

Italian Psychometric Validation of the Multidimensional Students' Health-Promoting Lifestyle Profile Scale

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How to cite this paper: Savarese, G., Carpinelli, L., Cavallo, P. and Vitale, M.P. (2018) Italian Psychometric Validation of the Multidimensional Students' Health-Promoting Lifestyle Profile Scale. *Health*, 10, 1554-1575.

<https://doi.org/10.4236/health.2018.1011118>

Received: October 17, 2018

Accepted: November 24, 2018

Published: November 27, 2018

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Abstract

The present study examines the factorial structure and assesses the psychometric properties of the adapted multidimensional Health-Promoting Lifestyle Profile II Scale, considering a sample of Italian university students who participated to an online survey. The original 52-items Scale showed a high overall internal consistency. Four of the six subscales were associated with good values of the Cronbach's α coefficient, whereas two subscales had lower values. Hence corrected item-total correlation was calculated and 26 items that decreased the scale's reliability were deleted. The remaining 26 items were first subjected to Principal Component Analysis that suggested a conceptually meaningful five-factor model. This result was further supported by the first-order confirmatory factor analysis, in which all the factor loadings were statistically significant. The internal consistency and the composite reliability for the reduced version of the Scale and its subscales have shown a good reliability for the measurement models. The multidimensionality of the scale was also confirmed by a second-order factor model.

Keywords

Scale Reliability and Validity, Confirmatory Factor Analysis, Health Promotion and Quality of Life, University Students

1. Introduction

The World Health Organization (WHO) has defined the concept of health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” ([1] p. 100). WHO references the bio-psycho-social

model, a systemic formulation that accounts for different levels of interpretation about health due to the complex interactions among biological, psychological, social, and cultural factors.

Health and well-being are commonly needed to achieve a sufficient or satisfactory level of existence, and they are essential concepts for health promotion, *i.e.*, the process of enabling people to have more control over their health and improve it [2]. Furthermore, health has been defined as a positive dynamic process [3] and not merely an extension of illness-avoidance behavior.

A health-promoting lifestyle [4] [5] is a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance an individual's level of wellness, self-actualization, and fulfillment [6]. Practicing daily health-promoting lifestyle behaviors is an important component [2] of maintaining and improving health.

Health-promoting behaviors are an integral part of an individual's lifestyle, and they are determinants of a person's health status. People should take responsibility for their personal health and well-being when they are young because it is difficult for adults to change unhealthy habits if they have adopted them during their youth [7].

Within this theoretical framework, the present contribution aims to validate the use of the Health-Promoting Lifestyle Profile II scale (HPLP-II, Appendix A) [4] [8] [9] in Italy, to investigate the individual and cultural representations of university students regarding health promotion and quality of life.

Two main research questions we attempt to answer are: 1) to what extent the HPLP-II, which was originally used to examine the theorized dimensions of health-promoting lifestyles in a convenience sample of literate volunteers recruited from the adult population in two Midwestern states [8] [9], could be adapted to Italian young people to investigate the individual representations of university students regarding health promotion and quality of life; 2) and what are the factor structure and psychometric properties of the adapted HPLP-II Scale. In particular, are the reliability and validity results for the multidimensional HPLP-II Scale different in Italy than they are in other countries where the instrument has already been validated? This is especially pertinent given that Italy is a nation that is marked by the socio-economic factors of disadvantage and precariousness in relation to work opportunities for youth, even with educational aspects based on less independence from the family of origin.

2. Theoretical Framework

During youth, a dynamic transition period of growth and development occurs that bridges childhood and adulthood, resulting in changes to an individual's body, mind, and social relationships. This transitional period provides young adults with a good opportunity to establish a health-promoting lifestyle [10]. During their youth, people gradually assume responsibility for their health. Health-promoting practices and psychosocial well-being will not only affect a

person's current health status, it will also have long-term health consequences.

It is well known that young people often engage in a wide range of unhealthy habits in terms of nutrition and exercise, and/or participate in illicit behaviors, such as the use of substances (e.g., alcohol, tobacco, and drugs). This can lead to adverse health outcomes, and it can put them at long-term high risk for serious health problems later in life, such as cardiac, respiratory, metabolic, degenerative, and psychiatric diseases and cancer [11]. These unhealthy habits have a negative impact on health, and it is important to emphasize health-promoting practices and psychosocial well-being to the current generations of children, adolescents, and young adults.

Cultural, social, and economic aspects are very important when defining well-being. The scientific literature describes the Italian young adult context as being “characterized by uncertainty—towards the future, personal relationships and professional status (...) and resignation—accepting the status quo without striking forms of protest, dissent or rebellion” ([12] p. 1). Vancea and Utzet [13] have suggested that young people are especially vulnerable to health problems if they are unemployed or working in precarious conditions. In Italy, there is “the crisis” for young people due to the economic conjuncture [14] and the lack of trade union support and/or political representation [15].

Many researchers have suggested “that the rapid expansion of insecure contractual arrangements in the 1990s-early 2000s have produced increasing difficulties in terms of transitions to a “better” job condition (*i.e.*, into secure employment), which enhanced the role of the family of origin in overcoming them, generating new inequalities among young Italians” ([16] p. 1). In fact, in Italy, many young adults live with their parents; thus, they are not independent in terms of the psychological, social, and economic aspects related to health and well-being. This situation is often associated with stress in the transition to adulthood [17] [18].

Many studies have used the multidimensional HPLP-II scale in a university setting [19]-[24]. However, to the best of our knowledge, this instrument has never been used among a study population of Italian students. Thus, the use of the HPLP-II Scale could be relevant for the prevention and for the intervention. In the following, the Scale is used to assess the wellness dimensions of Italian university students, starting from findings reported in previous studies.

3. Methodology

3.1. Translation

After obtaining permission from Susan Noble Walker (the inventor of the Scale), the original version of HPLP-II was translated into Italian language (Appendix A) by an expert translator and then back-translated into English by another translator with the same language proficiency. Then, two expert psychologists who are proficient in both languages reviewed the items to agree on the final version used in the present study.

3.2. Procedure

The study was designed and performed in accordance with the Declaration of Helsinki. The protocol included a full assurance of anonymity, participation discretion, and the absence of risk, burden, sponsors, conflicts of interest, and incentives for the responding participants. The appropriate ethical committee approved the protocol. Implied consent was obtained, because the questionnaire was administered through an electronic tool (each questionnaire has been filled one time based on IP address), which the students had to specifically and intentionally access on the Internet. Nevertheless, a disclaimer text indicated the aim of the study, and the anonymous and voluntary nature of participation was presented in the header of the web page questionnaire.

The data were collected from an online questionnaire using Research Electronic Data Capture (REDCap), an electronic data capture tool [25] hosted by the university. REDCap is a secure, Internet-based application designed to support data capture for research studies. It provides: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. The online questionnaire used retained the structure of the original questionnaire, and was easily writable and editable using a PC or a tablet or a smartphone. Face validity of the questionnaire was assumed, because it had already been used for studies in the same setting of University students in many different countries.

3.3. Participants

The target population of the study was university students in southern Italy enrolled in an undergraduate program. A self-selected sample of students was employed, and the participants were recruited by placing posters in the rooms in the student union on campus. Moreover, the students were invited to participate through the student union's social network webpages. The instrument to collect data was an anonymous, self-reported online questionnaire in which the only requested socio-demographic characteristics were age and gender.

The study was conducted in the middle of the 2015-2016 academic year (around 75 days) to avoid seasonal holidays and stressful periods that are usually concentrated at the beginning of the semester (because of the novelty of the challenge of college) and the end of the semester (because of examinations). In this period, 642 students responded to the request to participate to the survey, of which 517 (80.53%) answered almost all required information in the online questionnaire.

In the final sample under analysis are included only the survey participants (517) who have completed the questionnaire, whereas 125 participants are excluded for the lack of sufficient information. Among them, 181 (35.01%) are men, 314 (60.74%) women, and 22 (4.26%) are subjects who reported an alterna-

tive gender identity (e.g. subjects who identified themselves as homosexual) (see **Table 1**). The respondents have an age ranged from 18 to 35, with a mean age of around 23 (SD = 3.09).

3.4. Instruments

The multidimensional HPLP-II Scale was used to conduct the present study by considering “the theorized dimensions of a health-promoting lifestyle” [4] [9]. The original version of this instrument includes 52 items (Appendix B) categorized into six subscales [9]. The following dimensions were investigated:

- *Health Responsibility* (HRESP) [9 items]: taking responsibility for one’s own well-being; attending to and educating oneself with regard to health; using informed consumerism when seeking professional care;
- *Physical Activity* (PHACT) [8 items]: regular physical activity, which can be established with a plan or engaged in at random and included as part of one’s everyday life or recreational activities;
- *Nutrition* (NUTRI) [9 items]: the choice of a healthy daily diet, consistent with the guidelines provided in the food pyramid;
- *Spiritual Growth* (SPGRO) [9 items]: the development of one’s own resources through the ability to change (or grow) that seeks to maximize the potential of well-being by examining the meaning or sense of every target, and works toward achieving numerous goals in life;
- *Interpersonal Relationships* (INTRE) [9 items]: communication skills that seek to share one’s thoughts and feelings through verbal and non-verbal messages to build and maintain functional and long-lasting interpersonal relationships;
- *Stress Management* (STMAN) [8 items]: the control or reduction of tension; strategies to reduce perceived stress.

The items ask a respondent to indicate how often he/she adopts specific health-promoting behaviors or well-being habits. The items are scored on a 4-point Likert scale: “never” (1), “sometimes” (2), “often” (3), and “routinely” (4).

The original HPLPII [9] was assessed in 712 adults ranging from 18 to 29. Content validity was established by literature review and experts’ evaluation, construct validity was supported by factor analysis that confirmed a six-subscale structure and reliability was measured by α coefficient, which was 0.94 for the total scale and ranged from 0.79 to 0.87 for the subscales.

Table 1. Descriptive statistics for gender and age of survey participants.

| | Gender (%) | | Age |
|-------|------------|-----------|--------------|
| Men | 35.01 | Min | 18 |
| Women | 60.74 | Max | 35 |
| Other | 4.26 | Mean (SD) | 22.91 (3.09) |

Minimum [Min], Maximum [Max], Standard Deviation [SD].

Taking into account the peculiarity of socio-cultural factors in each nation, some authors have reported interesting results on the use of this scale in university setting. In Spain, Pérez-Fortis *et al.* [21] found that a six-factor model of a 44-item scale accounted for 40% of the variance, and the scale had an internal consistency of 0.87. In Jordan, Alkhawaldeh [23] found that the total average score of the HPLP-II Scale for students was 2.4 (Standard Deviation [SD] = 0.4). The highest mean score was for the *spiritual growth* dimension (Mean = 3.0, SD = 0.7), and the lowest mean score was for the *physical activity* dimension (Mean = 2.0, SD. = 0.7). In Portugal, Sousa *et al.* [24] found an adequate fit to a 52-item scale with a six-factor structure in a cross-cultural study. They reported a global Cronbach's α coefficient of 0.93. In Turkey, Pinar *et al.* [19] studied adults and found Cronbach's α coefficients greater than 0.70 for the six dimensions. After performing tests on the latent construct measurement, the final model reduced the number of items from 52 to 48. In Taiwan, Meihan and Chung-Ngok [20] validated the HPLP-II Scale and obtained a total Cronbach's α coefficient greater than 0.70 for the revised instrument; the values for the six dimensions ranged from 0.71 to 0.91. In Japan, Wei *et al.* [22] found a mean of 2.5 (SD = 0.29), the highest mean was associated with the *interpersonal relationships* dimension, and the lowest mean was associated with the *health responsibility* dimension.

3.5. Analysis

The multidimensional HPLP-II Scale was evaluated for its reliability and validity. Internal consistency was considered to assess the reliability of the results across items within the adopted scale by using Cronbach's α coefficient. For internal validity, a two-step procedure was performed to confirm the factor structure of the scale by means of exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) [26], as reported in other studies in different theoretical frameworks (e.g., [27] [28] [29] [30]).

According to the procedure discussed in Bai *et al.* [31] and Bozkurt *et al.* [32], the total sample of 517 participants was randomly divided into two sample groups (Sample 1 with $n = 193$, around 40% of the survey participants; Sample 2 with $n = 324$, around 60% of the survey participants) using the Statistical Package for the Social Sciences (SPSS) random case selection function. This procedure ensured that the EFA sample was not the same as the CFA sample, and then the sample findings could be generalized to the population. Item analysis and EFA were conducted on Sample 1. EFA analysis was performed using principal component analysis (PCA) with Varimax rotation implemented in the SPSS. For Sample 2, a first-order CFA model was used to explore the validity of the factor solution identified in the exploratory step; a second-order CFA model was specified to prove that the items were multidimensional in line with the suggestions presented in Walker *et al.* (1987) seminal paper. The CFA analyses were conducted with R software using the Lavaan package [33] for the model estimation and the semPlotpackage [34] for the graphical representation of the measurement models. To minimize the loss that occurs in list wise deletion, a

pair wise deletion (available-case analysis) was adopted in the exploratory and confirmatory factor analyses, assuming that missing answers were completely random.

4. Results

4.1. Exploratory Analysis

Starting from the information provided by the sample of 517 participants, the descriptive statistics for the each subscale and the total scale are presented in **Table 2**. The mean of the total HPLP-II Scale was 2.28, and the mean of its dimensions were 2.05 for HRESP, 1.97 for PHACT, 2.30 for NUTRI, 2.60 for SPGRO, 2.62 for INTRE, and 2.09 for STMAN. The normality of each item was checked by its skewness and kurtosis (Hair *et al.* 2010). The results showed that almost all of the items reported values within the +2 to -2 range for skewness and kurtosis; however, for two items [hplp_29 and hplp_41] in the STMAN subscale, the kurtosis value was higher than 3, indicating deviations from the normal distribution. Thus, those items were removed (in our opinion the determinants of this phenomenon are found in the student cultural variation, as we will discuss in the concluding section).

Internal consistency was assessed for the entire instrument as well as for each subscale. The HPLP-II Scale showed a high overall internal consistency: the Cronbach's α coefficient for the total 52-item scale was 0.90 (see **Table 3**), which is near the original value of 0.92 for the English language version reported [9].

Four of the six HPLP-II subscales, HRESP (0.79), PHACT (0.82), SPGRO (0.77), and INTRE (0.79) were associated with values around 0.80, whereas the NUTRI and STMAN subscales had lower values of 0.68 and 0.65, respectively. Corrected item-total correlation was calculated for the total scale and for the six subscales. Step-by-step, the items that decreased the scale's reliability were deleted. A total of 26 items was deleted from the instrument on the basis of the item analysis findings. More specifically, the following items were not included in further analysis: hplp_09, hplp_21, hplp_33, hplp_45, and hplp_51 from the HRESP subscale; hplp_34 from the PHACT subscale; hplp_14, hplp_32, hplp_38, and hplp_50 from the NUTRI subscale; hplp_18, hplp_48, and hplp_52 from the SPGROW subscale; and hplp_07, hplp_37, hplp_43, and hplp_49 from the INTRE subscale. All the items related to the STMAN subscale were disregarded given their poor inter-item correlations and low α coefficient value. A description of the specific items is presented in Appendix B.

The remaining 26 items were first subjected to EFA. Specifically, PCA using a Varimax rotation with Kaiser Normalization was performed. The scree plot, with Kaiser's "greater than one" criterion [35] was used to determine the number of factors to be retained. A first solution with six factors was obtained. Nevertheless, the examination of this factorial solution showed that the NUTRI subscale items were split into two factors. Hence, a five-factor solution was estimated by fixing the extracted factors to five. This approach is supported by pre-

vious results that explored the dimensionality of the HPLP-II Scale in which the items were included in a unique dimension. The results of the Kaiser-Meyer-Olkin (KMO = 0.80) test and Bartlett's test of sphericity ($\chi^2 = 1777.53$, $p < 0.001$) obtained from this latter solution demonstrate the adequacy of the sampling in which the criteria for conducting a factor analysis were met.

The final five-factor solution (see scree plot in **Figure 1** and the items' factor loadings and communality values in **Table 3**) shows a clear, interpretable structure accounting for 55.53% of the total variance (specifically, Factor 1: 22.18%; Factor 2: 12.55%; Factor 3: 8.46%; Factor 4: 6.98%; and Factor 5: 5.36%). The first factor captured the PHACT subscale, the second factor captured the SPGRO subscale, the third factor captured the HRESP subscale, the fourth factor captured the INTRE subscale, and the fifth factor captured the NUTRI subscale. The communalities (see **Table 3**) of most items were greater than or close to 0.50 (except for the item hplp_46 and for other items with values close to 0.40), which indicated that this factor solution adequately accounted for almost all variables [36].

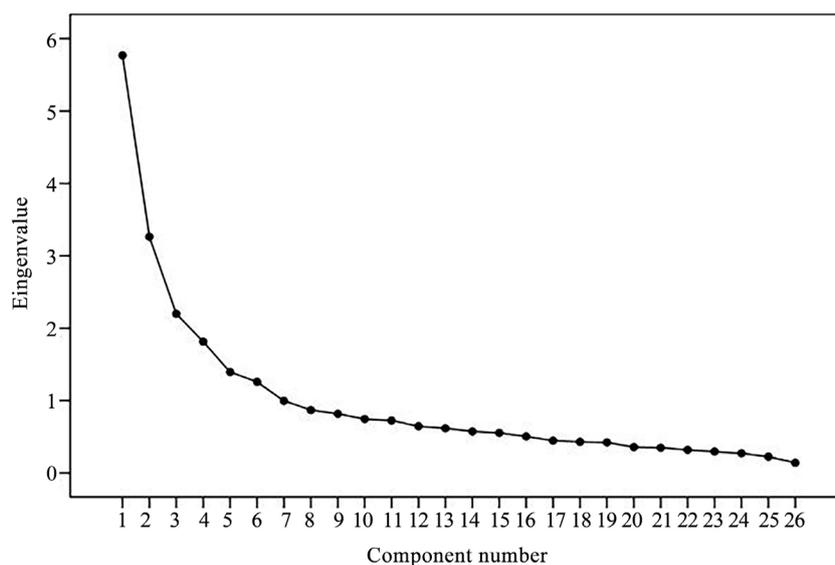


Figure 1. Scree plot for the final five-factor solution with 26-item of the HPLP-II Scale for Italian university students.

Table 2. Descriptive statistics of the HPLP-II total score and the 6 subscales.

| | HPLPII | HRESP | PHACT | NUTRI | SPGRO | INTRE | STMAN |
|----------|--------|-------|-------|-------|-------|-------|-------|
| Mean | 2.28 | 2.05 | 1.97 | 2.30 | 2.60 | 2.62 | 2.09 |
| SD | 0.36 | 0.53 | 0.66 | 0.50 | 0.52 | 0.50 | 0.42 |
| Skewness | 0.10 | 0.34 | 0.55 | 0.19 | -0.06 | -0.23 | 0.13 |
| Kurtosis | 0.15 | -0.33 | -0.32 | -0.29 | -0.06 | -0.03 | 0.01 |

Standard Deviation [SD]. *Health-Promoting Lifestyle Profile Scale II* [HPLPII], *Health Responsibility* [HRESP], *Physical Activity* [PHACT], *Nutrition* [NUTRI], *Spiritual Growth* [SPGRO], *Interpersonal Relationships* [INTRE], *Stress Management* [STMAN].

Table 3. Factor loadings and communalities values of the five-factor HPLPII Scale with the 26-item solution of the Exploratory Factor Analysis.

| Subscale/Item | PHACT | SPGRO | HRESP | INTRE | NUTRI | Communalities |
|---------------|-------|-------|-------|-------|-------|---------------|
| hplp_04 | 0.87 | | | | | 0.77 |
| hplp_10 | 0.90 | | | | | 0.83 |
| hplp_16 | 0.66 | | | | | 0.48 |
| hplp_22 | 0.68 | | | | | 0.51 |
| hplp_28 | 0.79 | | | | | 0.63 |
| hplp_46 | 0.43 | | | | | 0.35 |
| hplp_06 | | 0.64 | | | | 0.45 |
| hplp_12 | | 0.69 | | | | 0.55 |
| hplp_24 | | 0.75 | | | | 0.61 |
| hplp_30 | | 0.61 | | | | 0.41 |
| hplp_36 | | 0.76 | | | | 0.61 |
| hplp_42 | | 0.59 | | | | 0.49 |
| hplp_03 | | | 0.77 | | | 0.64 |
| hplp_15 | | | 0.82 | | | 0.70 |
| hplp_27 | | | 0.79 | | | 0.71 |
| hplp_39 | | | 0.79 | | | 0.66 |
| hplp_01 | | | | 0.53 | | 0.41 |
| hplp_13 | | | | 0.75 | | 0.64 |
| hplp_19 | | | | 0.72 | | 0.55 |
| hplp_25 | | | | 0.67 | | 0.47 |
| hplp_31 | | | | 0.72 | | 0.56 |
| hplp_02 | | | | | 0.81 | 0.69 |
| hplp_08 | | | | | 0.67 | 0.47 |
| hplp_20 | | | | | 0.56 | 0.41 |
| hplp_26 | | | | | 0.53 | 0.43 |
| hplp_44 | | | | | 0.57 | 0.41 |

Physical Activity [PHACT]; *Spiritual Growth* [SPGRO]; *Health Responsibility* [HRESP]; *Interpersonal Relationships* [INTRE]; *Nutrition* [NUTRI].

4.2. Confirmatory Factor Analysis

As a second step, CFA was conducted to confirm whether the emerging five-factor solution was consistent with the model suggested by the PCA in the exploratory analysis.

A first-order factor analysis was performed. All the factor loadings were statistically significant ($p < 0.001$), ranging from 0.41 (hplp_01) to 0.90 (hplp_10). Correlations between the five factors showed statistically significant coefficients

($p < 0.001$) for SPGRO and INTRE (0.67) and PHACT and NUTRI (0.51) (see the standardized solutions in the path diagram presented in **Figure 2**). The fit of model was assessed by considering the χ^2 test statistic, and some goodness-of-fit [37] [38] [39]: the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). In line with the threshold values indicated in most extant structural equation modeling literature [40] [41], the results suggested that the five-factor solution with the 26-item HPLP-II Scale provided an acceptable fit of model to the data with CFI and TLI values around 0.90, and RMSEA and SRMR values ranging between 0.05 and 0.08. Note that by deleting two items (hplp_16 and hplp_46), from the PHACT subscale that had a factor loading value less than 0.6, the fitness indices of the new measurement model slightly improved.

In addition, a second-order CFA model was estimated in line with the conceptualization advocated in Walker *et al.* [8] to test the hypothesis that a higher order factor (HPLP-II) represents the pattern of relations among the first-order factor model [42]. In this way, higher-order CFA enables one to test the multidimensionality of the first-order factor solution in the presence of the total score combining all of the items, regardless of the five domains. A diagrammatic representation of the standardized solution of the estimated model is presented in **Figure 3**; as seen, the covariation among the five first-order factors is explained by their regression coefficients on the second-order factor model. Although all the path coefficients of the HPLP-II Scale secondary factors in relation to the five factors were statistically significant, the values for three of the subscales were around 0.30 or lower (0.25 PHACT, 0.32 NUTRI, and 0.34 HRESP). The values for the path coefficients of INTRE and SPGRO were higher (0.78 and 0.82, respectively). The value of the goodness-of-fit indices of this model had a lower fit to the data than the first-order factor model (see **Figure 2** and **Figure 3**). To compare the two models, the chi-square difference test was used to determine which model was better ($\Delta\chi^2 = 649.09 - 585.34 = 63.75$, $\Delta df = 5$, $p < 0.001$). The null hypothesis (the two models are identical), was rejected: the first-order factor model is better than the second-order factor model. Hence, it seems that the higher-order CFA did not support the unidimensionality of the data, and the five dimensions solution of the first-order CFA was confirmed.

Finally, the internal consistencies (Cronbach's α) and composite reliability (CR, ω coefficients) for the HPLP-II Scale and its subscales in the first-order factor model and the second-order factor model at Level 1 and Level 2 are listed in **Table 4**. Both criteria show good reliability for the measurement models with Cronbach's α values greater than 0.70 (except for the INTRE subscale) and composite reliability values greater than 0.06. The average variance extracted (AVE), which is the average percentage of variation explained by the measured items for a latent construct, shows that the values were lower than 0.50 for some of the subscales.

Table 4. Composite reliability (α , ω and Average Variance Extracted (AVE) coefficients) of the first-order factor and the second-order factor measurement models (L1 = level 1 and L2 = level 2).

| | HRESP | PHACT | NUTRI | SPGRO | INTRE | HPLP-II |
|----------------------------------|-------|-------|-------|-------|-------|---------|
| <i>First-order factor model</i> | | | | | | |
| α | 0.81 | 0.85 | 0.76 | 0.79 | 0.69 | 0.85 |
| ω | 0.82 | 0.86 | 0.76 | 0.79 | 0.68 | 0.89 |
| ω_2 | 0.82 | 0.86 | 0.76 | 0.79 | 0.68 | 0.89 |
| ω_3 | 0.81 | 0.85 | 0.76 | 0.79 | 0.64 | 0.83 |
| AVE | 0.53 | 0.52 | 0.39 | 0.40 | 0.30 | 0.43 |
| <i>Second-order factor model</i> | | | | | | |
| α | 0.81 | 0.85 | 0.76 | 0.79 | 0.69 | 0.85 |
| ω | 0.82 | 0.86 | 0.76 | 0.80 | 0.68 | 0.88 |
| ω_2 | 0.82 | 0.86 | 0.76 | 0.80 | 0.68 | 0.88 |
| ω_3 | 0.81 | 0.85 | 0.75 | 0.79 | 0.65 | 0.75 |
| AVE | 0.53 | 0.52 | 0.39 | 0.40 | 0.31 | 0.43 |
| ω_{L1} | 0.52 | | | | | |
| ω_{L2} | 0.52 | | | | | |
| partial ω_{L1} | 0.81 | | | | | |

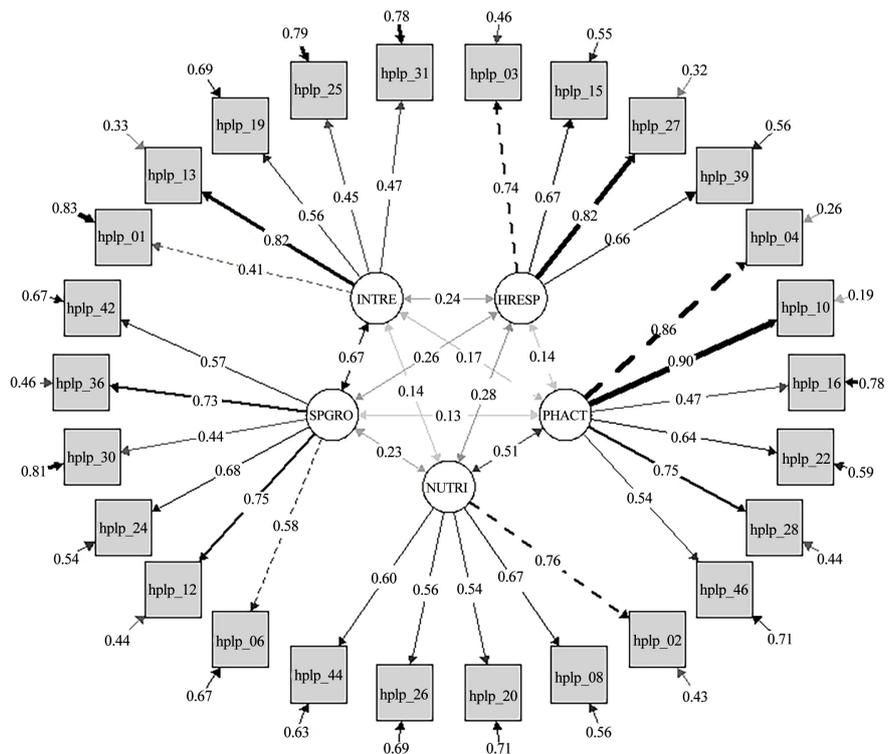


Figure 2. Measurement model for the first-order model of the 26-item HPLP-II Scale: standardized solutions. χ^2 test statistic = 585.34 (289 df). Goodness-of-fit statistics: Comparative Fit Index (CFI) = 0.89, Tucker–Lewis Index (TLI) = 0.87, Root Mean Square Error of Approximation (RMSEA) = 0.06, Standardized Root Mean Square Residual (SRMR) = 0.07. Dashed lines represent the factor loadings fixed to 1 to identify the scale of latent factor.

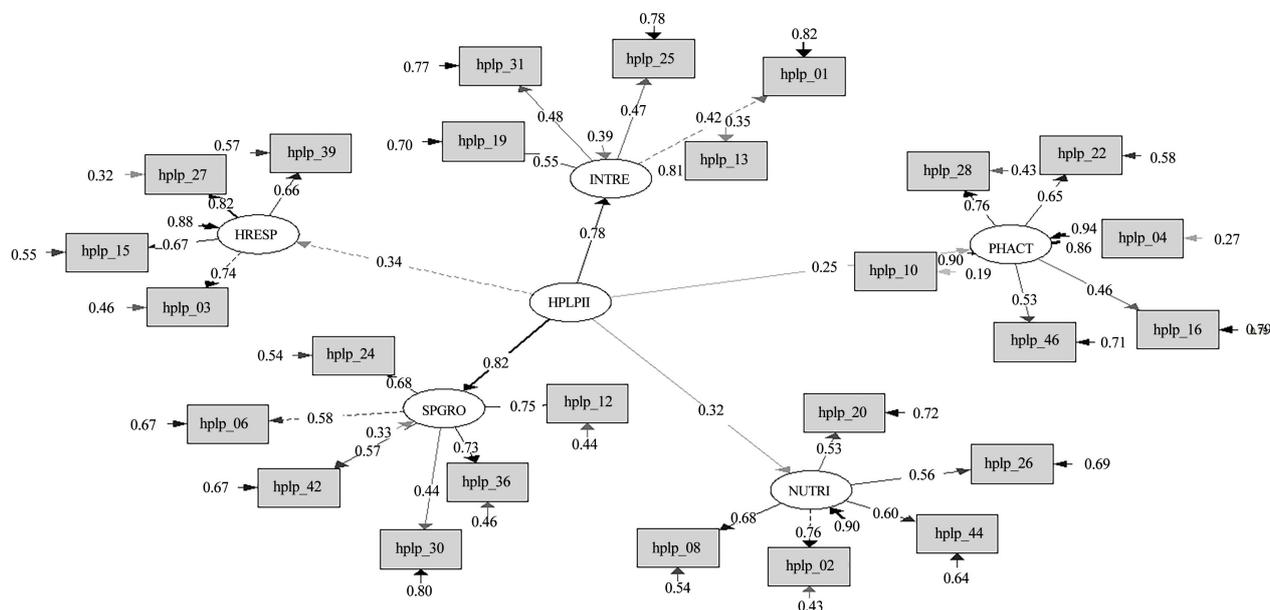


Figure 3. Measurement model for the second-order factor structure of the 26-item HPLP-II Scale: standardized solutions. χ^2 test statistic = 649.09 (294 df). Goodness-of-fit statistics: Comparative Fit Index (CFI) = 0.86, Tucker-Lewis Index (TLI) = 0.85, Root Mean Square Error of Approximation (RMSEA) = 0.06, Standardized Root Mean Square Residual (SRMR) = 0.09. R^2 for the first-order factors: Health Responsibility [HRESP] = 0.12, Physical Activity [PHACT] = 0.06, Nutrition [NUTRI] = 0.10, Spiritual Growth [SPGRO] = 0.67, and Interpersonal Relationships [INTRE] = 0.61. Dashed lines represent the factor loadings fixed to 1 to identify the scale of latent factors.

5. Discussion

The present study validated the HPLP-II Scale using a sample of 517 Italian university students. The HPLP-II Scale was found to have good overall internal consistency for four of the six subscales, which is in line with the results reported in previous studies.

The adapted 26-item HPLP-II Scale solution with five dimensions was supported by both analyses, EFA and CFA. The first-order CFA model presented an adequate fit to the data on Italian university students. However, in contrast to the results reported by Walker *et al.* [8], in which second-order CFA yielded a single factor interpreted as a health-promoting lifestyle, in the present study the multidimensionality of the scale was confirmed.

Half of items of the total scale were disregarded in the revised version of the instrument thanks to the item analysis conducted in the exploratory phase. A review of the item statistics as well as a consideration of the meaning of these items within the cultural context of Italy (specifically the country's young population) led to the decision that, in this framework, the 26-item Italian version of the HPLP-II Scale was the most appropriate version and there was no effect on content validity of the original version of the questionnaire.

The psychological well-being is a state of equilibrium between an individual and the physical and social/cultural environment in which he/she lives [43]. A previous study [44] reported that the Italian young adults need to develop adequate competencies on the cognitive, emotional-affective and strategic behavior-

al levels, but their coping strategies are mainly those that involve emotions more than cognition. Furthermore, the Italian socioeconomic context offers too few opportunities for members of this population. This socio-economic and professional uncertainty results in a negative relationship between internal coping and the many ineffective strategies employed to reduce perceived stress [45] [46] [47] [48]. More specifically, the STMAN subscale was omitted from the additional analysis. In the literature, stress management includes optimism, flexibility, and stress tolerance [49]. Generally speaking, the modern working environment (which is often uncertain for young adults) increases chronic stress and results in insufficient coping behaviors [50]. In Italy, due to the alarming work crisis, the cultural variation on emotional response [51], and the domain of dependence upon parents [52], young adults probably do not possess the resources that may help them manage stress.

6. Conclusions

In conclusion, the results indicate that the HPLP-II Scale seems to be a valuable tool for studying representations of the promotion of well-being and lifestyle, and its Italian version could be applied to the Italian population as a tool to evaluate a health-promoting lifestyle. The final five-factor solution for the Italian version is composed of 26-item with an interpretable structure. Cronbach's α values are greater than 0.70 (except for the INTRE subscale) and composite reliability values greater than 0.06. From the interpretation of the statistical results, the stress management subscale, as well as some of the items from the other subscales, did not help young adults identify the psychological and physical resources that need to be activated to effectively control or reduce stress and, in general, enhance different factors related to well-being and lifestyle.

Finally, caution is merited, given that the present study is limited to a self-selected sample of university students at a single university. The generalizability of its findings is not allowed. Further analyses are needed to validate the HPLP-II Scale in a larger sample and to compare the results across people of different ages offering a wide representation of the Italian socio-economic and cultural environment. However, if the findings were confirmed by further analysis in different settings, the HPLP-II Scale could be used to monitor the psychological and behavioral changes of young people related to a health-promoting lifestyle during their educational years; the scale could also be used to evaluate the effectiveness of ad hoc university programs devoted to improving students' health-promoting lifestyles.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix A

The original version of the Health-Promoting Lifestyle Profile II (HPLP-II): Subscales and Items.

| Subscales | 52-item solution | 26-item solution |
|---|---|---|
| (HRESP) <i>Health Responsibility</i> | hplp_03. Report any unusual signs or symptoms to a physician or other health professional. | |
| | hplp_09. Read or watch TV programs about improving health. | |
| | hplp_15. Question health professionals to understand their instructions. | hplp_03. Report any unusual signs or symptoms to a physician or other health professional. |
| | hplp_21. Get a second opinion when I question my healthcare provider's advice. | hplp_15. Question health professionals to understand their instructions. |
| | hplp_27. Discuss my health concerns with health professionals. | hplp_27. Discuss my health concerns with health professionals. |
| | hplp_33. Inspect my body at least once per month for physical changes/warning signs. | hplp_39. Ask for information from health professionals about how to take good care of myself. |
| | hplp_39. Ask for information from health professionals about how to take good care of myself. | |
| | hplp_45. Attend educational programs on personal healthcare. | |
| | hplp_51. Seek guidance or counseling when necessary. | |
| | (PHACT) <i>Physical Activity</i> | hplp_04. Follow a planned exercise program. |
| hplp_10. Exercise vigorously for 20 or more minutes at least three times a week (e.g., brisk walking, bicycling, aerobic dancing, and using a stair climber). | | hplp_10. Exercise vigorously for 20 or more minutes at least three times a week (e.g., brisk walking, bicycling, aerobic dancing, and using a stair climber). |
| hplp_16. Take part in light-to-moderate physical activity. | | hplp_16. Take part in light-to-moderate physical activity. |
| hplp_22. Take part in leisure-time (recreational) physical activities (e.g., swimming, dancing, and bicycling). | | hplp_22. Take part in leisure-time (recreational) physical activities (e.g., swimming, dancing, and bicycling). |
| hplp_28. Do stretching exercises at least 3 times per week. | | hplp_28. Do stretching exercises at least 3 times per week. |
| hplp_34. Exercise during usual daily activities (e.g., walking during lunch, using stairs instead of elevators, and parking car away from destination and walking). | | hplp_46. Reach my target heart rate when exercising. |
| hplp_40. Check my pulse rate when exercising. | | |
| hplp_46. Reach my target heart rate when exercising. | | |

Continued

| | | |
|---|--|---|
| | <p>hplp_02. Choose a diet low in fat, saturated fat, and cholesterol.</p> <p>hplp_08. Limit use of sugars and foods containing sugar (sweets).</p> <p>hplp_14. Eat 6 - 11 servings of breads, cereals, rice, and pasta each day.</p> <p>hplp_20. Eat 2 - 4 servings of fruit each day.</p> <p>hplp_26. Eat 3 - 5 servings of vegetables each day.</p> <p>hplp_32. Eat 2 - 3 servings of milk, yogurt, or cheese each day.</p> <p>hplp_38. Eat only 2 - 3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.</p> <p>hplp_44. Read labels to identify nutrients, fats, and sodium content in packaged food.</p> <p>hplp_50. Eat breakfast.</p> | <p>hplp_02. Choose a diet low in fat, saturated fat, and cholesterol.</p> <p>hplp_08. Limit use of sugars and foods containing sugar (sweets).</p> <p>hplp_20. Eat 2 - 4 servings of fruit each day.</p> <p>hplp_26. Eat 3 - 5 servings of vegetables each day.</p> <p>hplp_44. Read labels to identify nutrients, fats, and sodium content in packaged food.</p> |
| (NUTRI) <i>Nutrition</i> | <p>hplp_06. Feel I am growing and changing in positive ways.</p> <p>hplp_12. Believe that my life has purpose.</p> <p>hplp_18. Look forward to the future.</p> <p>hplp_24. Feel content and at peace with myself.</p> <p>hplp_30. Work toward long-term goals in my life.</p> <p>hplp_36. Find each day interesting and challenging.</p> <p>hplp_42. Am aware of what is important to me in life.</p> <p>hplp_48. Feel connected with a force greater than myself.</p> <p>hplp_52. Expose myself to new experiences and challenges.</p> | <p>hplp_06. Feel I am growing and changing in positive ways.</p> <p>hplp_12. Believe that my life has purpose.</p> <p>hplp_24. Feel content and at peace with myself.</p> <p>hplp_30. Work toward long-term goals in my life.</p> <p>hplp_36. Find each day interesting and challenging.</p> <p>hplp_42. Am aware of what is important to me in life.</p> |
| (SPGRO) <i>Spiritual Growth</i> | <p>hplp_01. Discuss my problems and concerns with people close to me.</p> <p>hplp_07. Praise other people easily for their achievements.</p> <p>hplp_13. Maintain meaningful and fulfilling relationships with others.</p> <p>hplp_19. Spend time with close friends.</p> <p>hplp_25. Find it easy to show concern, love, and warmth to others.</p> <p>hplp_31. Touch and am touched by the people I care about.</p> <p>hplp_37. Find ways to meet my needs for intimacy.</p> <p>hplp_43. Get support from a network of caring people.</p> <p>hplp_49. Settle conflicts with others through discussion and compromise.</p> | <p>hplp_01. Discuss my problems and concerns with people close to me.</p> <p>hplp_13. Maintain meaningful and fulfilling relationships with others.</p> <p>hplp_19. Spend time with close friends.</p> <p>hplp_25. Find it easy to show concern, love, and warmth to others.</p> <p>hplp_31. Touch and am touched by the people I care about.</p> |
| (INTRE) <i>Interpersonal Relationships</i> | | |

Continued

| | |
|----------------------------------|--|
| | hplp_05. Get enough sleep. |
| | hplp_11. Take time for relaxation each day. |
| | hplp_17. Accept the things in my life that I cannot change. |
| | hplp_23. Concentrate on pleasant thoughts at bedtime. |
| (STMAN) Stress Management | hplp_29. Use specific methods to control my stress. |
| | hplp_35. Balance time between work and play. |
| | hplp_41. Practice relaxation or meditation for 15 - 20 minutes each day. |
| | hplp_47. Pace myself to prevent tiredness. |

Appendix B

The Health Promoting Lifestyle Profile II (HPLP-II): Italian Version.

STILE DI VITA E PROMOZIONE DELLA SALUTE.

Questo questionario contiene una serie di affermazioni riguardanti il tuo attuale stile di vita ovvero le abitudini personali. Ti invitiamo a rispondere a ciascuna affermazione il più accuratamente possibile, cerca anche di non saltare alcuna voce. Per rispondere indica la frequenza con la quale ti impegni in ogni comportamento mettendo un cerchietto o una crocetta su: M per “mai”, Q per “qualche volta”, S per “spesso”, oppure D per “di continuo”.

NOTE: The 26-item solution results are highlighted in bold.

| AFFERMAZIONE | MAI | QUALCHE VOLTA | SPESSO | DI CONTINUO |
|---|-----|---------------|--------|-------------|
| 1. Discuto i miei problemi e preoccupazioni con persone che mi stanno vicino | M | Q | S | D |
| 2. Scelgo una dieta con pochi lipidi, grassi saturi e colesterolo | M | Q | S | D |
| 3. Riferisco qualunque segno o sintomo a un medico o altro professionista della salute | M | Q | S | D |
| 4. Svolgo esercizio fisico in base ad un programma | M | Q | S | D |
| 5. Dormo abbastanza | M | Q | S | D |
| 6. Sento che sto crescendo e cambiando in modo positivo | M | Q | S | D |
| 7. Mi congratulo frequentemente con gli altri per i loro risultati | M | Q | S | D |
| 8. Limito l'uso di zucchero e cibi contenenti zucchero (dolci) | M | Q | S | D |

Continued

| | | | | |
|--|---|---|---|---|
| 9. Leggo, oppure guardo programmi televisivi, che spiegano come migliorare la salute | M | Q | S | D |
| 10. Faccio esercizio fisico vigoroso per 20 o più minuti almeno tre volte a settimana (come correre, andare in bici, aerobica etc.) | M | Q | S | D |
| 11. Mi prendo un po' di tempo per rilassarmi tutti i giorni | M | Q | S | D |
| 12. Ritengo che la mia vita abbia uno scopo | M | Q | S | D |
| 13. Mantengo con gli altri relazioni significative e soddisfacenti | M | Q | S | D |
| 14. Mangio da 6 a 11 porzioni di pane, cereali e pasta ogni giorno | M | Q | S | D |
| 15. Discuto con i professionisti della salute per riuscire a comprendere bene le loro istruzioni | M | Q | S | D |
| 16. Svolgo una attività fisica leggera o moderata (come camminare a passo spedito 30 - 40 minuti almeno 5 volte a settimana) | M | Q | S | D |
| 17. Accetto le cose della mia vita che non posso cambiare | M | Q | S | D |
| 18. Attendo con ansia il futuro | M | Q | S | D |
| 19. Passo del tempo con i miei amici più cari | M | Q | S | D |
| 20. Mangio 2 - 4 porzioni di frutta ogni giorno | M | Q | S | D |
| 21. Ottengo una seconda opinione quando discuto i consigli di chi mi fornisce l'assistenza sanitaria | M | Q | S | D |
| 22. Prendo parte ad attività fisiche (ricreative) nel tempo libero (come nuotare, ballare, andare in bicicletta) | M | Q | S | D |
| 23. Mi concentro su pensieri piacevoli quando vado a dormire | M | Q | S | D |
| 24. Mi sento contento ed in pace con me stesso | M | Q | S | D |
| 25. Riesco facilmente a mostrare preoccupazione, amore e affetto agli altri | M | Q | S | D |
| 26. Mangio 3-5 porzioni di verdure ogni giorno | M | Q | S | D |
| 27. Discuto i miei problemi di salute con professionisti della salute | M | Q | S | D |
| 28. Faccio esercizi di allungamento (stretching) almeno 3 volte a settimana | M | Q | S | D |
| 29. Uso metodi specifici per controllare il mio stress | M | Q | S | D |
| 30. Lavoro per obiettivi a lungo termine | M | Q | S | D |
| 31. Tocco e vengo toccato dalle persone che ho a cuore | M | Q | S | D |
| 32. Mangio 2 - 3 porzioni di latte, yogurt o formaggio ogni giorno | M | Q | S | D |
| 33. Osservo il mio corpo almeno una volta al mese per vedere se vi sono cambiamenti o segni di pericolo | M | Q | S | D |

Continued

| | | | | |
|---|---|---|---|---|
| 34. Faccio esercizio durante le attività giornaliere (camminare ad ora di pranzo, usare le scale invece dell'ascensore etc.) | M | Q | S | D |
| 35. faccio un bilanciamento del mio tempo tra lavoro e divertimento | M | Q | S | D |
| 36. Trovo ogni giorno interessante e stimolante | M | Q | S | D |
| 37. Trovo modi per soddisfare i miei bisogni di intimità | M | Q | S | D |
| 38. Mangio solo 2 - 3 porzioni di cibi appartenenti ai gruppi di carne, pollo, pesce, fagioli secchi, uova e noci ogni giorno | M | Q | S | D |
| 39. Chiedo informazioni ai professionisti della salute per sapere come prendermi cura di me stesso | M | Q | S | D |
| 40. Controllo le mie pulsazioni quando faccio esercizio | M | Q | S | D |
| 41. Pratico rilassamento o meditazioni per 15 - 20 minuti al giorno | M | Q | S | D |
| 42. Sono consapevole di ciò che è importante per me nella vita | M | Q | S | D |
| 43. Ottengo supporto da una rete di persone che mi aiutano | M | Q | S | D |
| 44. Leggo le etichette per identificare i nutrienti, i grassi ed il sodio nei cibi confezionati | M | Q | S | D |
| 45. Svolgo programmi di educazione sulla cura della salute personale | M | Q | S | D |
| 46. Raggiungo la frequenza cardiaca prevista quando faccio esercizio | M | Q | S | D |
| 47. Regolo i miei ritmi per prevenire la stanchezza | M | Q | S | D |
| 48. Mi sento connesso con una qualche forza più grande di me | M | Q | S | D |
| 49. Risolvo i conflitti con gli altri mediante la discussione ed il compromesso | M | Q | S | D |
| 50. Faccio colazione | M | Q | S | D |
| 51. Chiedo una guida o un supporto quando necessario | M | Q | S | D |
| 52. Mi espongo a nuove esperienze e sfide | M | Q | S | D |