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ORIGINAL ARTICLE

# Validation of the Greek Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) in a Mature Student Community-Based Sample

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## Abstract

This paper reports the validation of the Greek Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) in a mature student community-based sample ($n = 734$). The WEMWBS was administered as part of a battery of questionnaires, and the survey data were analyzed employing rigorous advanced multivariate methods to determine its reliability and validity. The findings revealed excellent internal consistency, a unidimensional structure substantiated by exploratory and confirmatory factor analyses, and adequate convergent validity, confirming its validity as a cohesive metric for assessing mental well-being. The validated WEMWBS has the potential to be an instrument, for researchers, healthcare professionals, and other individuals involved in assessing the current condition of mental well-being in Greek-speaking populations.

**Keywords** Positive mental health · Mental well-being · Scale validation · Measurement

## Introduction

Mental health research has traditionally prioritized a pathology-centered paradigm, focused on the diagnosis, treatment, and management of psychological disorders (Seligman & Csikszentmihalyi, 2000). Within this framework, mental health has been conventionally defined as the absence of psychopathology (Westerhof & Keyes, 2010). As such, the primary quantifiable end points for many therapeutic interventions have been centered on the reduction of psychiatric symptoms. Mental health, however, transcends the mere absence of illness, potentially existing as a separate, albeit related, construct within the continuum of the human lifespan (Westerhof & Keyes, 2010). Indeed, there has been a growing recognition within contemporary scholarship that the historical perspective fails to capture the nuanced experiences of individuals and the subjective quality of mental well-being that extends beyond symptomatology (Slade, 2010). The global discourse on mental health has therefore been expanding in recent decades to include a recognition of mental well-being and its impact on health outcomes. This evolution is mirrored by a growing interest among medical professionals, policymakers, the scientific community, and public health organizations like the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD), in exploring this concept (Fung, 2019; Stewart-Brown et al., 2009). Acknowledging its importance for pre-empting ill health, particularly in light of the growing burden of long-term conditions (Nolte & McKee, 2008), an emphasis on positive elements of mental health and functioning as opposed to deficits, problems, and symptoms has since permeated psychiatric research, mental health policy, and clinical practice (Gable & Haidt, 2005; Chida & Steptoe, 2008; OECD, 2013; Siahpush et al., 2008; Slade, 2010). In 2001, the WHO acknowledged mental well-being as a critical component of health prompting global health policy reforms. Bhutan's Gross National Happiness Index (Ura et al., 2012), New Zealand's Wellbeing Budget (Mintrom, 2019), and European Union's Mental Health Action Plan (World Health Organization, 2015) all embed mental well-being into their development agendas. Similarly, in the UK, the Stiglitz Commissions report (Stiglitz et al., 2009) recommended tracking well-being in population surveys.

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The assessment and integration of well-being metrics, in particular, has garnered considerable attention with numerous studies advocating for a deeper comprehension and more nuanced quantification of this concept. Surveilling well-being serves many public health objectives, given its far-reaching socioeconomic implications (Forsman et al., 2015; Huppert, 2014; Doherty & Kartalova O'Doherty, 2010; Dolan et al., 2011; Beddington et al., 2008; Oswald & Wu, 2010). Firstly, poor mental well-being is a predictor for various adverse health outcomes including general mortality rates (Keyes et al., 2010; Tennant et al., 2012) and all-cause mortality specifically (Keyes & Simoes, 2012). Conversely, higher levels of well-being are associated with decreased risks of mental and physical disorders, disability, and healthcare service utilization (Lyubomirsky et al., 2005; Song et al., 2023). Tracking well-being is therefore an effective strategy for enhancing health-related quality of life and for pre-emptive health management (Keyes, 2002; Keyes et al., 2012). For the aforementioned reasons, most instruments are designed to detect and measure mental illness or disorders with considerably less emphasis on measuring well-being. In practice, this means that many existing tools have limited utility in monitoring positive mental health or evaluating interventions aiming at promoting it. Ceiling effects, insufficient cultural sensitivity, and a predominant focus on negative indicators constrain traditional scales from providing such an assessment (Trousselard et al., 2016). Valid and reliable tools are therefore needed to appraise the status quo and population needs, and evidence shows that subjective well-being can be measured in valid and reliable ways (Waqas et al., 2015). For such measures to be useful, however, they must be theoretically rigorous, policy relevant, and empirically robust (Dolan et al., 2011; Lang & Bachiner 2017).

The concept of mental well-being emerged from a rich and sometimes controversial theoretical background marked by debates over the degree to which it is represented by psychological attributes (such as cognitive and functional aspects) or affective dimensions (such as positive or negative moods) (Ryan & Deci, 2001; Tennant et al., 2007). Consensus has largely formed around a dual-component model that encompasses positive psychological functioning, self-realization, and positive relationships—*the eudaimonic perspective*—and the subjective experience of happiness and life satisfaction including positive feelings, affect, and emotions—*the hedonic perspective* (MacKean et al., 2011; May, 2017; Taggart, 2015). Various tools have been used to track well-being including Ryff's Scale of Psychological Well-being (Ryff & Keyes, 1995), the Satisfaction with Life Scale (Diener et al., 1985), the Positive and Negative Affect Scale (Watson et al., 1988), the Short Depression Happiness Scale (Joseph et al., 2004), and the World Health Organization (WHO) Well-being Index (Bech, 2004). However, these measures do not fully align with the dual-component model and therefore do not appraise the full spectrum of mental well-being as currently conceptualized (Castellví et al., 2014).

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) incorporates both perspectives, assessing affective-emotional aspects, cognitive-evaluative dimensions, and psychological functioning (May, 2017). It is among the most widely recognized tools for assessing mental well-being. Supported by NHS Scotland, it was developed and validated through a collaborative effort between the Universities of Warwick and Edinburgh and grounded in a mixed methods study of English and Scottish students (Clarke et al., 2010, 2011). The resulting scale, comprising 14 positively worded items, is concise and therefore suitable for use in large-scale population surveys and for the appraisal of well-being-related initiatives (Castellvi et al., 2014; Stewart-Brown, 2011, 2015a, 2015b; Tennant et al., 2007; Trousselard et al., 2016). The scale has been translated into more than 25 languages over the last decade and validated qualitatively and psychometrically in various populations including the Italian, Brazilian, Portuguese, Chinese, French, German, Urdu, Slovenian, Danish, and Norwegian. Research confirms its ease of administration, user-friendliness, robust psychometric validity (Clarke et al., 2011; Lloyd & Devine, 2012; Maheswaran et al., 2012; Taggart et al., 2013; Tennant et al., 2007), and sensitivity to change in different well-being promotion initiatives (Stewart-Brown, 2015a, 2015b). The validation also encompasses subgroups such as students, general populations, adolescents, clinical samples, and ethnic minority samples and has consequently gained widespread acceptance among medical professionals and practitioners, around the world (Orgeta et al., 2013). Despite its growing popularity and extensive validations, the scale has not yet been adapted and validated for use in the Greek population. Of particular importance is the ongoing national transition within the Greek mental health system towards a community-based paradigm, accompanied by an emphasis on preventative psychiatry (Anargyros et al., 2021). Along with evidence-based service development plans, these initiatives underscore the need for standardized tools that can track the success of such policy reforms.

Achieving and maintaining good mental well-being is not always easy and can have a significant impact on individuals' quality of life (Ringdal et al., 2017). This is especially relevant for adults with multiple roles, such as adult university students studying through distance learning. These non-traditional students represent a diverse population who are attracted to open distance learning programs due to their ability to balance their careers and family life while pursuing a degree (Miller & King, 2003). Accordingly, this study aimed to assess the reliability and validity of the Greek version of the WEMWBS among a sample of adult students enrolled

in undergraduate and postgraduate programs at the Hellenic Open University (HOU). The university follows an open distance learning approach without any registration constraints, making it accessible to adult residents anywhere in Greece. This investigation therefore provides insights into a portion of Greece's adults, marking the first measurement of well-being among this population using the particular instrument. Our hope is that the validation of the Greek WEMWBS will provide mental health practitioners and national policymakers with a standardized measure of well-being and an accurate method for tracking the effectiveness of various primary and tertiary programs. The potential, for advancing health assessment and intervention strategies in Greek settings, is significant as demonstrated by the validation of the WEMWBS in a Danish sample (Koushede et al., 2019).

## Methods

### Participants

Prior to the study, ethical approval was secured from the HOU Governing Board (reference 161/GC-3/2013 and 634/1–8/2013). Data were sourced from a cohort of HOU adult students using a stratified sampling approach in recognition of differences in their academic level (undergraduate or postgraduate) and discipline (science, social science, or humanities). This approach aimed to discern potential influencers on results and ensure a representative sample, targeting 2% of the student body. This study was part of a larger project which aimed at exploring HOU students' needs and recommendations regarding the development of a university-based counselling center. The Greek version of the WEMWBS was administered to 894 students attending various randomly selected classes from the aforementioned stratification categories. Students were informed of their voluntary and anonymous participation. Assurances were given that data would be handled in aggregate and confidentiality would be maintained. Participants were asked to fill in paper-based questionnaires spontaneously, which took approximately 15 min. Responses from participants with incomplete answers ($N = 160$) were discarded. The complete data from a final sample of 734 participants were anonymized and transferred into IBM SPSS (v 26) for analysis.

### Measures

The Greek WEMWBS was administered as part of a battery of scales in the form of a printed booklet. The additional sections assessed various aspects of students' psychological functioning including their mental state, needs, counselling preferences, and attitudes towards help seeking. The selection of measures was grounded in prior research concerning counselling services in Greece (e.g., Christidis et al. (2004), Christopoulos et al. (1997), Efstathiou et al. (2003), Efthymiou et al., (2001, 2007), Efthymiou (2003, 2007), Malikiosi-Louizou (1989), Navridis et al. (1990), and Papadioti-Athanasiou and Damigos (2003)). All measures were self-administered.

### Warwick-Edinburgh Mental Well-Being Scale

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (Tennant et al., 2007) was developed to measure well-being at the population level and appraise initiatives focused on its enhancement. It comprises 14 positively worded statements and is structured for comprehension across varied sociodemographic profiles. Respondents retrospect on their past fortnight, considering both affective experiences and personal growth. Items are scored on a 5-point scale ranging from "none of the time" to "all of the time." Aggregate scores, ranging from 14 (minimal) to 70 (optimal), serve as an indicator of respondents' well-being. While the WEMWBS was not designed for individual monitoring, research suggests its efficacy in tracking changes in well-being among adults and, in particular, in providing individuals with an overview of their well-being.

### Greek Translation

A rigorous translation process was implemented in line with similar WEMWBS validation studies (e.g., Fung (2019), López et al. (2012), and Trousselard et al. (2016)). First, the scale was forward-translated by two native Greek speakers proficient in English, with translation difficulties resolved by consensus. Subsequently, a back-translation was undertaken by two other bilingual mental health experts who had no knowledge of the original content. Forward- and back-translations were examined by two bilingual professors of psychology to ensure conceptual clarity, cultural relevance, and linguistic accuracy, and a pilot version was formulated. The resulting questionnaire was pilot tested on a group of 50 HOU postgraduate students from a Master's in Education cohort. Feedback from the pilot study was collected and analyzed qualitatively and informed the final questionnaire translation. The final version administered in the present study is available from the developers' website (https://warwick.ac.uk/fac/sci/med/research/platform/wemwbs/using/translations). Pilot data are not included in this study's dataset.

### Other Measures

Additional measures, chosen on the basis that they measure similar well-being-related concepts, were included in the booklet for purposes of verifying the scale's construct validity. These included the Depression, Anxiety, and Stress Scale–21 (DASS-21) (Lovibond & Lovibond, 1995),

the Inventory of Attitudes towards Seeking Mental Health Services (IAMSH) (Mackenzie et al., 2004), and a set of intake questionnaires developed in-house to assess informants' needs and rationale for seeking counselling services. Sociodemographic data including age, gender, educational level, marital status, and self-reported health status were also collected.

### Depression, Anxiety, and Stress Scale–21 (DASS-21)

Psychological distress, encompassing stress, distress, irritation, and emotional sensitivity, has been strongly linked to physical morbidity, reduced quality and duration of life, and increased utilization of health services (e.g., Lahey (2009)). The DASS-21 was developed to assess and distinguish between the symptoms and intensity of three dimensions of mental well-being: depression, anxiety, and stress (Lovibond & Lovibond, 1995). The measure consists of three 7-item subscales that effectively discriminate between these constructs (González-Rivera et al., 2020), with demonstrated reliability and validity in both clinical and nonclinical adult populations (Antony et al., 1998; Bottesi et al., 2015; Sinclair et al., 2012; Vasconcelos-Raposo et al., 2013). Each subscale is rated on a scale from 0 ("did not apply to me at all") to 3 ("applied to me very much, or most of the time"). Total scores for each subscale are calculated by summing the scores for each item and multiplying the result by a factor of 2. The sum scores on the subscales range from 0 to 42, while the total DASS scores range from 0 to 120. In the Greek population, the DASS-21 has been confirmed as a valid and reliable instrument for measuring depression, anxiety, and stress (Pezirkianidis et al., 2018).

### Inventory of Attitudes Towards Seeking Mental Health Services (IASMH)

The IASMHS, developed by Mackenzie et al. (2004), is a 24-item scale that consists of three factors: psychological openness, help-seeking propensity, and indifference to stigma (Mackenzie et al., 2004). Psychological openness refers to the willingness to acknowledge psychological problems and seek help for them. Help-seeking propensity measures one's willingness and ability to seek help. Indifference to stigma assesses the concern about how others in individuals' lives would react to their seeking help. Responses are measured on a scale of 0 ("somewhat disagree") to 4 ("agree"). Items require participants to rate their agreement with statements concerning societal perceptions of their psychological health. The scale has demonstrated strong internal consistency reliability coefficients for both the overall measure and the subscales (MacKenzie et al., 2004). Additionally, it has shown good convergent validity (MacKenzie et al., 2006).

### Difficulties and Adverse Life Events

Stressful life events, moderated by the manner of their appraisal, coping mechanisms, resilience, and social support (Monroe & Simons, 1991), have profound implications for a range of health outcomes (Marlowe, 1998). These bear significant consequences for well-being, often disrupting daily functioning and life satisfaction (Diener et al., 1999; Seligman, 1972) and can precipitate episodes of mental illness like depression and anxiety (Kendler, Karkowski, & Prescott, 1999). To quantify the impact of such difficulties and adverse life events on students' well-being and academic performance and evaluate the need for counselling services, we formulated two evaluative indexes informed by the literature (e.g., Barnett et al. (1983), Brown and Harris (1978), and Holmes and Rahe (1967)). The *Academic Difficulties Index*, comprising 10 items, assessed students' academic concerns and their willingness to seek support for them. The *Life Difficulties Index* with 23 items captured a range of personal, social, family, and professional difficulties or adversities encountered in the past year. Both indexes were rated on a 5-point Likert scale, ranging from 1 (none) to 5 (very high), to determine the extent to which respondents would seek help from a specialist if possible. An Index of Difficulties was calculated from each list based on the count of academic and personal difficulties reported by respondents (range 0–10 for former and 0–23 for the latter). Additionally, a Needs Intensity Index (NII) was calculated, which reflected the estimated perceived impact of the recorded events based on the sum of scores indicated for each difficulty. The theoretical range for difficulties impact in academic study was 10–50, while for personal, social, and family difficulties, the range was 23–115. Higher scores indicated a greater need for support or more difficulties experienced.

### Statistical Analyses

Statistical analyses were conducted using SPSS v.26 (IBM Chicago, IL, USA) and RStudio software (v1.4.1717 for Windows) using the Lavaan, GPArotation, and Psych packages. Participants' data collected in this study were selected for further analysis only when all questions of the Greek version of the WEMWBS were answered, as recommended by Tennant and colleagues (2007). A number of psychometric testing tools and validated instruments were used to analyze the data, as described below.

#### Descriptive Statistics

The distribution of total WEMWBS scores was inspected visually using histograms and quantile–quantile (*Q-Q*) plots and by assessing absolute skewness and kurtosis in line with recommendations for our samples size (Kim, 2013). The

Shapiro–Wilk and Kolmogorov–Smirnov (K-S) with the Lilliefors correction statistical tests were also computed as a mainstream strategy, although it is acknowledged that these tests are not always reliable with large sample sizes ($n > 300$) (Öztuna et al., 2006). Frequencies and descriptive statistics were calculated for sociodemographic variables and total WEMWBS scores.

### Factor Analysis

Data suitability for factor analysis was checked using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity (Kaiser, 1974; Watkins, 2018). The single factor model was investigated using exploratory factor analysis using the principal component analysis (PCA) method as suggested in the literature (Brown, 2014; Dong et al., 2016; Fung, 2019; Stewart-Brown et al., 2009; Tennant et al., 2007). In PCA, factor extraction was investigated using Kaiser's eigenvalue-over-one criterion (Kaiser, 1960), parallel analysis using eigenvalues that correspond to the desired percentile (95th) as recommended by O'Connor (2002), and the scree plot test (Cattell, 1966; Cattell & Vogelmann, 1977; Fabrigar et al., 1999). In this analysis, an item with a factor loading over 0.50 can be interpreted as having practical significance when the sample size is more than 350 (Bech, 2004).

In addition, confirmatory factory analysis (CFA) using SPSS and RStudio was applied to evaluate the scales' construct validities (Joreskog, 1969; Li, 2016; Loewenthal, 2001). CFA was conducted using the diagonally weighted least squares (DWLS) estimation model using the Lavaan package in RStudio (Rosseel, 2012). The relevant literature suggests that the DWLS method is less biased, works well for ordinal variables that include items with two to seven categories, and provides more optimal fit and accurate parameter estimates when working with large sample sizes consisting of ordinal data with two to seven categories (Browne & Cudeck, 1992; DiStefano & Morgan, 2014; Flora & Curran, 2004; Mîndrilă, 2010; Li, 2016; Lionetti et al., 2016; Yang-Wallentin et al., 2010). The model fit and cut-off criteria were evaluated on the basis of the cut-off values indicated in the existing structural equation modelling (SEM) literature. As recommended by Kline (2015) and others (Bass et al., 2016; Bentler & Bonett, 1980; Hair, 2010; Hu & Bentler, 1999; Schreiber et al., 2006), several fit metrics were observed including the Comparative Fit Index (CFI > 0.95), a Tucker-Lewis Index (TLI > 0.95), a Root Mean Square Error of Approximation (RMSEA < 0.06), and the Standardized Root Mean Square Residuals (SRMSR < 0.08) (Hooper et al., 2008; Hu & Bentler, 1999; Kline, 2015; Williams et al., 2009) which were considered acceptable. Additionally, as the chi-square value is not completely reliable with sample sizes above 200 (Meyers et al., 2005), we elected to observe the value of chi-square divided by the degree of freedom in the model ($\chi^2$/df), with values less than 2.5 (Kline, 2015; Rosseel, 2012) indicating a good fit and values around 5.0 indicating an acceptable fit. Finally, we assessed the structure coefficients as indicators of model fit and sought coefficients that achieved statistical significance ($p < 0.05$) with loadings above the minimum 0.30 recommended by Meyers et al. (2005).

### Reliability

Internal consistency was assessed using a suite of reliability coefficients including conventional and ordinal Cronbach's alpha and omega coefficients (hierarchical and total) for which values above 0.70 were sought (Nunnally & Bernstein, 1994; George & Mallery, 2003; Cheung et al., 2023). An evaluation of all 14 items' correlation coefficients was conducted, to analyze whether these items warranted scale construction. As the alpha coefficient alone is not a sufficient indicator of internal reliability, we also observed the impact of deleting any of the 14 items on the overall alpha coefficient and corrected item-total correlations as additional measures of reliability. Specifically, we sought alpha coefficient values similar to the overall alpha coefficient for the former and items that correlated well with the overall score from the scale (> 0.30) for the latter (Field, 2018).

### Convergent Validity

The evaluation of convergent validity, a sub-type of criterion validity, was used to estimate the correlation coefficients of the WEMWBS scores with those of other well-established instruments. The WEMWBS has been reported to have significant moderate to high positive correlations with indicators of positive affect, life satisfaction, and overall health and negative correlations to symptoms of anxiety and depression. To evaluate our hypotheses, we performed Pearson's correlation coefficient calculations between the overall WEMWBS scores and the DASS-21 and IASMHS subscales and overall scales, respectively.

## Results

### Sample Characteristics and Differences Across Subgroups in WEMWBS Scores

The sample characteristics and differences in WEMWBS scores across subgroups are detailed in Table 1. Briefly, of the final 734 adult students sampled, 40.3% were male and 59.7% were female. Most were employed (86.1%), aged 30 or older (88.26%), with ages ranging between 23 and

**Table 1** Differences across subgroups in the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) scores

| Variable | Category | Frequency *N* (%) | WEMWBS Mean (SD) | *p* |
|---|---|---|---|---|
| Gender | Male | 296 (40.3%) | 52.75 (8.24) | 0.215 [T] |
| | Female | 438 (59.7%) | 52.01 (7.24) | |
| Age | ≥ 30 | 632 (88.26%) | 52.42 (7.63) | 0.280 [T] |
| | < 30 | 84 (11.73%) | 51.44 (7.80) | |
| Level of study | Undergraduate | 433 (59%) | 52.09 (8.09) | 0.335 [T] |
| | Postgraduate | 301 (41%) | 52.63 (7.00) | |
| Employment status | Employed | 659 (86.1%) | 52.70 (7.65) | < 0.001 [T] |
| | Unemployed | 106 (13.9%) | 49.80 (7.27) | |
| Financial problems | Not at all | 174 (23.93%) | 55.24 (7.15) | < 0.001 [A] |
| | Occasionally | 312 (42.50%) | 51.96 (7.71) | |
| | Often | 196 (26.96%) | 51.00 (7.33) | |
| | A lot | 45 (6.18%) | 49.00 (7.65) | |
| Marital status | Not married | 324 (43.9%) | 52.26 (7.83) | 0.156 |
| | Married | 373 (51.2%) | 52.45 (7.52) | |
| | Separated | 4 (0.5%) | 43.50 (8.26) | |
| | Divorced | 28 (3.7%) | 51.53 (6.25) | |
| | Widowed | 5 (0.7%) | 55.60 (11.26) | |
| Children | Yes | 391 (53.3%) | 52.05 (7.71) | 0.334 |
| | No | 343 (46.7%) | 52.60 (7.60) | |
| Health status | Well and in shape | 89 (11.8%) | 59.68 (7.23) | < 0.001 [A] |
| | In good health | 441 (60%) | 52.95 (6.27) | |
| | Often unwell | 185 (25.4%) | 48.09 (7.36) | |
| | Always unwell | 17 (2.4%) | 43.47 (9.46) | |

"T" indicates *p*-values generated by independent samples *t*-test; "A" indicates *p*-values generated by analysis of variance tests

64 years of age and an average age (SD) of 37.59 (7.19). The majority (67%) faced no or occasional financial challenges, while the remaining (33.14%) experienced frequent difficulties. Most (71.8%) perceived themselves in good health. The distribution was fairly even across study level (59% undergraduate, 51.2% postgraduate), marital status (51.2% married, 43.9% single), and parental status (53.3% with children, 46.7% without).

No difference in WEMWBS total scores was observed between participants by age ($t(105.28) = 1.085$, $p = 0.280$), level of study (undergraduate or postgraduate) ($t(697.78) = -0.965$, $p = 0.335$), gender ($t(577.36) = 1.242$, $p = 0.215$), parental status ($t(197.63) = -0.208$, $p = 0.836$), or marital status ($F(4, 729) = 1.66$, $p = 0.156$). However, unemployed respondents had significantly lower total WEMWMBS scores ($M = 49.80$, SD = 7.27) compared to employed respondents ($M = 52.70$, SD = 7.65) ($t(732) = 3.554$, $p < 0.001$). Significant differences were observed based on the extent of financial problems reported ($F(3, 723) = 14.10$, $p < 0.001$), with those experiencing severe financial issues scoring lower. In our sample, scores decreased by 2.08 points on average with increasing levels of financial difficulties. A significant difference in scoring was observed between participants by health status ($F(4, 728) = 70.15$, $p < 0.001$) with those reporting "(often or always) unwell" scoring lower.

An examination of the academic difficulties faced by students revealed a heterogeneous distribution of challenges (Table 2). The majority of respondents reported no discontent with their field of study (67.3%), while time management (31.5% moderate difficulty) and study organization (30.4% low difficulty) were prevalent concerns. Notably, a significant proportion of students reported high levels of exam anxiety (25.9%) and learning difficulties (24.3% low difficulty). Fear of failure also emerged as a notable stressor, with 12.9% of students experiencing it to a very high degree, suggesting areas where academic support services could be beneficial. The NII for academic difficulties was 22.24 (SD = 8.44), with a distribution that was positively skewed, indicating that most participants reported fewer academic difficulties. Extreme difficulties (score of 50) were observed in only a single case.

The analysis of personal difficulties (Table 3) revealed a substantial prevalence of anxiety/stress issues with 51.3% of respondents reporting moderate to very high levels of difficulty. This suggests that mental health concerns, particularly

**Table 2** Frequencies and percentages of reported academic difficulties

| Item | *N* | None | Low | Moderate | High | Very high |
|---|---|---|---|---|---|---|
| | *N* (%) | | | | | |
| Discontent with the field of study (18a) | 663 | 446 (67.3) | 116 (17.5) | 85 (12.8) | 14 (2.1) | 2 (0.3) |
| Study difficulties (18b) | 673 | 141 (21.0) | 192 (28.5) | 211 (31.4) | 107 (15.9) | 22 (3.3) |
| Time management difficulties (18c) | 696 | 85 (12.2) | 131 (18.8) | 219 (31.5) | 178 (25.6) | 83 (11.9) |
| Study organization difficulties (18d) | 672 | 128 (19.0) | 204 (30.4) | 194 (28.9) | 119 (17.7) | 27 (4.0) |
| Lack of motivation (18e) | 662 | 308 (46.5) | 174 (26.3) | 106 (16.0) | 52 (7.9) | 22 (3.3) |
| Reduced performance (18f) | 659 | 219 (33.2) | 218 (33.1) | 177 (26.9) | 33 (5.0) | 12 (1.8) |
| Concentration difficulties (18g) | 661 | 178 (26.9) | 189 (28.6) | 157 (23.8) | 100 (15.1) | 37 (5.6) |
| Exam anxiety (18h) | 686 | 88 (12.8) | 123 (17.9) | 159 (23.2) | 178 (25.9) | 138 (20.1) |
| Learning difficulties (18i) | 645 | 365 (56.6) | 157 (24.3) | 86 (13.3) | 30 (4.7) | 7 (1.1) |
| Fear of failure (18j) | 680 | 179 (26.3) | 152 (22.4) | 140 (20.6) | 121 (17.8) | 88 (12.9) |

related to anxiety and stress, were significant among this sample. The least reported difficulty pertained to addiction and substance abuse, with a significant majority (93.1%) reporting no problems in this area. Financial difficulties were also prominent, with a combined 54% reporting moderate to very high levels of financial distress.

## Preliminary Analyses

The total WEMWBS scores had a mean (SD) of 52.31 (7.66) and a median of 53. While the histogram and *Q*-*Q* plots suggested a normal distribution (Fig. 1), the Shapiro–Wilk and Kolmogorov–Smirnov with the Lilliefors correction statistical tests indicated significant

**Table 3** Frequencies and percentages of reported academic difficulties

| Item | *N* | None | Low | Moderate | High | Very high |
|---|---|---|---|---|---|---|
| | *N* (%) | | | | | |
| 1. Loneliness | 647 | 403 (62.3) | 112 (17.3) | 85 (13.1) | 35 (5.4) | 12 (1.9) |
| 2. Difficulties with spouse/partner | 653 | 355 (54.4) | 152 (23.3) | 95 (14.5) | 30 (4.6) | 21 (3.2) |
| 3. Difficulties with kids | 558 | 394 (70.6) | 94 (16.8) | 51 (9.1) | 19 (3.4) | - |
| 4. Difficulties with relatives | 670 | 338 (50.4) | 202 (30.1) | 86 (12.8) | 37 (5.5) | 7 (1.0) |
| 5. Difficulties with friends | 662 | 382 (57.7) | 186 (28.1) | 66 (10.0) | 25 (3.8) | 3 (0.5) |
| 6. Separation or divorce | 600 | 524 (87.3) | 23 (3.8) | 22 (3.7) | 13 (2.2) | 18 (3.0) |
| 7. Loss-Mourning | 623 | 468 (75.1) | 52 (8.3) | 42 (6.7) | 32 (5.1) | 29 (4.7) |
| 8. Feelings of depression | 671 | 312 (46.5) | 161 (24.0) | 114 (17.0) | 68 (10.1) | 16 (2.4) |
| 9. Anxiety/stress issues (phobias) | 682 | 151 (22.1) | 181 (26.5) | 172 (25.2) | 130 (19.1) | 48 (7.0) |
| 10. Suicidal behaviors | 648 | 519 (80.1) | 72 (11.1) | 38 (5.9) | 15 (2.3) | 4 (0.6) |
| 11. Feeling shame | 658 | 444 (67.5) | 122 (18.5) | 56 (8.5) | 27 (4.1) | 9 (1.4) |
| 12. Sleep disorders (insomnia) | 664 | 332 (50.0) | 142 (21.4) | 104 (15.7) | 60 (9.0) | 26 (3.9) |
| 13. Problems with addictions substance abuse (alcohol, drugs) | 649 | 604 (93.1) | 21 (3.2) | 14 (2.2) | 4 (0.6) | 6 (0.9) |
| 14. Physical manifestations of anxiety psychosomatic problems | 669 | 281 (42.0) | 158 (23.6) | 128 (19.1) | 63 (9.4) | 39 (5.8) |
| 15. Sexual orientation concerns/sexual problems | 650 | 494 (76.0) | 87 (13.4) | 43 (6.6) | 19 (2.9) | 7 (1.1) |
| 16. Serious illness and health problems | 662 | 402 (60.7) | 108 (16.3) | 75 (11.3) | 43 (6.5) | 34 (5.1) |
| 17. Andrological or gynecological problems/issues | 652 | 522 (80.1) | 74 (11.3) | 34 (5.2) | 16 (2.5) | 6 (0.9) |
| 18. Traumatic events (e.g., serious accident) | 648 | 568 (87.7) | 36 (5.6) | 25 (3.9) | 10 (1.5) | 9 (1.4) |
| 19. Nerves, control my anger | 668 | 255 (38.2) | 190 (28.4) | 132 (19.8) | 61 (9.1) | 30 (4.5) |
| 20. Various emotional problems (boredom, pessimism, etc.) | 671 | 252 (37.6) | 192 (28.6) | 120 (17.9) | 76 (11.3) | 31 (4.6) |
| 21. Feeling of inadequacy | 662 | 338 (51.1) | 156 (23.6) | 103 (15.6) | 46 (6.9) | 19 (2.9) |
| 22. Nutrition/body image issues | 670 | 302 (45.1) | 173 (25.8) | 100 (14.9) | 61 (9.1) | 34 (5.1) |
| 23. Financial difficulties/issues | 697 | 136 (19.5) | 185 (26.5) | 183 (26.3) | 112 (16.1) | 81 (11.6) |

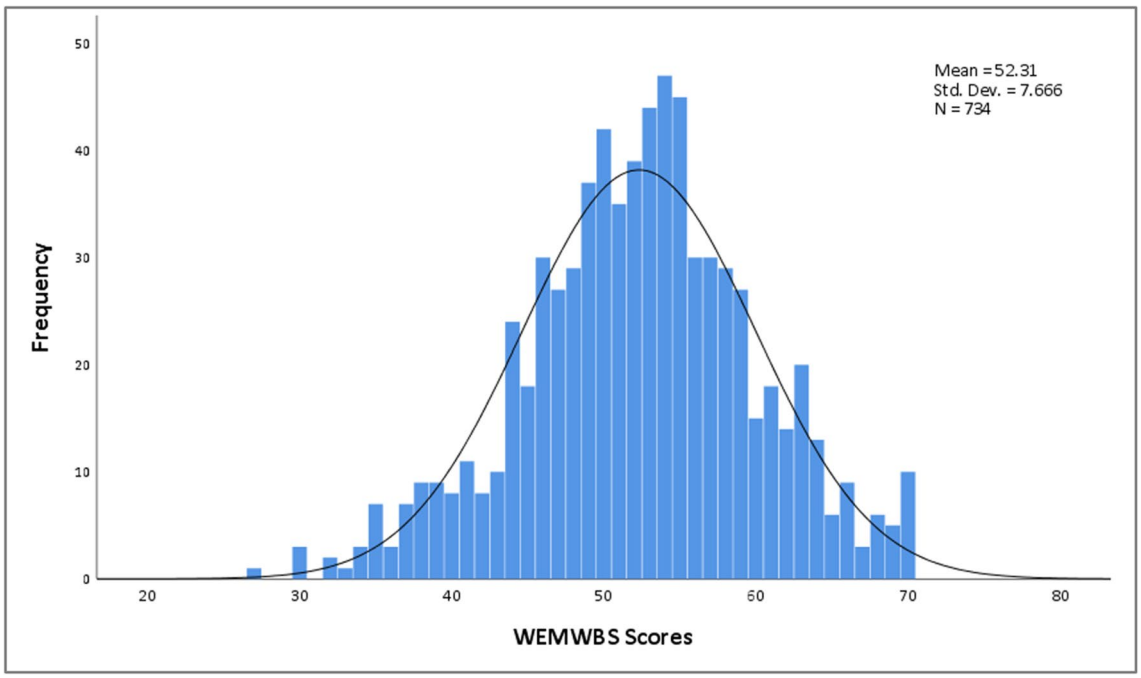


**Fig. 1** Score distribution of the Greek version of the WEMWBS in a mature student sample ($n = 734$)

deviations from normality ($W(734) = 0.993$, $p < 0.001$ and $W(734) = 0.047$, $p < 0.001$, respectively). Both tests are conservative; however, the Kolmogorov–Smirnov test is highly sensitive to extreme values (Ghasemi & Zahediasl, 2012), while the Shapiro–Wilk is typically recommended for sample smaller than 50 (Gupta et al., 2019). Inspection of our data revealed no extreme outliers or anomalies. Given that deviations from normality are common in large sample sizes (Field, 2013; Kim, 2013) without affecting the results of parametric testing (Öztuna et al., 2006), along with skewness and kurtosis absolute values (−0.171 and 0.122, respectively) aligning with expectations for our sample size (Kim, 2013), we deemed parametric testing to be appropriate for our data.

WEMWBS item-level mean scores spanned from 2.81 to 4.28. Standard deviations varied from 0.714 to 1.003, indicating moderate variability in the dataset. The highest mean score was attributed to item 4 ("I've been feeling interested in other people"), while item 3 ("I've been feeling relaxed") received the lowest mean score (Table 4). Overall, the majority of items garnered mean scores exceeding 3.5.

## Reliability

The Greek WEMWBS showed good internal consistency with a Cronbach's alpha coefficient of 0.896, ordinal alpha of 0.920, and omega hierarchical and omega total values of 0.900. The reliability analysis showed that deleting any of the items would not improve the alpha coefficient meaningfully (Table 5).

The inter-item correlation coefficient matrix (Table 6) showed that all items were positively correlated with each other and the inter-item correlation average (0.385) was satisfactory (Clark & Watson, 1995). Based on these results, all items were henceforth included for further analyses.

## Factor Structure

The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was 0.91, exceeding the 0.6 value suggested by Pallant (2005). Bartlett's test of sphericity was statistically significant ($p < 0.001$). These results showed that the data was suitable for exploratory factor analysis. Using the Kaiser-Guttman criterion, PCA identified three factors with eigenvalues above 1 accounting for 43.74%, 9.39%, and 7.33% of total variance explained (Table 7).

Parallel analysis of principal components indicated that only two factors should be retained (Fig. 2). Item loadings on component one ranging from 0.421 to 0.810 were all higher compared to loadings on components 2 and 3, with the exception of item 4 which loaded preferentially on component 2. The sharp elbow of the scree plot showed a substantial drop in magnitude of the eigenvalues. Taken together, these results suggest a single underlying factor to the scale.

CFA fit indices were acceptable ($\chi^2/df = 3.48$, CFI = 0.972, TLI = 0.976, RMSEA = 0.058, SRMR = 0.067; Fig. 3) without any model respecification. All factor structure

**Table 4** Item-level statistics for responses on the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) in a sample of mature Greek students ($n = 734$)

| Item | Statement | Mean | Std. deviation |
|---|---|---|---|
| Item 1 | I've been feeling optimistic about the future<br>Νιώθω αισιόδοξος/-η για το μέλλον | 3.18 | (0.953) |
| Item 2 | I've been feeling useful<br>Νιώθω χρήσιμος/-η | 3.84 | (0.779) |
| Item 3 | I've been feeling relaxed<br>Νιώθω χαλαρός/-ή | 2.81 | (1.003) |
| Item 4 | I've been feeling interested in other people<br>Ενδιαφέρομαι για τους ανθρώπους γύρω μου | 4.28 | (0.725) |
| Item 5 | I've had energy to spare<br>Έχω ενέργεια να μοιραστώ με ανθρώπους γύρω μου | 3.80 | (0.884) |
| Item 6 | I've been dealing with problems well<br>Τα καταφέρνω καλά με τις δυσκολίες/προβλήματα | 3.67 | (0.714) |
| Item 7 | I've been thinking clearly<br>Σκέφτομαι καθαρά/με διαύγεια | 3.78 | (0.722) |
| Item 8 | I've been feeling good about myself<br>Νιώθω καλά με τον εαυτό μου | 3.73 | (0.835) |
| Item 9 | I've been feeling close to other people<br>Νιώθω κοντά στους ανθρώπους γύρω μου | 3.83 | (0.875) |
| Item 10 | I've been feeling confident<br>Νιώθω σιγουριά για τον εαυτό μου/έχω αυτοπεποίθηση | 3.67 | (0.880) |
| Item 11 | I've been able to make up my own mind about things<br>Νιώθω ικανός/-η να παίρνω μόνος/-η μου τις αποφάσεις για θέματα που με απασχολούν | 3.95 | (0.815) |
| Item 12 | I've been feeling loved<br>Νιώθω ότι εισπράττω αγάπη | 3.99 | (0.860) |
| Item 13 | I've been interested in new things<br>Ενδιαφέρομαι για καινούρια πράγματα | 4.19 | (0.818) |
| Item 14 | I've been feeling cheerful<br>Νιώθω χαρούμενος/-η | 3.58 | (0.826) |

 Answer options were "none of the time" (Ποτέ), "rarely" (Σπάνια), "some of the time" (Μερικές φορές), "often" (Συχνά), and "all of the time" (Διαρκώς)

**Table 5** Item-total statistics for the Greek Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) in a sample of mature Greek students ($n = 734$)

| | Scale mean if item deleted | Scale variance if item deleted | Corrected item-total correlation | Squared multiple correlation | Cronbach's alpha if item deleted |
|---|---|---|---|---|---|
| I've been feeling optimistic about the future | 49.13 | 50.658 | 0.530 | 0.404 | 0.892 |
| I've been feeling useful | 48.47 | 51.259 | 0.618 | 0.430 | 0.888 |
| I've been feeling relaxed | 49.50 | 50.152 | 0.535 | 0.391 | 0.892 |
| I've been feeling interested in other people | 48.03 | 54.318 | 0.366 | 0.363 | 0.897 |
| I've had energy to spare | 48.52 | 51.006 | 0.552 | 0.436 | 0.891 |
| I've been dealing with problems well | 48.64 | 51.713 | 0.637 | 0.467 | 0.888 |
| I've been thinking clearly | 48.53 | 52.173 | 0.582 | 0.442 | 0.890 |
| I've been feeling good about myself | 48.58 | 49.310 | 0.746 | 0.630 | 0.882 |
| I've been feeling close to other people | 48.48 | 50.212 | 0.628 | 0.506 | 0.887 |
| I've been feeling confident | 48.64 | 49.243 | 0.708 | 0.595 | 0.884 |
| I've been able to make up my own mind about things | 48.36 | 51.867 | 0.531 | 0.384 | 0.891 |
| I've been feeling loved | 48.32 | 51.603 | 0.520 | 0.435 | 0.892 |
| I've been interested in new things | 48.12 | 52.032 | 0.514 | 0.298 | 0.892 |
| I've been feeling cheerful | 48.73 | 49.466 | 0.741 | 0.625 | 0.883 |

**Table 6** Inter-item correlation coefficient matrix heat map of the Greek WEMWBS

| | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 | Item 6 | Item 7 | Item 8 | Item 9 | Item 10 | Item 11 | Item 12 | Item 13 | Item 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item 1 | 1 | | | | | | | | | | | | | |
| Item 2 | 0.44 | 1 | | | | | | | | | | | | |
| Item 3 | 0.47 | 0.35 | 1 | | | | | | | | | | | |
| Item 4 | 0.17 | 0.32 | 0.06 | 1 | | | | | | | | | | |
| Item 5 | 0.28 | 0.38 | 0.31 | 0.53 | 1 | | | | | | | | | |
| Item 6 | 0.38 | 0.48 | 0.36 | 0.26 | 0.39 | 1 | | | | | | | | |
| Item 7 | 0.3 | 0.34 | 0.39 | 0.18 | 0.3 | 0.55 | 1 | | | | | | | |
| Item 8 | 0.45 | 0.53 | 0.49 | 0.2 | 0.38 | 0.52 | 0.55 | 1 | | | | | | |
| Item 9 | 0.32 | 0.39 | 0.33 | 0.38 | 0.43 | 0.4 | 0.4 | 0.54 | 1 | | | | | |
| Item 10 | 0.4 | 0.52 | 0.44 | 0.18 | 0.37 | 0.52 | 0.53 | 0.69 | 0.45 | 1 | | | | |
| Item 11 | 0.23 | 0.4 | 0.31 | 0.17 | 0.27 | 0.44 | 0.43 | 0.47 | 0.31 | 0.57 | 1 | | | |
| Item 12 | 0.25 | 0.33 | 0.27 | 0.29 | 0.31 | 0.29 | 0.28 | 0.4 | 0.59 | 0.37 | 0.27 | 1 | | |
| Item 13 | 0.27 | 0.33 | 0.26 | 0.27 | 0.38 | 0.4 | 0.33 | 0.41 | 0.31 | 0.41 | 0.37 | 0.3 | 1 | |
| Item 14 | 0.57 | 0.47 | 0.54 | 0.25 | 0.45 | 0.46 | 0.41 | 0.63 | 0.51 | 0.55 | 0.37 | 0.53 | 0.42 | 1 |

Using a two-color grading system, weak correlations are shown in white while darker colors represent stronger correlations between items

coefficients achieved statistical significance ($p < 0.05$) with coefficients greater than 0.30 ranging from 0.37 (item 4) and 0.80 (item 8). The chi-squared test was significant ($\chi^2 = 268.113$, df = 77, $p < 0.0005$), although, as argued by Lloyd and Devine (2012), this may be an artifact of the large sample size. The $\chi^2$/df, however, was acceptable. Overall, these results indicate that the Greek version of the WEMBS had a good fit for a unidimensional structure.

## Internal Consistency and Item Validity

Cronbach's alpha for the Greek WEMWBS (0.896) was above the recommended acceptable value of 0.70 (DeVellis, 2016; Polit & Beck, 2012). Corrected item-total correlations ranging from 0.366 for item 4 (I've been feeling interested in other people) to 0.746 for item 8 (I've been feeling good about myself) were above 0.3, showing that all items correlate well with the overall scale (Table 7).

## Convergent Validity

Pearson correlation coefficients between the overall scores on the Greek WEMWBS are detailed in Table 8. There were statistically significant negative correlations between the WEMWBS scores and the DASS-21 subscales for anxiety ($r = -0.430$, $p < 0.01$), depression ($r = -0.585$, $p < 0.01$), and stress ($r = -0.542$, $p < 0.01$), as well as the total DASS-21 score ($r = -0.570$, $p < 0.01$). Furthermore, significant positive correlations were found between the WEMWBS and the IASMHS subscales for help-seeking propensity ($r = 0.207$, $p < 0.01$), indifference to stigma ($r = 0.262$, $p < 0.01$), and the total IASMHS score ($r = 0.219$, $p < 0.01$).

**Table 7** Factor loadings for the 14 items in the Greek version of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) and variance explained by each component in a mature student population sample ($n = 734$)

| Factor loadings | | Component | | |
|---|---|---|---|---|
| | | 1 | 2 | 3 |
| Item 1 | I've been feeling optimistic about the future | 0.603 | | −0.430 |
| Item 2 | I've been feeling useful | 0.686 | | |
| Item 3 | I've been feeling relaxed | 0.612 | | |
| Item 4 | I've been feeling interested in other people | 0.421 | 0.741 | |
| Item 5 | I've had energy to spare | 0.612 | 0.475 | |
| Item 6 | I've been dealing with problems well | 0.708 | | |
| Item 7 | I've been thinking clearly | 0.660 | | |
| Item 8 | I've been feeling good about myself | 0.810 | | |
| Item 9 | I've been feeling close to other people | 0.691 | | |
| Item 10 | I've been feeling confident | 0.779 | | |
| Item 11 | I've been able to make up my own mind about things | 0.612 | | 0.441 |
| Item 12 | I've been feeling loved | 0.589 | | |
| Item 13 | I've been interested in new things | 0.584 | | |
| Item 14 | I've been feeling cheerful | 0.790 | | |
| Variance explained by component | | 43.74% | 9.39% | 7.33% |

Components were extracted using principal component analysis, no rotation

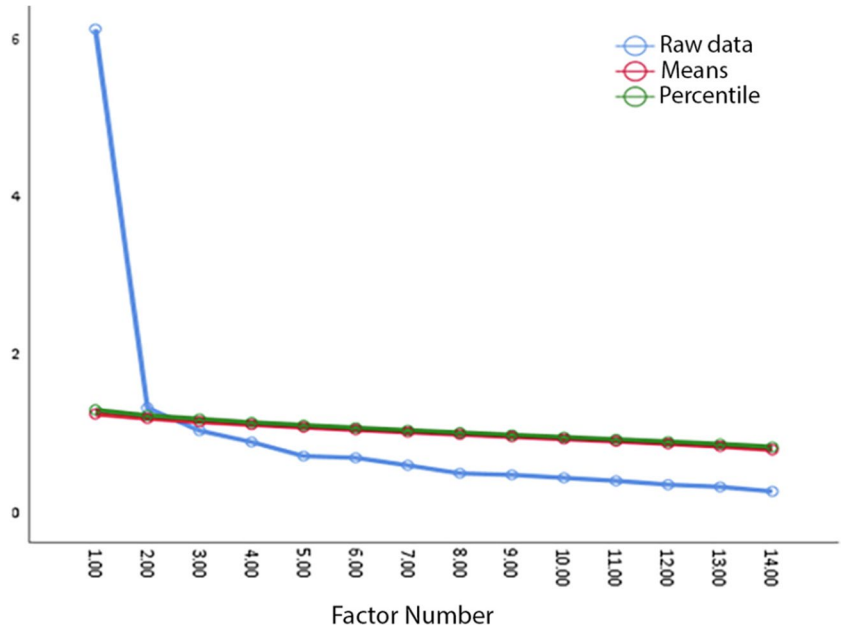


**Fig. 2** Parallel analysis scree plot

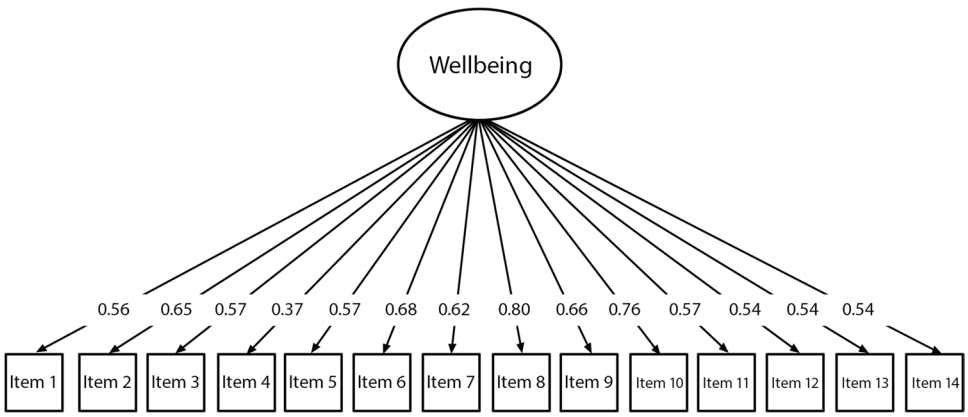


**Fig. 3** Confirmatory factor analysis of the Greek version of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS). Note. Model fit indices ($\chi^2$/df = 3.48, CFI = 0.972, TLI = 0.976, RMSEA = 0.058, 90% [0.051–0.066], SRMR = 0.067) and factor loadings confirm the unidimensional structure of the Greek WEMWBS

The Index of Difficulties showed a significant negative correlation with the Greek WEMWBS ($r = -0.402$, $p < 0.01$), as did the Index of Difficulties for moderate to high scores ($r = -0.381$, $p < 0.01$), and the Needs Intensity Index ($r = -0.493$, $p < 0.01$).

## Discussion

This study examined the psychometric properties of the Greek WEMWBS using a sample of adult students drawn from the HOU. Findings highlighted excellent internal consistency, a unidimensional structure substantiated by exploratory and confirmatory factor analyses, and adequate convergent validity, confirming its validity as a cohesive metric for assessing mental well-being. The validation of this questionnaire provides the Greek research community and policymakers with a means for assessing well-being among its population, especially pertinent given the country's evolving emphasis on mental health prevention strategies (Anargyros, et al., 2021).

The development of the WEMWBS was based on research conducted with student demographics in England and Scotland (Tennant et al., 2007). Drawing parallels, our study attempted to validate the Greek adaptation of the scale with a similar student population. Cronbach's alpha exceeded the conventional threshold and aligned closely with values reported by the original scale developers and other translated versions. The fidelity of alpha, however, has been intensely scrutinized in recent years, with many apt critiques offered elsewhere (McNeish, 2018; Sijtsma, 2009). Briefly, conventional alpha is critiqued for its misinterpretation as a measure of internal consistency, dependence on item quantity, and inability to discern unidimensionality, necessitating alternative metrics for the assessment of internal consistency reliability. While we have provided the traditional alpha for

**Table 8** Correlations between the Greek Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) and other survey instruments

| Scale | Greek WEMWBS |
|---|---|
| DASS anxiety subscale | −0.430** |
| DASS depression subscale | −0.585** |
| DASS stress subscale | −0.542** |
| DASS total scores | −0.570** |
| IASMHS psychological openness | 0.003 |
| IASMS help-seeking propensity | 0.207** |
| IASMS indifference to stigma | 0.262** |
| IASMS total scores | 0.219** |
| Academic Difficulties (count of moderate–high scores) | −0.381** |
| Academic Difficulties Index (total scores) | −0.402** |
| Life Difficulties (count of moderate–high scores) | −0.528** |
| Life Difficulties Index (total scores) | −0.562** |
| Intention to seek psychological help | 0.121** |

Correlations were significant at the 0.01 level (2-tailed); *$p < .05$, **$p < .01$

*DASS* depression anxiety stress scales, IASMHS inventory of attitudes towards seeking mental health services

comparative purposes with existing publications, our evaluation prioritizes ordinal alpha, omega hierarchical, and omega total indices, all of which demonstrated excellent internal scale consistency. The omega coefficient, grounded in the congeneric model of classical test theory, accommodates variable item means and variances unlike the tau-equivalent model employed by alpha which assumes that these are constant across test items (Dunn et al., 2014). Our obtained value ($\omega = 0.90$) aligns closely to that reported by Konaszewski et al. (2021) ($\omega = 0.91$) from a recent validation study conducted in the Polish population. Lastly, ordinal alpha is a more accurate estimate as it is based on the polychoric correlation matrix rather than the Pearson covariance matrix (Gadermann, Guhn, & Zumbo, 2012).

The mean scale score of the Greek WEMWBS for the sample (52.31) was similar to those reported in others studies including those conducted in France (51.88), Slovenia (56.30), Spain (53.5), Denmark (52.2), Austria (54.5), England, and China (47.41) (e.g., Koushede et al. (2019), Trousselard et al. (2016), Castellví et al. (2014), Fung et al. (2019), and López et al. (2012)). The scores had a broad range, spanning 27 to 70, although others have observed lower minimum values of 14 (Clarke et al., 2011). The PCA suggested a three-factor structure, yet the dominance of the first factor—which accounted for roughly half of the total variance—coupled with the marginal contributions of the subsequent factors supported a unidimensional mode. This inference was reinforced by the sharp "elbow" of the scree plot which showed a pronounced discontinuity between the leading eigenvalue and second factor which was very close to 1. Additionally, most items loaded preferentially onto the first factor. Notably, the CFA demonstrated satisfactory model fit indices for a unidimensional construct without model respecification. It is common practice among scholars to use post-estimation alternations, such as the addition of covariances or allowing cross-loading of indicators, that improve the global model fit (Tennant et al., 2007; Fung, 2019; López et al., 2012; Ringdal et al., 2017). However, the presence of many and sizeable modifications risk compromising the model's theoretical validity through overfitting and can therefore diminish generalizability and replicability across samples. The good model fit observed in this study without re-estimations therefore suggests that the Greek WEMWBS has a robust unidimensional structure.

Item mean scores ranged from 2.81 to 4.28, with most averaging above 3.5. In terms of individual item performance, item 4 ("I've been feeling interested in other people") of the Greek WEMWBS exhibited a low factor structure coefficient in the CFA. Interestingly, this item achieved the highest mean response score. This finding merits further scrutiny, particularly in light of the stable Cronbach's alpha coefficient remaining unaffected by the item's removal. Item 4 has shown poor performance in other similar previous studies in various analyses (e.g., Fung et al. (2019) and Waqas et al. (2015)). It is possible that its low factor loading could be attributed to linguistic issues such as ambiguity, double meaning, sensitivity, or bias. Indeed, Taggart et al., (2013) found that the statement was misinterpreted among Chinese and Pakistani cohorts in the UK where it was construed as indicating romantic interest. Gender-based differential item functioning might also contribute to the item's performance (Steward-Brown et al., 2009). Indeed, Stewart-Brown et al., (2009), the proponents of the shortened WEMWBS (SWEMWBS), suggested that this item may be a candidate for removal based on a Rasch analysis of data from the Scottish Health Education Population Survey. Indeed, the SWEMWBS is preferred by some for its psychometric properties and convenience. Nonetheless, the shortened version of the scale appears to relate more to functioning than affect and the authors advocate for the use of the full 14-item inventory as part of further validation studies and dimensionality analyses.

In line with previous findings, the present study discovered that the WEMWBS questionnaire was straightforward to complete and a tool capturing both emotions and functioning (Compton et al., 1996; Keyes et al., 2002; Waterman, 1993). The analyses revealed that the questionnaire fitted with the data well and there were no variations in results based on gender, age, or marital status. The variations in overall WEMWBS scores according to health and financial status are consistent with the extant literature. Indeed, health status correlates robustly with subjective well-being across diverse clinical and general population cohorts (Ngamaba

et al., 2017), and financial strain has been linked to poorer psychological and physiological outcomes (McCloud & Bann, 2019; Roberts et al., 2000). These issues can be exacerbated among nontraditional mature students (Lauder & Cuthbertson, 1998) who have more life roles and responsibilities compared to traditional college students (Ely, 1997; Fairchild, 2003; Kasworm, 2003; Kim, 2002; Villela & Hu, 1991). This dual burden of academic objectives and external responsibilities likely impacts not only their educational attainment and continuity but also their mental well-being (Scott et al., 1996; Muilenburg & Berge, 2001; Tressman, 2002). The role of being a student requires a redefinition of priorities and the effective management of resources among various obligations, including time, personal-psychological well-being, and finances. As the focus shifts towards positive health measures, it is important to measure the subjective mental well-being of adult learners in Greece to better understand their experiences. Nonetheless, it is important to take into account factors such as unemployment and poor health status when interpreting these findings. These socioeconomic determinants not only inform the heterogeneity of responses but likely also signal the need for targeted interventions within vulnerable subpopulations. Overall, these findings support the applicability of the Greek-translated version of the WEMWBS for measuring mental well-being in different cultural and cross-cultural contexts.

The correlations between WEMWBS scores and scores on measures of psychological variables used in this study were in line with expectations. There were statistically significant correlations between the DASS-21 anxiety, depression, and stress subscales, as well as the IASMHS help-seeking propensity (HSP) and indifference to stigma (IS) subscales, and the total scores on these scales. Consistent with other studies that employed similar scales to measure related constructs, the findings of the current study indicated that individuals with higher levels of mental well-being experienced less stress and anxiety, reported fewer and less impactful stressful events, and were more inclined to seek help when needed (e.g., Gulliver et al. (2010) and Rickwood et al. (2007)). These results support the notion that higher psychological well-being is associated with positive outcomes in various domains.

Despite its contribution, this study is not without limitations. Firstly, although adequate in size, participants were drawn using a convenience sampling strategy which limits the broader generalizability of the results (Trousselard et al., 2016). Secondly, the cross-sectional design did not allow for test–retest reliability which is crucial for establishing temporal stability. Finally, this study did not include comparisons with scales such as the Positive and Negative Affect Scale (PANAS), the Scale of Psychological Well-Being (SPWB), the Short Depression Happiness Scale (SDHS), and the Global Life Satisfaction (GLS) scale, as Tennant et al. (2007) did when validating the original scale. This omission was either due to the unavailability of reliable Greek-translated versions of these scales or concerns about the length of the questionnaire potentially discouraging participants. To address this limitation, the present study compared the WEMWBS with other scales that measure related constructs to evaluate the criterion validity of the WEMWBS following the example of previous studies (Castellvi et al., 2014; Clarke et al., 2011; Dong et al., 2016; Ringdal et al., 2017; Santos et al., 2015; Taggart et al., 2013).

## Conclusions

The findings of this study substantiate the use of the Greek WEMWBS among university students, demonstrating satisfactory internal consistency and convergent and factorial validity, thereby affirming its utility for assessing mental well-being in this demographic. However, further research is required to enhance our understanding of the instrument's validity across various Greek subpopulations including individuals of different age groups and both clinical and nonclinical populations. Additionally, future studies assessing well-being using WEMWBS and employing a longitudinal design may offer valuable insights towards enhancing the assessment of well-being and improvement strategies over time. Mental well-being has gained recognition as a component of psychological well-being. Consequently, there is a growing need for increased attention to well-being within counselling services and mental health initiatives, in schools, universities, workplaces, hospitals, and other relevant settings. The validated WEMWBS has the potential to be an instrument, for researchers, healthcare professionals, and other individuals involved in assessing the present condition of mental well-being, in Greece.

**Author Contribution** All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Konstantinos Petrogiannis and Irina Sangeorzan. The first draft of the manuscript was written by Konstantinos Petrogiannis, Irina Sangeorzan, and Panoraia Andriopoulou, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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**Data Availability** Data is available upon request.

## Declarations

**Ethics Approval** The study involved human participants and has received approval from the university's relevant committee.

**Consent for Publication** All participants have provided informed consent for the analysis of the data and publication.

**Conflict of Interest** The authors declare no competing interests.



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