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Changes in mental health and academic engagement following brief university counseling: practice-based evidence from a pre-post study

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Abstract

University students face a critical developmental transition from adolescence to emerging adulthood, marked by increased vulnerability to psychological distress. Effective and accessible counseling services are essential for supporting their mental health and academic functioning. This pre-post study evaluated changes in psychological well-being and academic engagement following a brief individual counseling intervention at an Italian University Counseling Service (UCS). The intervention consisted of up to six weekly, individual one-hour sessions with a counseling psychologist, delivered in person. A total of 372 students (Mage = 23.9, SD = 2.8; F = 74.7%) completed validated self-report questionnaires assessing anxiety, depressive symptoms, psychological distress, emotion regulation strategies, and at-risk behaviors before and after the intervention. Academic engagement dimensions (persistence, motivation, sense of belonging, and relational aspects) were analyzed in a subsample (n = 280; Mage = 23.9, SD = 2.9; F = 74.6%). Changes were analyzed using mixed models, with moderation by age and gender. Significant improvements were found in anxiety (B = −0.482, p < .001, f^2 = 0.26), depressive symptoms (B = −0.705, p < .001, f^2 = 0.28), psychological distress (B = −0.662, p < .001, f^2 = 0.22), at-risk behaviors (B = −0.087, p < .001, f^2 = 0.04), and adaptive emotion regulation (B = 3.791, p < .001, f^2 = 0.06). Changes in academic engagement emerged mainly in peer relationships (B = 0.144, p = .001, R^2c = 0.823, f^2 = 0.002) and in relationships with professors (B = −0.115, p = .006, R^2c = 0.762, f^2 = 0.005). Age and gender partially moderated these changes, highlighting the relevance of demographic characteristics. These findings contribute to practice-based research by providing insights into UCS effectiveness and highlighting areas requiring further attention. Future research should explore long-term trajectories and further examine individual differences to better tailor counseling services to students' diverse needs.

Keywords University counseling services · Mental health · Academic engagement · Emerging adulthood · Practice-based evidence

Introduction

The transition to higher education typically coincides with emerging adulthood, a developmental stage characterized by identity exploration, shifting roles, and heightened academic and social demands (Tanner, 2016). Navigating these challenges increases the risk of psychological distress, potentially impacting students' well-being and overall adaptation to university life. Recent data underscore the magnitude of this issue: a large international survey indicated that 40% of European university students experience mental health problems, with one in five meeting criteria for a diagnosable mental disorder (Cuppen et al., 2024). In Italy, approximately 78.5% of students report mild to severe psychological distress (Porru et al., 2021).

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Given its high prevalence, student mental health has become a major public health concern (Sheldon et al., 2021). Mental health problems can affect various aspects of students' lives, reducing quality of life, academic achievement, and satisfaction with the university experience, while also negatively influencing physical health, relationships, and future opportunities. These issues can also have lasting effects, compromising future employment prospects, earning potential, and overall health, which in turn contribute to broader economic and social costs.

In response, academic institutions and health systems are increasingly required to address these challenges in a structured and coordinated manner, defining clear roles for psychological support services and developing shared, evidence-based strategies. Originally conceived as informal and often unstructured support services, University Counseling Services (UCSs) have redefined their operational models to respond to the growing complexity, frequency, and severity of students' mental health concerns (Bastianoni et al., 2024). This evolution has led to the adoption of flexible, time-limited interventions and closer integration with academic and health policy frameworks, aiming to meet both immediate needs and broader goals of prevention and personal development. A central feature of this evolving, practice-based approach is the systematic monitoring and evaluation of outcomes, which not only addresses the requirements of funders and policymakers, but also ensures that services remain accountable to students and responsive to their evolving needs (Dufour, 2020).

In line with this, a substantial body of research has examined the effectiveness of university counseling interventions, focusing primarily on changes in psychological well-being before and after counseling. For example, Strepparava et al. (2016) examined 45 undergraduates receiving cognitive-relational counseling and found significant reductions in psychological symptoms and distress, with moderate improvements in emotion regulation. These changes were measured using the Symptom Checklist-90 Revised, the Clinical Outcomes in Routine Evaluation-Outcome Measure, and the Emotion Regulation Questionnaire, with effect sizes ranging from medium to large. In a sample of 107 university students with elevated distress, Stallman et al. (2016) reported moderate pre-post effect sizes for reductions in anxiety and depression, as assessed by the Depression Anxiety Stress Scales, the WHO Well-Being Index, and measures of coping and university connectedness. Using the CORE-OM total scores, Murray et al. (2016) assessed 305 students at a UK university counseling service and found significant reductions in post-intervention distress with 63% showing reliable improvement and nearly half achieving clinically significant change.

These studies have typically relied on standard pre-post comparison methods (e.g., paired t-tests, Mann-Whitney tests) to quantify improvements. Although these approaches are useful for assessing average change, they do not consider individual differences in how students respond to counseling, even though such characteristics are associated with differences in psychological symptom severity (Conley et al., 2020; Sabella et al., 2020). When studies take individual variability into account, the magnitude of observed change often appears smaller, offering a more realistic view of student outcomes. For example, Cerutti et al. (2020) used latent change score modeling to assess symptom changes in 372 university students following a brief psychodynamic counseling intervention. This approach allowed them to model individual variability in response to counseling and to examine the influence of demographic variables such as gender and age. Their results showed that the magnitude of change was not uniform across students, and that gender differences emerged for some outcomes. These findings underscore that taking individual characteristics into account yields a more nuanced and accurate picture of intervention effectiveness.

To further enrich this understanding, a comprehensive assessment should also include outcomes beyond the psychological domain, particularly aspects of academic functioning that are central to students' life. Among these, academic engagement, defined as active involvement, commitment, and enthusiasm in university-related activities (Alrashidi et al., 2016), has been shown to be associated with psychological well-being. For example, Saleem et al. (2022) found that positive psychological resources like resilience and self-efficacy promote greater academic engagement, indirectly linking engagement to well-being. More directly, Greco et al. (2025) identified distinct patterns of academic engagement among students seeking counseling and found that higher engagement aligned with greater psychological well-being and fewer mental health symptoms, while lower engagement was associated with increased distress.

Despite the relevance of these findings, a recent systematic review (Pizzo et al., 2024) confirms that academic-related variables are considered in only a minority of counseling studies. Nevertheless, some evidence suggests that counseling can support students' academic functioning as well as their psychological well-being. Broglia et al. (2023) analyzed data from over 2,400 students across four UK university counseling centers and found significant pre- to post-intervention reductions in both psychological and academic distress, measured by the CORE-OM and the Counseling Center Assessment of Psychological Symptoms (CCAPS), with academic distress emerging as the highest concern in their sample. Bani et al. (2024) evaluated 218 Italian students who completed a brief CBT-based

counseling intervention, reporting significant improvements in academic self-efficacy that persisted at six-month follow-up.

Another relatively neglected area in the literature concerns at-risk behaviors, such as self-harm and other harmful actions. Yet, these behaviors are increasingly recognized as a major concern among university students. A large epidemiological study in Northern Europe found that 19.6% of university students engaged in non-suicidal self-harm (Sivertsen et al., 2019). Similarly, peer aggression, both physical and relational, remains common and can negatively affect academic and psychological functioning (Thomas, 2019). Although UCSs are not specifically designed to address these issues, they play an important role in identifying vulnerable students and facilitating access to specialized care. In the Italian context, only a few studies have assessed changes in risk behaviors as counseling outcomes, specifically using the risk subscale of the CORE-OM. Vescovelli et al. (2017) reported significant reductions in self-reported risk behaviors after a brief counseling intervention within a sample of 89 university students, whereas Strepparava et al. (2016) did not find significant changes. These mixed findings underscore the need for further research to clarify how effective UCS interventions are in addressing at-risk behaviors.

Finally, as highlighted in their systematic review, Worsley et al. (2021) point out that most studies on the effectiveness of university counseling tend to focus mainly on positive outcomes, with little attention given to cases where no improvement or even negative effects occur. This selective reporting makes it difficult to fully understand the role of counseling interventions and identify areas needing improvement. Overall, the current literature shows that, while university counseling services can help improve students' psychological well-being and academic functioning, important gaps remain. Further research is needed on academic outcomes, individual differences in responsiveness, risk behaviors, and more transparent reporting of all outcomes. Addressing these areas, especially through studies using representative samples and multidimensional measures, will help build a more nuanced understanding of UCS effectiveness and support the ongoing development of services tailored to the needs of today's diverse student population.

The present study

This study aimed to expand practice-based research on UCSs by addressing gaps highlighted in the literature. Specifically, it examined changes in students' psychological well-being and academic engagement following brief counseling interventions, offering a broader perspective on individual variability and trajectories. The present study addressed the following questions:

1. Do anxiety, depressive symptoms, psychological distress, and maladaptive emotion regulation decrease among students after attending brief counseling interventions at the university counseling service?
2. Do the specific dimensions of academic engagement measured in this study, including persistence in university choice, perceived course value, sense of belonging, and relational aspects, improve after students attend brief counseling interventions at the university counseling service?
3. To what extent do sociodemographic characteristics such as age and gender, as well as individual variability, contribute to pre-post changes in psychological well-being and academic engagement?

The overall conceptual model underlying the study design is illustrated in Fig. 1. In addition to the primary research questions, the study further sought to:

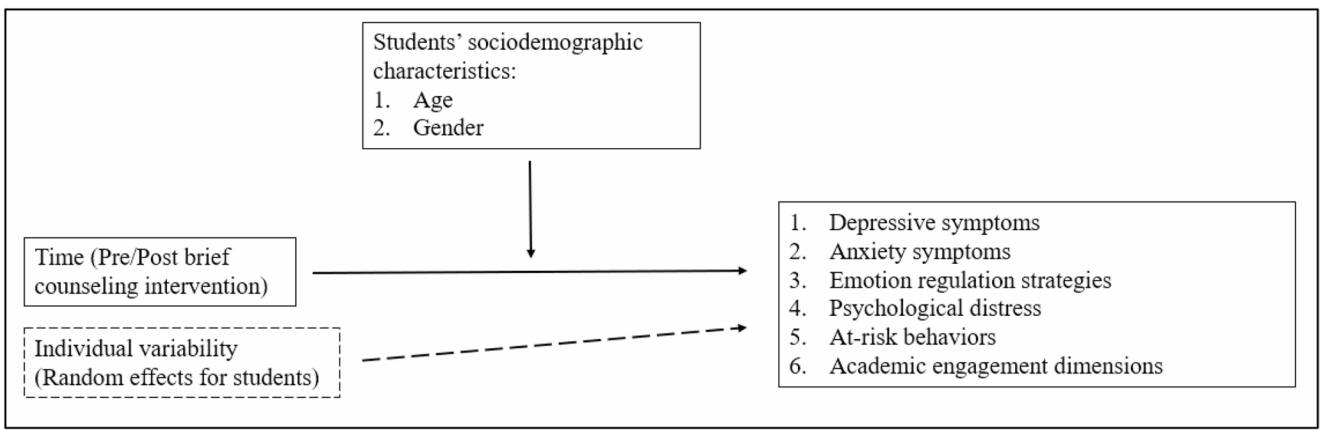

Fig. 1 Conceptual model of the study design

- Expand the examination of psychological and academic functioning in students accessing UCSs by considering multiple domains and pre-intervention outcomes.
- Examine at-risk behaviors and their potential changes following counseling interventions.

Methods

This section outlines the methodological framework adopted in this study, detailing the procedures for data collection, the measures employed, the sample characteristics, and the statistical analyses conducted to address the research objectives.

University counseling service

The UCS at the [MASKED FOR REVIEW] is dedicated to supporting students facing developmental, transitional, or adjustment challenges that may arise during their academic years. Its primary aim is to promote psychological well-being and effective personal and academic functioning, by helping students identify and utilize their own resources and strengths, and by preventing or alleviating distress. The UCS operates according to a brief counseling model, which is specifically designed to provide focused, time-limited support oriented toward specific and achievable goals (Bastianoni et al., 2024). Each intervention begins with a clear definition of the student's main area of concern and explores how these difficulties relate to their personal history and future aspirations, with particular emphasis on processes of meaning-making and self-reflection (Strong et al., 2008). The ultimate objective of the counseling intervention is to foster self-awareness by helping students focus on their personal resources, reinterpret their difficulties, and consider new possibilities for action and adaptation.

Requests for counseling are highly diverse, including psychological symptoms, relational or family issues, emotional or physical distress, or concerns directly related to academic life, such as exam anxiety or difficulty managing study demands. These different areas are often interrelated, and difficulties in one domain may affect others. Students presenting with acute clinical needs, such as high suicide risk or severe mental health conditions, are promptly referred to specialized psychiatric care integrated within the service.

Procedure

Access to the UCS was voluntary. The psychological service was promoted through the university website and institutional newsletters. Students accessed the service via the online university platform. On first access, they received information about the counseling process and outcome monitoring program, and provided digital informed consent for research participation on outcome monitoring. The consent form explained that data would be anonymized and used for research purposes in compliance with EU GDPR (Regulation 2016/679).

After providing consent, students completed the baseline (pre-intervention) assessment. Upon completion, the triage staff received an automatic notification containing the student's contact information. These details were kept separate from the anonymized research data and were not included in the aggregated database. Triage staff then contacted students by phone to schedule the intake session (average wait time: two weeks), which was conducted by a licensed psychotherapist. During intake, needs and motivations were assessed, and students were assigned to a counseling psychologist for the intervention. Before beginning counseling, students signed an additional informed consent for the professional service (Law 56/1989; Italian Code of Ethics for Psychologists). This document outlined the operational and ethical terms of the intervention. The intervention consisted of up to six weekly, in-person sessions (one hour each) over approximately 2 months. Students were included in analyses if they attended at least four sessions; on average, participants attended 5.8 sessions (82.5% completed all six). Within one week after the final session, students completed the post-intervention survey (identical to baseline), and a follow-up assessment was administered two months later. All questionnaires were delivered in Italian using validated versions.

All procedures were approved by the Ethical Committee of [masked for review] (protocol no. 115/22; subsequent amendment accepted in June 2023 to include an additional assessment instrument) and were conducted in accordance with the Declaration of Helsinki.

Measures

Generalized anxiety disorder −7 (GAD-7; Spitzer et al., 2006) This 7-item scale assesses the severity of generalized anxiety disorder symptoms. Item examples are as follows: *Worrying too much about different things*; *Becoming easily annoyed or irritable*. Responses range from 0 ("Not at all") to 3 ("Nearly every day"), with total scores ranging from 0 to 21. Higher scores indicate greater anxiety severity, which can be classified into four categories: minimal (0–4), mild (5–9), moderate (10–14), and severe (15–21). The official Italian version, provided by Pfizer (https://www.phqscreeners.com/select-screener), was used in this study. In an Italian general population sample, internal consistency was

Cronbach's α=0.92 (Shevlin et al., 2022). In our sample, Cronbach's α was 0.83.

Beck depression inventory-II (BDI-II; Beck et al., 1996) The BDI-II is a 21-item measure evaluating the severity of depressive symptoms, such as sadness, loss of interest, and guilt. For example, the item on guilty feelings presents the following response options: *I don't feel particularly guilty*; *I feel guilty over many things I have done or should have done; I feel quite guilty most of the time; I feel guilty all of the time.* Scores range from 0 to 63 and are categorized as minimal (0–13), mild (14–19), moderate (20–28), or severe (29–63). The Italian validation was conducted by Montano and Flebus (2006), with an internal consistency of Cronbach's α=0.92 in a non-clinical sample. In our sample, Cronbach's α was 0.89.

Emotion regulation questionnaire-10 (ERQ-10; Gross & John, 2003) This 10-item scale measures two emotion regulation strategies: Cognitive Reappraisal (CR; e.g., *I control my emotions by changing the way I think about the situation I'm in*) and Expressive Suppression (ES; e.g., *When I am feeling negative emotions*, *I make sure not to express them*). CR refers to the process of reinterpreting a situation in a way that changes its emotional impact, typically leading to more adaptive emotional outcomes. ES involves inhibiting outward emotional expressions, which is generally considered a less effective strategy for managing emotions (Gross & John, 2003). Responses are rated on a 7-point Likert scale (1 = 'Strongly disagree' to 7 = 'Strongly agree'). CR scores range from 7 to 42, and ES scores from 7 to 28, with higher scores indicating a greater tendency to use the respective strategy. Internal consistency for CR and ES subscales in the Italian validation (Balzarotti et al., 2010) was Cronbach's α=0.84 and 0.72, respectively. In the current study, α was 0.84 (CR) and 0.75 (ES).

Clinical outcomes in routine evaluation (CORE-OM; Evans et al., 2002) This 34-item instrument evaluates psychological distress across four domains: Well-being, evaluating overall life satisfaction; Problems, assessing emotional, behavioral, or relational difficulties; Life functioning, measuring the ability to perform daily activities and maintain social or work relationships; and Risk, focusing on self-harm and harm to others.

Responses are rated on a 5-point scale (0 = "Not at all" to 4 = "Most or all of the time"). Scores can be analyzed as total, mean, or by domain. Additional subscales include "All Items Less Risk" (general psychological functioning; e.g., *Tension and anxiety have prevented me doing important things; I have felt overwhelmed by my problems*) and "Risk" (self- and other-harm behaviors; e.g., *I have thought of hurting myself*; *I have threatened or intimidated another person*), with mean scores ranging from 0 to 4. Continuous scores can be used to differentiate between clinical and non-clinical populations based on the cut-off values established in the Italian validation study (Palmieri et al., 2009). According to the Italian validation, internal consistency in a non-clinical sample was α=0.92 for the "All Items Less Risk" subscale and α=0.79 for the "Risk" subscale. In this study, α was 0.92 for the "All Items Less Risk" subscale and 0.73 for the "Risk" subscale. The relatively lower internal consistency observed for the Risk subscale may be due to the restricted range and low prevalence of high-risk behaviors in this non-clinical sample.

SInAPSi academic engagement scale (SAES; Freda et al., 2023) This 29-item scale evaluates six dimensions of academic engagement:

1) Perception of the capability to persist in the university choice (α=0.80): the awareness of the difficulties and the resources required to overcome them (e.g., *I'd better do other things than go to University*).
2) University value and sense of belonging (α=0.86): the relevance ascribed to the choice of pursuing higher education and the feeling of connection to the academic community (e.g., *Going to University is a great opportunity for me*).
3) Value of university course (α=0.94): the acknowledgment of the chosen course's potential to contribute to professional career and personal growth (e.g., *The course of study I'm attending is interesting*).
4) Integration between university and relational net (α=0.85): the ability to integrate academic responsibilities and personal life, by sharing university experiences with external relational networks (e.g., *I discuss with my family about my University path*).
5) Relationships with university peers (α=0.89): the perceived opportunities to build meaningful and supporting relationships with university peers (e.g., *I have good relationships with my university colleagues*).
6) Relationships with university facultys (α=0.89): the perceived level of availability, respect and interest from faculty members (e.g., *My teachers respect me as a person*).

Responses are rated on a 5-point Likert scale (0 = "Not at all" to 5 = "Very much"), with mean scores calculated for each dimension. Higher values reflect more positive attribution to that dimension. In the original validation, all subscales showed Cronbach's α>0.70. Internal consistency coefficients (Cronbach's α) from our sample are reported

above for each dimension. Since the SAES was added into the outcome monitoring protocol during data collection, academic engagement data at both pre- and post-intervention are available only for a subsample of 280 students out of the total 372 included in the study. The study protocol was amended to include the SAES and approved by our institutional ethics committee.

Sample

Data was collected between March 2023 and November 2024. During this period, 784 students requested access to the UCS. Of these, 4.85% ($n=38$) suspended or dropped out of the intervention, 8.93% ($n=70$) did not attend the initial session, and 11.73% ($n=92$) were still receiving the intervention at the time of data collection. Overall, 74.49% ($n=584$) of students completed the counseling intervention. Among them, 36.30% ($n=212$) did not complete the post-intervention survey, while 63.70% ($n=372$) provided the required data for pre-post analysis.

The present study focused on these 372 participants (Mage = 23.9, SD = 2.8; Female = 74.7%). Most participants were female ($n=278$, 74.7%), while 25.3% ($n=94$) were male. Regarding academic background, 42.7% ($n=159$; 1 st year = 23.3%, 2nd year = 30.2%, 3rd year = 46.5%) were enrolled in bachelor's programs, 28.8% ($n=107$; 1 st year = 30.8%, 2nd year = 69.2%) in master's programs, 25.0% ($n=93$; 1 st year = 9.7%, 2nd year = 10.8%, 3rd year = 20.4%, 4th year = 15.1%, 5th year = 31.2%, 6th year = 12.9%) in five- or six-year degree courses, and 1.3% ($n=5$) were PhD students. Additionally, 2.2% ($n=8$) were pursuing other academic pathways, such as advanced training programs or specialization schools. Regarding motivation for accessing the counseling service, students could select up to three areas of concern. The most frequently endorsed motivations were psychological symptoms, such as anxiety (64.5%), difficulties managing academic life (47.3%), and the desire for greater self-understanding (43.3%). Other common reasons included difficulties in relationships with peers (22.0%), physical symptoms (e.g., headaches, insomnia; 17.5%), difficulties in family relationships (16.9%), difficulties in romantic relationships (16.9%), and having experienced traumatic events such as bereavement or illness (13.4%). Curiosity about the service was reported less frequently (8.3%).

Analytic plan

Statistical analyses were conducted using Jamovi software, following a two-phase strategy: preliminary and longitudinal analyses. This approach provided an evaluation of both pre-intervention measures and changes over time.

Preliminary analyses

Correlation analyses and Multivariate Analyses of Covariance (MANCOVAs) were performed separately on psychological outcomes (GAD-7, BDI-II, ERQ-10, CORE-OM) and AE dimensions scores, to evaluate pre-intervention age- and gender-related differences. MANCOVA was conducted to examine baseline differences independently of the longitudinal model, ensuring that pre-post changes were not confounded by pre-existing disparities. Analyses on the six dimensions of AE were performed on a sub-sample of students ($n=280$; F = 74.6%; M = 23.9, SD = 2.9) due to the later inclusion of the SAES questionnaire in the survey process.

In accordance with established methodological guidelines (Kline & Little, 2023), confirmatory factor analyses (CFA) were first conducted on baseline (pre-intervention) SAES data to verify the measurement structure prior to any longitudinal analyses. Specifically, following the approach of Passeggia et al. (2023) we tested both a correlated six-factor model and a second-order factor solution, to assess which factorial structure was best supported by the current data. Model fit was assessed using the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR), adopting standard cutoffs of CFI > 0.90, RMSEA < 0.08, and SRMR < 0.08 to indicate acceptable fit (Kline & Little, 2023). The equivalence of the two models was determined by the difference in CFI (ΔCFI < 0.01), in line with best practices for model comparison (Cheung & Rensvold, 2002).

To determine the required sample size for MANCOVA, G*Power software (Faul et al., 2007) was used following Dattalo's (2013) guidelines. A moderate effect size ($f^2(V)=0.0625$), a significance level of 0.01, and a desired power of 0.95 indicated a minimum sample size of 182 participants, ensuring sufficient statistical power for the planned analyses.

Pre-post longitudinal analyses

Longitudinal changes were examined through Linear Mixed Models (LMMs) and Generalized Linear Mixed Models (GLMMs) to evaluate pre- and post-counseling changes. Random intercepts were included for "students" to account for individual variability, and an AR(1) residual structure was applied to model autocorrelation within repeated measures. Fixed effects for Time (pre- and post-intervention) were included to assess changes over time, while interaction terms (Time × Gender, Time × Age) were examined to evaluate the moderating role of demographic factors. Parameters were estimated via Restricted Maximum Likelihood.

For variables with non-normal distributions (assessed through histograms and Q-Q plots; see Supplementary Materials), GLMMs with a Gamma distribution and log link function were applied (Dunn & Smyth, 2018). Skewness and kurtosis values (with standard errors) for all outcome variables at both pre- and post-intervention are reported in Supplementary Table S1. Model selection prioritized convergence and parameter estimation quality (Bono et al., 2017). Descriptive analyses were used to examine clinically significant changes in CORE-OM subscales. Local effect sizes for each fixed effect were calculated as Cohen's f^2 according to established recommendations for mixed models (Selya et al., 2012; Nakagawa et al., 2017), quantifying the proportion of outcome variance explained by each predictor.

Results

Results are presented in two sections. The first examines pre-intervention differences in psychological outcomes and AE dimensions by age and gender. The second analyses changes over time using mixed-effects models, considering the moderating role of demographic factors.

Pre-intervention differences

Correlation analyses confirmed that the study's variables were interrelated but not redundant, as none of the correlations exceeded r=.90 (Tabachnick & Fidell, 2013). Correlational matrices for psychological outcomes and AE dimensions are reported in Table S2 and S3 of Supplementary Materials, respectively.

Results of the CFA on the SAES measure indicated that both the correlated six-factor solution (CFI=0.913, RMSEA=0.069, SRMR=0.058) and the second-order factor model (CFI=0.911, RMSEA=0.069, SRMR=0.063) showed acceptable fit, with a negligible difference in CFI (ΔCFI=0.002), indicating statistical equivalence (Cheung & Rensvold, 2002). However, the inspection of the second-order model revealed that some dimensions, such as *Relationships with university faculty* (loading=0.449), *Relationships with peers* (0.476), showed relatively lower standardized loadings on the general engagement factor compared to others (e.g., *Course Value*=0.864, *Sense of Belonging*=0.806). Full standardized loadings for all dimensions are reported in Supplementary Tables S4–S5. This finding suggests partial specificity among AE dimensions and supports the decision to analyze all six subscales separately, in line with the original theoretical framework and the aims of the present study.

To examine potential baseline differences in psychological outcomes as a function of gender and age, MANCOVA was conducted including all psychological outcome variables as dependents, with gender and age as between-subjects factors. Box's test of equality of covariance matrices was significant (χ^2 = 49.0, df=21, p<.001), indicating a violation of the homogeneity assumption. Therefore, Pillai's Trace was adopted as the test statistic, as it is specifically recommended for situations where the assumptions of multivariate normality and homogeneity of variance-covariance matrices are not met (Tabachnick & Fidell, 2013). MANCOVA is also considered a robust procedure in the presence of such violations, especially with larger samples (Field, 2018). The analysis revealed significant gender differences (Pillai's Trace=0.093, F (6,364)=6.238, p<.001), while no significant effects emerged for age (Pillai's Trace=0.004, F(6,364)=0.288, p=.943).

Male students reported lower anxiety symptoms (p=.013), greater use of expressive suppression (p=.003), and a higher incidence of at-risk behaviors (p=.003) compared to female students. No significant differences were found for other psychological variables. Full univariate results are available in Table S6 of Supplementary Materials.

For the MANCOVA conducted on the SAES dimensions, Box's test of equality of covariance matrices was not significant (χ^2 = 18.4, df=21, p=.621), indicating that the assumption of homogeneity was met. Pillai's Trace was used as the test statistic for consistency with previous analyses. Results revealed significant age differences (Pillai's Trace=0.134, F(6,272)=7.01, p<.001, ηp^2= 0.118), while no overall gender effect was observed (Pillai's Trace=0.031, F(6,272)=1.45, p=.196, ηp^2= 0.030). Univariate tests indicated that female students were associated with higher scores in *University Value and Sense of Belonging* dimension, compared to males (p=.010). Regarding age, significant effects were found for *Perception of the Capability to Persist in the University Choice* (F=23.005, p<.001) and *Relationships with University peers* (F=11.986, p<.001), with both dimensions decreasing as age increased. Full univariate results are provided in Table S7 of Supplementary Material. Table 1 below presents mean (and SD) of psychological and academic outcomes before and after completing the intervention.

Pre-post changes on psychological outcomes

Significant pre-post intervention changes were observed across multiple domains. Table 2 presents the model fit statistics, highlighting explained variance and individual variability. The higher conditional R^2 values compared to marginal R^2 emphasize the role of individual differences, while significant LRT X^2 tests support the inclusion of

Table 1 Pre-and post-intervention means and SDs of psychological and academic outcomes

	Time			
	Pre		Post	
	Mean	SD	Mean	SD
Psychological symptoms				
Anxiety severity (GAD-7)	11.88	4.64	7.45	4.45
Depression severity (BDI-II)	21.33	1.52	11.89	1.38
Emotion regulation strategies (ERQ-10)				
Cognitive Reappraisal	25.52	7.33	28.90	6.74
Expressive Suppression	15.12	5.53	13.95	5.45
Psychological distress (CORE-OM)				
All items minus Risk	1.99	0.67	1.35	0.70
Risk	0.24	0.43	0.10	0.26
SAES dimensions				
Perception of the capability to persist in the university choice	4.05	0.84	4.09	0.84
University value and sense of belonging	4.04	0.73	4.08	0.75
Value of university course	3.78	0.85	3.77	0.91
Integration between university and relational net	3.20	1.12	3.24	1.15
Relationships with university peers	3.11	1.05	3.25	1.02
Relationships with university faculty	3.22	0.88	3.11	0.85

random effects to improve model fit beyond fixed effects alone. These findings underscore the importance of accounting for variability to accurately represent psychological outcomes.

Anxiety symptoms

The model revealed a significant reduction in anxiety symptoms over time (B = −0.482, SE = 0.027, 95% CI [−0.535, −0.429], z = −17.87, p < .001; f^2 = 0.26), indicating an overall improvement across the sample. Age moderated this reduction (B = −0.020, SE = 0.008, 95% CI [−0.037, −0.004], z = −2.386, p = .017; f^2 = 0.004), following a linear trend: reductions were most pronounced in older students (B = −0.531, SE = 0.036, z = −14.6, p < .001), followed by those of average age (B = −0.475, SE = 0.027, z = −17.7, p < .001), and least pronounced in younger students (B = −0.419, SE = 0.035, z = −12.0, p < .001).

The interaction between Time and Gender was not significant (B = 0.014, SE = 0.054, 95% CI [−0.092, 0.119], z = 0.254, p = .795), indicating that changes in anxiety symptoms over time were similar for male and female students.

Depressive symptoms

Results indicated a significant reduction in depressive symptoms after the intervention (B = −0.705, SE = 0.037, 95% CI [−0.778, −0.633], z = −19.14, p < .001; f^2 = 0.28). Age was associated with differences in this reduction (B = −0.029, SE = 0.012, 95% CI [−0.051, −0.006], z = −2.506, p = .012; f^2 = 0.004). Simple effects analysis showed that the largest reductions were observed in older students (B = −0.815, SE = 0.049, z = −16.5, p < .001), followed by students of average age (B = −0.735, SE = 0.037, z = −19.9, p < .001), with smaller reductions among younger students (B = −0.656, SE = 0.048, z = −13.7, p < .001).

The interaction between Time and Gender was not significant (B = −0.059, SE = 0.074, 95% CI [−0.204, 0.085], z = −0.810, p = .418), suggesting that changes in depressive symptoms were comparable for male and female students.

Emotion regulation strategies

The LMMs revealed distinct patterns for the two emotion regulation strategies after the intervention. For Cognitive Reappraisal, a significant increase was observed (B = 3.791, SE = 0.403, 95% CI [3.000, 4.584], t = 9.41, p < .001; f^2 = 0.06). Gender moderated this change (B = −1.637, SE = 0.803, 95% CI [−3.217, −0.058], t = −2.04, p = .042; f^2 = 0.003), with female students showing a more pronounced increase (B = 3.79, SE = 0.403, t = 9.41, p < .001) compared to male students (B = 2.15, SE = 0.694, t = 3.11, p = .002). The interaction between Time and Age was not significant (B = 0.108, SE = 0.127, 95% CI [−0.141, 0.356], t = 0.85, p = .396), indicating that changes in cognitive reappraisal were consistent across age groups.

For Expressive Suppression, a significant reduction was found after the intervention (B = −1.083, SE = 0.315, 95% CI [−1.703, −0.464], t = −3.441, p < .001; f^2 = 0.012). Neither gender (B = −0.348, SE = 0.628, 95% CI [−1.583, 0.886], t = −0.555, p = .579) nor age (B = −0.076, SE = 0.099, 95%

Table 2 Model fit parameters for psychological outcomes

Psychological Outcomes	Model Type	Conditional R^2	Conditional LRT X^2 (p)	Marginal R^2	Marginal LRT X^2 (p)	ICC %
Anxiety	GLMM	0.576	393.421 (<0.001)	0.218	315.759 (<0.001)	45.7
Depressive Symptoms	GLMM	0.624	41.079 (<0.001)	0.223	347.248 (<0.001)	51.7
Cognitive Reappraisal	LMM	0.573	175.695 (<0.001)	0.062	88.581 (<0.001)	54.5
Expressive Suppression	LMM	0.551	144.879 (<0.001)	0.033	24.683 (<0.001)	53.5
Psychological Distress	LMM	0.625	25.448 (<0.001)	0.185	229.541 (<0.001)	54.0
At-Risk Behaviors	GLMM	0.515	528.891 (<0.001)	0.053	99.636 (<0.001)	48.7

Table 3 Transitions across clinical and non-clinical classifications for the CORE-OM subscales

	Pre		Post		Improvement	Deterioration	No change
	N	%	*N*	%	%	%	%
CORE-OM All items less Risk score category							
Clinical	302	81.2	157	42.2	51	-	49
Non-clinical	70	18.8	215	57.8	-	12.9	87.1
CORE-OM Risk score category							
Clinical	105	28.2	43	11.6	72.4	-	27.6
Non-clinical	267	71.8	329	88.4	-	5.2	94.8

Table 4 Model fit parameters for AE dimensions

AE Dimensions	Model Type	Conditional R^2	Conditional LRT X^2 (p)	Marginal R^2	Marginal LRT X^2 (p)	ICC %
Persistence in University Choice	LMM	0.749	22.744 (<0.001)	0.056	2.566 (0.767)	73.4
Sense of Belonging	LMM	0.775	234.537 (<0.001)	0.025	−14.796 (1.00)	76.9
Course Value	LMM	0.797	256.681 (<0.001)	0.008	−19.811 (1.00)	79.5
Integration with Relational Network	LMM	0.792	256.847 (<0.001)	0.017	−14.888 (1.00)	78.9
Relationships with University Peers	LMM	0.823	308.451 (<0.001)	0.058	7.194 (0.207)	81.2
Relationships with University facultys	LMM	0.762	217.388 (<0.001)	0.007	−11.191 (1.00)	76

CI [−0.271, 0.118], t = −0.774, p = .439) significantly moderated this change, suggesting consistent reductions in expressive suppression across demographic groups.

Psychological distress

For the All Items Less Risk subscale, the model indicated a significant improvement in overall psychological functioning after the intervention (B = −0.662, SE = 0.039, 95% CI [−0.740, −0.585], t = −16.83, p < .001; f^2 = 0.222). No significant interaction effects were found for either gender (B = 0.077, SE = 0.079, 95% CI [−0.077, 0.231], t = 0.980, p = .328) or age (B = −0.012, SE = 0.012, 95% CI [−0.037, 0.012], t = −1.004, p = .316), indicating consistent changes across demographic groups.

For the Risk subscale, the model showed a significant reduction in at-risk behaviors after the intervention (B = −0.087, SE = 0.012, 95% CI [−0.110, −0.064], z = −7.450, p < .001; f^2 = 0.043). Gender moderated these changes (B = −0.052, SE = 0.023, 95% CI [−0.097, −0.008], z = −2.284, p = .022; f^2 = 0.002), with male students exhibiting a more pronounced decrease (B = −0.139, SE = 0.020, z = −6.94, p < .001) compared to female students (B = −0.085, SE = 0.016, z = −7.38, p < .001). No significant moderating effect was found for age (B = 0.003, SE = 0.004, 95% CI [−0.004, 0.010], z = 0.895, p = .371).

Table 3 summarizes the transitions between clinical and non-clinical classifications for the CORE-OM subscales (*All Items Less Risk* and *Risk*). The CORE-OM is specifically designed to assess clinically significant change, making it a suitable tool for evaluating meaningful improvements in psychological distress following counseling interventions. Percentages in the Improvement, Deterioration, and No Change columns are calculated based on the total number of students in each classification at pre-intervention. Thresholds for clinically significant change were derived from the Italian validation study (Palmieri et al., 2009).

Improvement refers to students who transitioned from Clinical to Non-clinical classifications, indicating a significant reduction in psychological distress. Conversely, Deterioration represents transitions from Non-clinical to Clinical classifications, reflecting a worsening of psychological outcomes. No Change indicates stability within the same classification, meaning that students remained in either the Clinical or Non-clinical category.

Pre-post changes in academic engagement outcomes

The model fit parameters in Table 4 indicate that individual variability accounted for a substantial portion of the variance in academic engagement outcomes, as reflected by the higher conditional R^2 values. While fixed effects contributed to the explained variance, the significant conditional LRT X^2 values confirm that including random effects improved model fit. The mostly non-significant marginal LRT X^2 values suggest that fixed effects alone were insufficient, highlighting the necessity of modeling interindividual differences.

Significant improvements emerged for the *Relationships with University Peers* dimension (B = 0.144, SE = 0.043, 95% CI [−0.058, 0.229], t = 3.311, p = .001; f^2 = 0.002), indicating greater ease in establishing meaningful peer connections. Conversely, scores for the *Relationships with University facultys* dimension decreased significantly post-intervention (B = −0.115, SE = 0.041, t = −2.765, p = .006; f^2

= 0.005), potentially indicating evolving relational dynamics with faculty members. No significant pre-post changes were observed for the *Sense of Belonging* (B = 0.029, SE = 0.034, 95% CI [−0.039, 0.097], t = 0.847, p = .398; f^2 = 001), *Course Value* (B = 0.007, SE = 0.040, 95% CI [−0.071, 0.086], t = 0.182, p = .856; f^2 = 000) or *Integration with Relational Network* (B = 0.054, SE = 0.051, 95% CI [−0.047, 0.156], t = 1.049, p = .295; f^2 = 001) dimensions.

A significant interaction effect was observed between Time and Age for the *Perception of the Capability to Persist in the University Choice* dimension (B = −0.036, SE = 0.012, 95% CI [−0.012, 0.059], t = 2.920, p = .004; f^2 = 0.004). Older students exhibited significant improvements (B = 0.155, SE = 0.055, t = 2.834, p = .005), possibly reflecting increased awareness of resources to address academic challenges. In contrast, no significant changes were observed for younger students (B = −0.050, SE = 0.052, t = −0.963, p = .336) or for students of average age (B = 0.053, SE = 0.040, t = 1.310, p = .191).

Discussion

This study investigated pre-post changes in psychological and academic engagement outcomes following brief counseling at an Italian UCS, using a longitudinal design to address common gaps in the literature. Specifically, we extended our analysis beyond a sole focus on psychological outcomes to also include academic engagement and risk behaviors, and by explicitly examining individual differences and outcome variability among university students. The discussion follows the main research questions, addressing first psychological outcomes and then academic engagement, with particular attention to age and gender as moderators. Secondary aims are considered within these sections.

Longitudinal changes in psychological outcomes

Significant reductions were found in anxiety and depressive symptoms, in line with prior research on university counseling effectiveness (Cerutti et al., 2022; Stallman et al., 2016). Pre-intervention gender differences disappeared after the intervention, suggesting that female students benefitted from a greater reduction compared to males. Prior research (Arora & Bhatia,2022) reported gender differences in approaching psychological support: women are more likely to seek self-awareness and emotional insight, while men focus on practical solutions. This emphasis on self-reflection may have contributed to the greater reduction in anxiety among women, as it may have helped them to more effectively identify and address the sources of their anxiety. For depressive symptoms, older students showed greater reductions compared to younger ones. This is consistent with developmental models suggesting that, with age, individuals typically develop greater resilience, a clearer sense of identity, and more effective coping strategies (Tanner, 2016). These factors, supported by accumulated life experience, may have helped older students manage stress and negative emotions more successfully, leading to a greater reduction in depressive symptoms.

Emotion regulation strategies improved overall after the intervention, with notable gender differences both at baseline and in response to counseling. Before counseling, male students reported higher levels of expressive suppression, reflecting gender norms that encourage emotional inhibition in men (Cai et al., 2016), while no gender differences were found in cognitive reappraisal. After counseling, however, women showed a greater increase in the use of cognitive reappraisal, possibly reflecting their broader repertoire of emotion regulation strategies and greater openness to interventions that promote emotional awareness and cognitive reframing (Nolen-Hoeksema, 2012). Rather than focusing solely on symptom reduction, these results underscore the importance of university counseling as an opportunity for students to learn and integrate new ways of managing their emotions, indicating a process of reorganization in their emotional experiences approach. Such skills are essential not only for personal well-being, but also for handling academic demands and maintaining engagement (Andrés et al., 2017).

Finally, reductions in at-risk behaviors and other CORE-OM domains were observed. These results align with meta-analytic evidence supporting the effectiveness of counseling in reducing psychological distress (Collins et al., 2025). At baseline, no significant differences in psychological distress emerged between age or gender groups, highlighting a common vulnerability among students accessing counseling. Following the intervention, the decrease in distress was consistent across the sample, suggesting that counseling benefits for general psychological functioning are generalizable rather than subgroup specific.

However, a more nuanced pattern emerged regarding at-risk behaviors. The proportion of students above the clinical threshold decreased from 28.2 to 11%, with gender influencing this change. Male students showed a greater reduction in risk behaviors compared to females. This difference is likely due to their higher initial scores on the Risk scale, which includes both self-harm and externalizing behaviors such as aggression or rule-breaking. While self-harm is more common in female population, externalizing behaviors are often reported by males (Steinhoff et al., 2023). The greater improvement observed in men may indicate that counseling sessions contributed to better management of externalizing

behaviors in this group. These changes could also be associated with the decreased use of maladaptive emotion regulation strategies, which are known risk factors for impulsivity and at-risk behaviors (Shadur & Lejuez, 2015).

In contrast to previous research primarily addressing the prevalence of at-risk behaviors in student populations (Cimino et al., 2010), this study explores post-intervention changes. Existing literature has reported mixed findings on the effectiveness of counseling in reducing these behaviors (Vescovelli et al., 2017; Strepparava et al., 2016). Although UCSs are not specifically designed to treat severe or chronic clinical conditions, our results suggest that these services fulfill an important preventive role by limiting the escalation of psychological difficulties. Moreover, UCSs offer valuable opportunities for early identification of students with emerging vulnerabilities or significant risk behaviors, facilitating timely access to specialized mental health care when necessary. This dual function, prevention and early identification, is particularly crucial in university settings, where high-risk behaviors are increasingly common yet often go unnoticed or untreated (Sivertsen et al., 2019; Thomas, 2019). Nonetheless, counseling was not uniformly beneficial for all students. Some students remained within the same clinical range, and a minority showed deterioration. As noted by Choi et al. (2010), this pattern suggests that brief interventions may not be equally effective for everyone, particularly students with chronic distress or those heavily reliant on maladaptive coping strategies.

While these findings confirm the effectiveness of counseling, the effect sizes were generally small to medium, somewhat lower than those reported in previous research (Strepparava et al., 2016; Stallman et al., 2016; Murray et al., 2016). This discrepancy may partly result from our analytical approach, which used mixed-effects modeling and reported effect sizes based on variance explained by fixed effects (e.g., time, age, gender). Mixed-effects models explicitly account for individual variability as random effects rather than attributing it to predictors like time, resulting in more conservative but accurate estimates (Selya et al., 2012). This approach is particularly appropriate for university counseling settings, where students present diverse psychological profiles and needs. Such diversity is especially relevant for brief interventions, as students' initial differences greatly influence their potential for change within a short timeframe. Not all students benefit equally; those with more severe or complex issues may require different or more intensive support. Recognizing this heterogeneity allows UCS to interpret outcomes accurately, adapt interventions effectively, and identify students who may need additional support or referrals. Accounting for individual variability thus supports a nuanced assessment of brief counseling's strengths and limitations, aligning with recent recommendations for greater flexibility in university counseling services to address students' diverse needs (Gavin, 2021).

Longitudinal changes in academic engagement dimensions

Changes in academic engagement following counseling were selective, mainly involving relational dimensions. Other components, such as sense of belonging, perceived course value, and persistence in university choice, remained stable. Peer relationships improved after counseling, suggesting increased social integration within the academic context. Before counseling, older students reported weaker social connections compared to younger peers, possibly because older individuals typically maintain existing relationships rather than actively seeking new ones (Kang, 2023). However, after counseling, these differences disappeared, indicating that the intervention may have supported also older students in strengthening their social networks, a key protective factor for psychological well-being (Bonsaksen et al., 2022). In contrast, relationships with faculty members declined, possibly reflecting a shift towards more critical or realistic perceptions of faculty support. This highlights a potential area for additional interventions aimed at enhancing faculty-student interactions.

Among non-relational engagement dimensions, significant improvements occurred only in students' perception of their capability to persist at university, yet exclusively among older students. Notably, these students started from lower baseline levels, which aligns with evidence that older students are at greater risk for university dropout (Casanova et al., 2021). This finding suggests that brief counseling interventions may help re-motivate those most vulnerable to disengagement and highlights the importance of identifying at-risk individuals who could benefit from targeted academic or motivational support.

For other engagement dimensions, no significant changes or moderation were observed. The stability in these dimensions suggests relational aspects of engagement may be more responsive to brief interventions, whereas core motivational-cognitive components might require more intensive or targeted approaches. This may also reflect the primary focus of university counseling interventions, which are designed to support personal and psychological well-being rather than to directly address academic difficulties.

The selective nature of these changes supports considering academic engagement as a multidimensional construct. Although engagement scales can be modeled as a single factor (Passeggia et al., 2023), our findings suggest that a multidimensional approach better captures specific patterns of change, particularly in brief interventions. Our analyses

showed that relational dimensions were less strongly associated with the general factor, indicating their relative independence and greater sensitivity to change. However, using a single-factor model may be still appropriate in other research settings, such as cross-sectional studies investigating the relationships between engagement and well-being, or when exploring mediation and moderation pathways among outcomes.

Given these considerations, monitoring the multiple dimensions of academic engagement offers valuable insight into students' adaptation and can serve as a meaningful proxy for both psychological health and the broader impact of counseling interventions.

Limitations and future research

This study presents some limitations that suggest directions for future research. First, the sample was predominantly female. Although gender differences were analysed, future studies should strive for a more balanced representation to better examine counseling outcomes across diverse student demographics. From a methodological perspective, the reliance on self-report measures, while widely used in counseling research, may introduce biases such as social desirability or subjective interpretation. Future studies could integrate behavioral or objective indicators to strengthen the validity of findings. Furthermore, the absence of a control group limits causal interpretations. Although this study focused on pre-post changes rather than causality, future research could employ controlled designs to provide stronger evidence on the effects of counseling interventions.

In addition, only a limited set of sociodemographic variables (age and gender) were examined as potential moderators of change. While individual variability at baseline was modeled analytically, other relevant factors, such as students' living arrangements (e.g., commuter vs. resident), concurrent employment, or degree type, were not considered. Nonetheless, they could influence both presenting concerns and responsiveness to counseling. Future research could explore these variables to further clarify subgroup differences and tailor interventions accordingly.

Another important limitation concerns the measurement of academic engagement. Since the SAES was added into the outcome monitoring protocol during data collection, academic engagement data at both pre- and post-intervention were available only for a subsample of 280 out of the total 372 participants. The reduced sample may limit comparability with other outcomes and could introduce selection effects, thus reducing the generalizability of findings related to academic engagement. Moreover, as SAES is a relatively new measure, further research is needed to establish its predictive validity and sensitivity to change over longer periods and in different student subgroups. Continued validation of the SAES in broader and more diverse samples will help clarify its utility for research and clinical assessment, including its ability to predict long-term academic or well-being outcomes following counseling.

Finally, the study relied on two time-points, which constrain the ability to assess long-term changes. Follow-up assessments could offer a more comprehensive understanding of the sustainability of psychological and academic improvements over time, helping to refine intervention strategies accordingly.

Conclusions

This study expands longitudinal research on counseling interventions by providing a comprehensive assessment of psychological and academic well-being outcomes. The findings highlight the role of UCSs as essential resources for student well-being, emphasizing the importance of individual variability in responsiveness to interventions. Recognizing the selectivity of change is crucial: improvements do not occur uniformly across all domains, and it is equally important to identify areas of stability as well as those with positive change. This distinction allows services to determine where interventions are most effective, identify domains that may require alternative or additional support, and ultimately refine their focus, develop targeted strategies, and allocate resources to areas with the greatest potential for impact.

Adopting a practice-based research framework that monitors multiple, interrelated outcomes aligns with the ongoing evolution of UCSs and provides a realistic view of what time-limited, brief interventions can achieve. Systematic outcome evaluation is fundamental for responding to students' evolving needs and supports the continued relevance of these services within the university context. Importantly, counseling interventions are not limited to symptom reduction, but aim to provide students with practical tools and strategies to address the academic and personal challenges characteristic of the university transition, thereby fostering long-term psychological resilience (Pellisson & Borucho-vitch, 2022).

UCSs also play a critical role in early intervention and prevention, particularly with regard to at-risk behaviors. Strengthening collaboration between UCSs and external mental health services can improve referral pathways and ensure timely, appropriate support for students with more complex needs.

In the longer term, addressing mental health vulnerability during university may help young adults recognize and manage challenges more effectively as they move beyond

the academic environment. Supporting students at this stage can lay the groundwork for better adjustment to future transitions and difficulties, which may ultimately help reduce the burden on health and social care systems.

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Author contributions C.G.: conceptualization; methodology; data curation; data analysis; writing– original draft; writing and editing. F.I: data curation. D.L.: reviewing, project administration; S.F: data analysis; project administration; funding acquisition. L.B.: conceptualization; supervision; writing– original draft; review and editing; funding acquisition. All authors contributed to the article and approved the submitted version.

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Data availability Data presented in this study are available upon request from the corresponding author.

Declarations

Ethics approval The study was approved by the Ethical Committee of the Department of Brain and Behavioral Science of University of Pavia and Scuola Universitaria Superiore of Pavia– IUSS (protocol n.115/22). All participants gave informed consent in accordance with the Declaration of Helsinki.

Conflict of interest The authors have no conflict of interests to disclose.

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