) comprises seven items that measure mental well-being by asking respondents to indicate how often they have experienced various positive mental states over the past two weeks. These states refer to feeling optimistic about the future, feeling useful, feeling relaxed, dealing with problems positively, thinking clearly, feeling connected to others, and being able to make their own decisions. Responses are given on a scale ranging from 1 (none of the time) to 5 (all of the time). An overall score for mental well-being is calculated by summing individual item scores, and thus ranges from 7 (the lowest possible mental well-being) to 35 (the highest possible mental well-being).

The SWEMWBS has shown high internal consistency in different adult populations, and it has been translated and validated internationally (Ng Fat et al., 2017; Stewart-Brown et al., 2009; Vaingankar et al., 2017). The long version of the scale has been administered to European individuals experiencing mental illness (Trousselard et al., 2016), and its short version has demonstrated satisfactory validity and reliability in research conducted with outpatients receiving psychiatric services (Vaingankar et al., 2017). The short version is considered preferable to the long version due to its brevity and robust psychometric properties (Ng Fat et al., 2017; Vaingankar et al., 2017). Cronbach's alpha for the SWEMWBS in the present sample was 0.80, indicating good internal consistency.

2.2.3. Demographic and health variables

A structured self-report questionnaire was used to gather demographic information, including age, gender, sexual orientation, and religious affiliation. Participants were also asked to provide specific details about any psychiatric diagnosis they had received.

2.3. Procedure

Access to the university's undergraduate programs was facilitated by the Vice Chancellor's Office for Student Affairs. One or two class groups from each program were randomly selected. Two researchers with a background in psychology or criminology explained the purpose of the study and made clear the measures that would be taken to protect the privacy and confidentiality of participants' information, including the coding practices that would be implemented to ensure anonymity. The questionnaires were completed collectively in a single session, subsequent to each student signing informed consent. The research was designed and conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Assembly, 2008) and the Code of Ethics of the Catalan Psychological Society. It was approved by the Institutional Review Board of the University of Barcelona (IRB00003099).

2.4. Statistical analyses

Data analysis was performed using Jamovi 2.3 (2021) open source software, and specifically the snowRMM package (Seol, 2022) and poLCA R package (Linzer & Lewis, 2021).

Latent class analysis was conducted in accordance with expert guidelines (Muthén & Muthén, 2000; Nylund et al., 2007; Sinha et al., 2021; Weller et al., 2020). With the aim of identifying latent classes of students exhibiting similar patterns of ACEs, we began with an initial two-class model and added classes in stepwise fashion until achieving a good fit to the data. At each step, the new model was compared with previous ones until the best model was identified. Determination of the optimal class solution was based primarily on two criteria: superior statistics and theoretical foundation (Weller et al., 2020).

Model fit was assessed using the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the adjusted Bayesian information criterion (ABIC). Lower values of these statistics are preferable, and the BIC is considered to provide the best justification for the number of classes (Nylund et al., 2007). The Lo-Mendell-Rubin test (LMRT) and the bootstrap likelihood ratio test (BLRT) were used to assess improvement in model fit when adding or removing latent classes. A significant result from these tests indicates that a model with a different number of classes fits significantly better than does the previous model (Merians et al., 2019). Entropy was also calculated to evaluate the quality of classification in the model, although in line with expert guidelines, it was not used to determine the final model selection (Weller et al., 2020).

Differences between classes in demographic variables were assessed by calculating the chi-square statistic, with Cramer's V being used as the measure of effect size.

The Games-Howell test was employed to compare the mean age and mean number of ACEs between classes, due to the statistically significant results obtained from both the test for homogeneity of variances (Levene's test, $p < .01$) and the Shapiro-Wilk test for normality ($p < .01$) for these two variables. Because these tests indicated violations of the assumptions required for traditional ANOVA, the Games-Howell test was chosen as a suitable alternative for conducting pairwise comparisons between the different classes.

To further investigate the relationship between ACEs and lower mental well-being, as well as the relation with other covariates, a multiple linear hierarchical regression model was implemented. In Model 1, ACE classes were introduced as predictors to assess their impact on well-being scores. Model 2 incorporated additional covariates based on their previous associations with lower mental well-being outcomes and the significant differences observed between the ACE classes we identified (the four classes are shown in Table 1). Specifically, variables that yielded statistically significant differences between classes were selected and introduced into the second model to examine their potential to predict variations in mental well-being. Consequently, age, sexual orientation, country of origin, and diagnosis of mental illness (Yes/No) were included in the analysis to assess their additional contribution in predicting lower well-

being scores, while controlling for the effects of ACE classes.

3. Results

3.1. Patterns of ACEs

The LCA identified a 4-class solution as the best-fitting model, with both the LMRT ($p < .001$) and BLRT ($p < .01$) indicating that it surpassed the previous model (see Table 2). Although the 5-class model had a lower AIC value, the *p*-value for the BLRT was non-significant. Additionally, the 4-class model had a higher log-likelihood value, suggesting a superior fit, as well as a lower BIC value, the most reliable measure of fit for LCA (Nylund et al., 2007). Furthermore, in the 5-class model, one class comprised only a very small percentage of the sample (6.3 %), providing further support for the superior fit of the 4-class model.

The 4-class model also made more sense theoretically. Three of the four classes (Low ACEs, Dysfunctional Household, and High ACEs) have been consistently identified in previous studies (Ho et al., 2019; Kim et al., 2023; Wang et al., 2021), while, interestingly, the fourth class revealed a distinctive profile characterized by household and peer abuse (Household and Peer Abuse). Classes were labeled based on two main criteria: a) the number of ACEs within each class (see Table 3); and b) the item-response probabilities (Fig. 1).

Regarding the number of ACEs, the Games-Howell test was applied to study the difference in the number of ACEs experienced by each class. The results showed that students in the Low ACEs class ($M = 0.96$, $SD = 0.84$; $p < .001$, 95 % CI [0.88, 1.03]) reported significantly fewer ACEs than did those in the other classes, while students in the High ACEs class ($M = 7.77$, SD = 1.61; $p < .001$, 95 % CI [7.40, 8.15]) reported significantly more ACEs than did those in other classes. While this is not surprising, the gap in terms of ACEs between these two classes is noteworthy, with 100 % of students in the High ACEs class reporting five or more ACEs, while none of their peers in the Low ACEs class reported more than four such experiences.

As for the item-response probabilities, the Low ACEs class (49.5 %) included those individuals less likely to report any ACE, with no specific ACE being notably more common than others. The Dysfunctional Household class (12.3 %) comprised those individuals with a higher probability of having grown up alongside a household member with substance abuse and/or mental health problems, and they were also more likely to have lost a parent through divorce, death, or abandonment. Individuals in the Household and Peer Abuse class (31.0 %) were more likely to have been exposed to abuse in their household, to have been physically abused in their household, and to have been maltreated by peers. Finally, the High ACEs class (7.2 %) comprised individuals with a higher probability of endorsing any type of ACE, with the exception of bullying, for which the probability was slightly higher in the Household and Peer Abuse class.

3.2. Associations between sociodemographic variables and ACE classes

As shown in Table 1, preliminary analyses indicated statistically significant differences between classes in age, sexual orientation, country of origin, presence of a mental illness, and, as explained above, the number of ACEs. Compared with the other classes, a higher percentage of students in the High ACEs class reported being born outside Spain (23.0 %), identified themselves as part of a sexual and gender minority (36.5 %), and had been diagnosed with a mental illness (31.1 %). The results of the Games-Howell test indicated that individuals in the High ACEs class ($M = 23.5$, $SD = 7.01$; $p < .001$, 95 % CI [21.9, 25.1]) were older than students in the other classes.

3.3. ACE classes and covariates in the prediction of lower mental well-being

Multiple linear regression was conducted to test whether ACE classes, age, sexual orientation, country of origin, and a diagnosis of mental illness significantly predicted lower well-being scores (Table 4). Tests for variance inflation factors (VIF) and tolerance were conducted, indicating that multicollinearity was not observed. Additionally, the data met the assumption of independent errors (Durbin-Watson value = 1.94).

In Model 1, ACE classes appeared to significantly explain the variance in the self-reported well-being score ($F(3, 1007) = 19.2$, $p < .001$, $R^2_{adj} = 0.054$). The analysis showed that being part of any of the Dysfunctional Household ($\beta = -0.260$, $t(1019) = -2.67$, $p < .01$), Household and Peer Abuse ($\beta = -0.491$, $t(1019) = -6.99$, $p < .001$), and High ACEs classes ($\beta = -0.537$, $t(1019) = -4.43$, $p < .001$) predicted significantly lower scores on self-reported well-being, in comparison with the Low ACEs class.

Table 2
Fit indices for latent class analysis with 2–5 classes.

Number of classes	LL	AIC	BIC	ABIC	LMRT *p*-value	BLRT *p*-value	Entropy
1	−6174	12,374	12,438	12,397	–	–	–
2	−5776	11,606	11,740	11,654	<0.001	<0.01	0.681
3	−5692	11,466	11,668	11,538	<0.001	<0.01	0.686
4	**−5642**	**11,395**	**11,666**	**11,491**	**<0.001**	**<0.01**	**0.653**
5	−5626	11,389	11,729	11,510	<0.01	0.128	0.642

Note: Bold indicates the selected model.
LL = log-likelihood value; AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = adjusted Bayesian information criterion; LMRT = Lo-Mendell-Rubin test; BLRT = bootstrap likelihood ratio test.

Table 3
Prevalence rates of ACEs in the total sample and differences between classes.

	Total sample (n = 1023)		Low ACEs (n = 506)		Dysfunctional Household (n = 126)		Household and Peer Abuse (n = 317)		High ACEs (n = 74)		Statistics	
	n	%	n	%	n	%	n	%	n	%	χ^2 (df)	Cramer's V
Physical abuse	313	30.6	24	4.7	27	21.4	200	63.1	62	83.8	420 (3)*	0.641
Emotional abuse	242	23.7	9	1.8	21	16.7	141	44.5	71	95.9	428 (3)*	0.647
Sexual abuse	214	20.9	42	8.3	28	22.2	106	33.4	38	51.4	120 (3)*	0.343
H. substance abuse	174	17.0	6	1.2	106	84.1	2	0.6	60	81.1	767 (3)*	0.866
H. incarcerated	24	2.3	1	0.2	8	6.3	2	0.6	13	17.6	97.9 (3)*	0.309
H. mentally ill	287	28.1	65	12.8	78	61.9	92	29.0	52	70.3	195 (3)*	0.437
H. violence exposure	274	26.8	5	1.0	40	31.7	162	51.1	67	90.5	422 (3)*	0.642
One or no parents	306	29.9	96	19.0	68	54.0	90	28.4	52	70.3	122 (3)*	0.345
Emotional neglect	89	8.7	9	1.8	16	12.7	42	13.2	22	29.7	82.5 (3)*	0.284
Physical neglect	56	5.5	1	0.2	18	14.3	1	0.3	36	48.6	329 (3)*	0.567
Peer abuse	460	45.0	143	28.3	34	27.0	230	72.6	53	71.6	192 (3)*	0.434
Community violence	251	24.5	71	14.0	49	38.9	95	30.0	36	48.6	72.5 (3)*	0.266
Collective violence	72	7.0	14	2.8	11	8.7	34	10.7	13	17.6	33.8 (3)*	0.182
Number of ACEs											951 (9)*	0.557
0	167	16.3	167	33.0	0	0.0	0	0.0	0	0.0		
1–2	382	37.3	315	62.3	18	14.3	49	15.5	0	0.0		
3–4	268	26.2	24	4.7	64	50.8	180	56.8	0	0.0		
5 or more	206	20.1	0	0.0	44	34.9	88	27.8	74	100		
Mean (SD)	2.70 (2.27)		0.96 (0.84)*		4.00 (1.33)*		3.78 (1.23)*		7.77 (1.62)*			

Note: *$p < .001$.
H = household/household member.

In Model 2, a substantial increase in the adjusted R^2 value suggested an improvement in the overall fit of the model ($F(7, 1003) = 18.4$, $p < .001$, $R^2_{adj} = 0.108$), which explained 10.8 % of the variance in self-reported well-being. After controlling for ACE classes, the variables of age, identifying with a sexual minority, and having a diagnosis of mental illness significantly predicted a change in self-reported well-being scores, while being born outside of Spain did not appear to be statistically significant.

Being diagnosed with a mental illness was the strongest predictor of lower levels of well-being and was associated with a reduction of more than two and a half points in the total self-reported well-being score ($\beta = -0.635$, $t(1015) = -6.49$ $p < .001$). Being part of the High ACEs class ($\beta = -0.454$, $t(1015) = -3.59$, $p < .001$) or the Household and Peer Abuse class ($\beta = -0.429$, $t(1015) = -6.16$, $p < .001$) was associated with a decrease in the total well-being score of almost 2 points (B = −1.87 and B = −1.76, respectively). Being in the Dysfunctional Household class was also associated with lower levels of self-reported well-being, although the decrease was less than one point (B = −0.89) and approximately half that observed in the High ACEs or Household and Peer Abuse classes. The effect size for the Dysfunctional Household class ($\beta = -0.217$, $t(1015) = -2.26$, $p = .024$) was also smaller in comparison with the other two classes.

4. Discussion

This study provides significant insights into the childhood adversity of university students and its correlation with lower mental well-being in the context of south-western Europe. The results make a substantial contribution to both the national and international literature by addressing a crucial topic that has been largely overlooked in this geographical area. Furthermore, the study has employed LCA, a more appropriate and increasingly used approach in studies focused on ACEs.

Overall, the research has: a) identified patterns of ACEs in university students, discerning a revealing pattern of co-occurring ACEs, labeled here as the Household and Peer Abuse class; b) investigated how ACE classes relate to lower mental well-being, going beyond the conventional approach that emphasizes the accumulation of experiences; and c) studied if and how other variables might have an influence on mental well-being, showing in this case the important role of mental illness and its relation to lower well-being.

Below we discuss the most relevant findings, address limitations, and propose future directions.

4.1. General findings and practical implications

Consistent with previous literature (Aizpurua et al., 2021; Gomis-Pomares & Villanueva, 2020; Kaminer et al., 2022), 83.6 % of the sample experienced at least one ACE before the age of 18, confirming that university students have commonly faced adversities during childhood. The prevalence of household adverse experiences, such as having an alcohol and/or drug abuser in the household, was similar to previous investigations. However, prevalence rates for more severe types of ACEs, such as sexual abuse (20.9 %) and physical abuse (30.6 %), were higher than in previous studies conducted in Spain with college samples (Gomis-Pomares & Villanueva, 2020; Kaminer et al., 2022), and this merits attention. In line with our first hypothesis, the LCA identified four classes of ACEs: Low ACEs, Dysfunctional Household, Household and Peer Abuse, and High ACEs. Results of the multiple regression showed that the Dysfunctional Household, Household and Peer Abuse, and High ACEs classes were all associated with significantly lower levels of mental well-being in comparison with the Low ACEs class, partially confirming our second hypothesis which proposed that higher levels of ACEs would

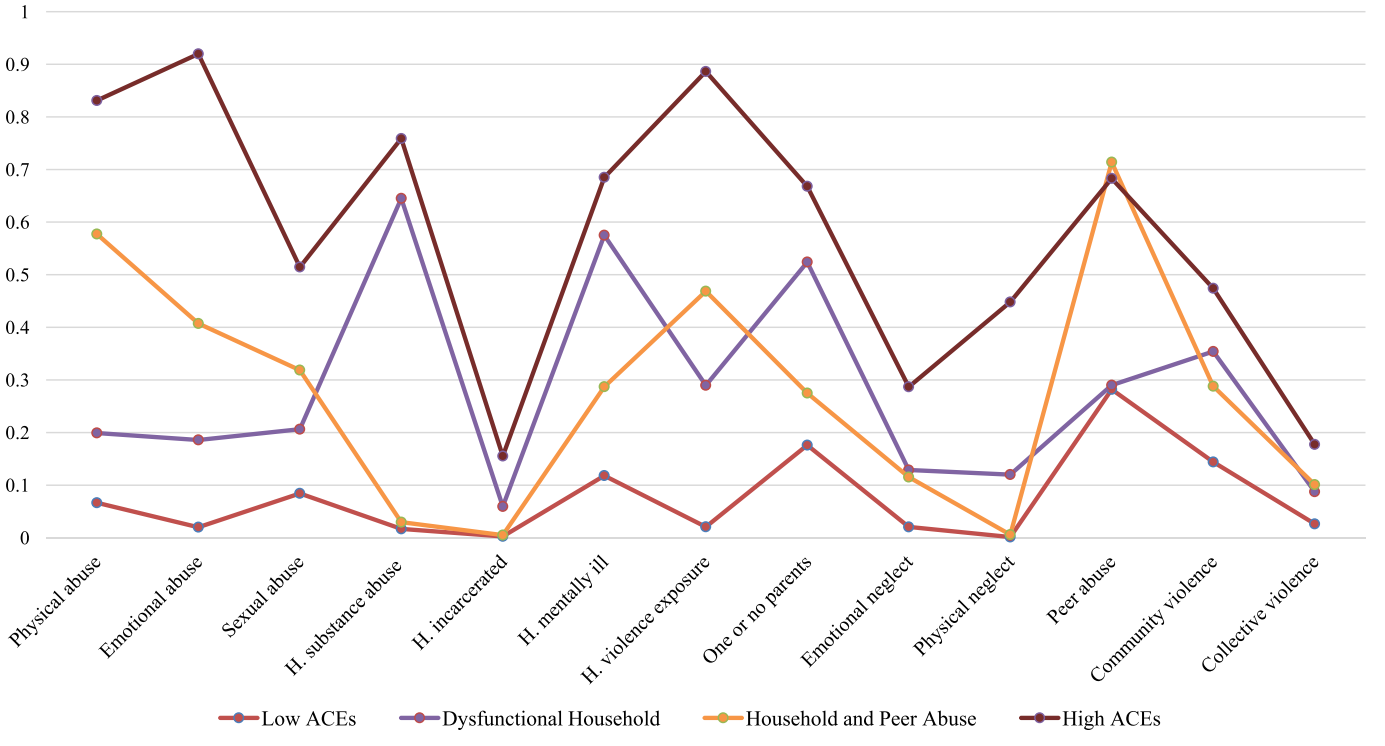

Fig. 1. Item-response probabilities for each class. *Note*: H = household/household member.

Table 4
The effect of ACE class, age, sexual orientation, and mental illness on the self-reported well-being of university students.

		Unstandardized coefficients		Standardized Coefficients	
	Indicators	B	SE B	*β*	*t (df)*
Model 1[a]	(Intercept)	26.58	0.179		148.17 (1019)***
	Dysfunctional Household	−1.07	0.401	−0.260	−2.67 (1019)**
	Household and Peer Abuse	−2.02	0.289	−0.491	−6.99 (1019)***
	High ACEs	−2.21	0.500	−0.537	−4.43 (1019)***
Model 2[b]	(Intercept)	24.69	0.665		37.15 (1015)***
	Dysfunctional Household	−0.89	0.395	−0.217	−2.26 (1015)*
	Household and Peer Abuse	−1.76	0.287	−0.429	−6.16 (1015)***
	High ACEs	−1.87	0.520	−0.454	−3.59 (1015)***
	Age	0.11	0.033	0.103	3.32 (1015)***
	Sexual orientation (other than heterosexual)	−0.69	0.299	−0.169	−2.34 (1015)*
	Country of origin (other than Spain)	−0.29	0.393	0.072	−0.75 (1015)
	Mental illness (Yes)	−2.62	0.403	−0.635	−6.49 (1015)***

Note: *$p < .05$, **$p < .01$, and ***$p < .001$.
[a] $F(3, 1007) = 19.2$, $p < .001$, $R^2_{adj} = 0.054$.
[b] $F(7, 1003) = 18.4$, $p < .001$, $R^2_{adj} = 0.108$.

be associated with lower levels of self-reported well-being. However, the analysis also yielded an interesting finding that did not fully align with this hypothesis. Specifically, individuals in the Household and Peer Abuse class reported a significantly lower number of ACEs ($M = 3.78$) than did students in the High ACEs class ($M = 7.77$), yet despite this difference in ACEs exposure, both groups reported low levels of well-being. Additionally, although the number of ACEs in the Household and Peer Abuse class ($M = 3.78$) was similar to that reported by students in the Dysfunctional Household class ($M = 4.00$), being part of the former class appeared to be associated with lower levels of self-reported well-being. These results suggest that while the accumulated number of ACEs is important for understanding mental health, it is more revealing to consider the specific types of ACEs that co-occur when studying moderate levels of ACEs.

Another relevant finding of this study was precisely the identification of the Household and Peer Abuse class, which comprised 31.0 % of the sample. A significant relationship between peer victimization and both experiencing maltreatment and witnessing victimization during childhood has been reported previously (Holt et al., 2007). This class therefore identifies a profile of vulnerability that should be considered when designing prevention programs, and it is especially relevant with regard to the detection of household abuse by external agents, such as schools, which can act as a support system by identifying cases of peer victimization and exploring other potential forms of abuse experienced by children (Greco et al., 2022). It should also be noted that nearly one-third of students fell into this class, suggesting a substantial prevalence of this phenomenon.

Consistent with our third hypothesis, being diagnosed with a mental illness was related to lower levels of well-being, and it was this relationship that showed the strongest effect among all the analyzed variables. Similar findings have been reported previously, indicating a close relationship between having a mental illness and lower levels of well-being in general (Trousselard et al., 2016). However, it should be noted that ACE classes continued to explain variations in mental well-being, suggesting that while mental illness is indeed an important factor, ACEs also play a significant role in shaping an individual's lower well-being. Therefore, when working with university students, professionals should adopt a comprehensive approach that addresses both mental health issues and the impact of childhood adversity.

Finally, a significant but small positive relationship was found between age and reported well-being, suggesting that mental well-being tends to increase with age. Conversely, belonging to a sexual orientation minority had a significant but small negative effect on mental well-being, indicating that students who identified as LGBTQ+ had lower mental well-being compared with heterosexual individuals. In this context, previous studies have shown that sexual minorities are disproportionately affected by adverse experiences and mental health problems (Díaz-Faes et al., 2023).

The results of this study offer new insights into the relationship between ACEs, mental illness, and mental well-being. Previous research has often examined the impact of ACEs on mental well-being and mental illness separately, possibly because they were considered to represent independent, non-interacting dimensions of mental health. However, it is crucial to explore how mental illness may interact with well-being, particularly given that while a psychiatric diagnosis may be permanent, mental health is not a static construct but rather a dimension that undergoes constant change, and it is here that well-being plays a key role (WHO, 2022).

The question of how lower well-being relates to various experiences of adversity during childhood, considering the pattern of adversities that individuals have experienced, is another issue that requires further in-depth investigation. This is especially important in light of our results showing that the pattern of ACEs is at least as important as their number when it comes to predicting a decrease in levels of mental well-being, making this a crucial factor to consider when designing personalized interventions that can effectively target vulnerable populations (Merians et al., 2019). The fact that numerous recent studies have reported a significant decline in levels of psychological well-being among undergraduates due to the effects of the COVID-19 pandemic (Ebrahim et al., 2022; Karatekin & Ahluwalia, 2020) underlines further the need to develop this field of study.

Finally, the considerable body of research that points to an intergenerational transmission of ACEs and their consequences from parents to children (Arnold et al., 2023; Gomis-Pomares et al., 2021) highlights the need to continue investigating the impact of ACEs

on young adults and their potential effects on future generations.

4.2. Limitations of the study

This study has a number of limitations that should be considered. First, the simultaneous examination of ACEs, well-being, and mental illness poses challenges. This is primarily due to the potential impact of the individual's mental state during assessment, such as being in a depressive state at the time of the interview. Such a condition can influence not only their well-being self-report scores but also render them more inclined to report negative experiences from their past. To address this in future studies, researchers may enhance reliability by incorporating objective measures alongside self-reported data. In addition, a longitudinal study design, spanning an extended period, can capture changes in well-being over time, minimizing the impact of transient emotional states on reported outcomes.

Second, we did not consider the frequency or duration of ACEs, although both are potentially important factors when it comes to understanding the severity of the experience and might potentially affect the identification of patterns in ACEs. Third, the cross-sectional nature of the dataset means that no causal relationships may be inferred from the present analysis, and hence further longitudinal studies are needed to establish a clearer understanding of the relationship between mental well-being, ACEs, and mental illness. In addition, there are many other variables that might explain variance in the mental well-being of university students, and more research is necessary to fully comprehend the complexity of mental health and related factors. Finally, while our study provides valuable insights into ACEs among college students, it is important to note that females made up the majority of the sample, which may limit the generalizability of results.

4.3. Future research

Further research involving diverse populations and settings is needed to enhance the generalizability of ACE-related findings, especially in south-western European countries. In particular, longitudinal designs should be employed to examine temporal associations and potential causal pathways of the relationship between ACEs, mental well-being, and mental illness. When measuring ACEs, future investigations should also consider the frequency and duration of these experiences, as this would allow for an examination of whether repeated exposure amplifies detrimental effects over time, and whether prolonged exposure intensifies the impact of ACEs on well-being and mental health outcomes. Finally, it is also important in future research to consider the interaction between mental illness and well-being, while also examining whether students have experienced ACEs and which specific types. This approach would contribute to a better understanding of whether mental illness is a robust predictor of lower well-being, regardless of childhood experiences or the type of adversity encountered. Additionally, it would provide insights into whether individuals who have experienced ACEs report lower levels of well-being, irrespective of whether they have a psychiatric diagnosis or not.

5. Conclusions

This study employed LCA to examine patterns of childhood adversity in a sample of university students in Spain. The analysis identified four distinct classes which differed in the prevalence and types of ACEs, and significant differences were also observed in mental health outcomes. Students in the High ACEs class had a higher likelihood of being diagnosed with a mental illness and reported lower levels of well-being, compared with individuals in the other classes.

The predicted level of well-being was similar for the Household and Peer Abuse class and the High ACEs class, but was lower for the Household and Peer Abuse class than for the Dysfunctional Household class, despite these two classes having experienced a similar number of adversities. Therefore, when studying moderate levels of ACEs, it is important to consider the specific types of ACEs that co-occur, rather than focusing solely on the total number of ACEs experienced since the specific combination of ACEs might have a more significant impact on self-reported well-being than does their overall number. Knowledge of the specific types and combinations of ACEs is therefore valuable for understanding changes in mental health.

Having a mental illness was a significant predictor of lower levels of well-being and showed the highest effect among all the variables analyzed. This may be attributed to the symptomatic challenges that not only impede the well-being of individuals with mental illnesses but also extend to hinder various aspects of their lives, such as employment opportunities and social connections. Moreover, the stigma surrounding mental illnesses is a critical factor that demands attention, as it frequently contributes to discriminatory practices. Finally, ACEs still appeared to play a role in mental well-being, suggesting that mental illness alone does not determine this relationship. Furthermore, experiencing adversity during childhood was almost as relevant as mental illness in understanding lower well-being. Therefore, when working with university students, professionals should adopt a comprehensive approach that addresses both mental health issues and the impact of childhood adversity.

These findings underscore the association between childhood adversity, mental illness, and lower well-being outcomes, and provide a platform for future research in this field.

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Marina Bartolomé-Valenzuela: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Noemí Pereda:** Writing – review & editing, Validation, Supervision, Project administration, Investigation. **Georgina Guilera:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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