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Original Article

Psychometric properties of the Assessment of Positive Occupations (APO-11) in Spanish undergraduates: measuring engagement in fulfilling and meaningful occupations

Propriedades psicométricas da Avaliação de Ocupações Positivas (APO-11) em estudantes de graduação espanhóis: medindo o envolvimento em ocupações gratificantes e significativas

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Abstract

Introduction: The Assessment of Positive Occupations (APO) is a self-report scale developed to measure engagement in fulfilling and meaningful occupations based on the PERMA model of psychological well-being. Although engagement in such activities relates to well-being in undergraduates, few validated instruments exist for Spanish-speaking, non-clinical populations. **Objective:** This study examined the factor structure and psychometric properties of the 11-item Assessment of Positive Occupations (APO-11) using confirmatory factor analysis (CFA) in a Spanish undergraduate sample. **Method:** Participants were 363 undergraduates (84.8% women; M = 20.32, SD = 2.21). They completed the APO-11, the Satisfaction with Life Scale, Purpose in Life-Short Form, Seeking of Noetic Goals-8, and the Engagement in Meaningful Activities Survey. CFA was performed using Diagonally Weighted Least Squares. Convergent, discriminant, and construct validity, as well as reliability (McDonald's omega), were assessed. **Results:** The four-factor model showed good fit (CFI = .939, TLI = .911, RMSEA = 0.067, SRMR = 0.047). Convergent validity was supported by positive correlations with life satisfaction, purpose in life, engagement in meaningful activities and expectations (r = .18–.62, p < .05); discriminant validity by negative correlations with existential vacuum (r = –.06 to –.36, p < .05). However, the Meaning dimension showed weaker

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discriminant validity (AVE = .44). Internal consistency was acceptable for the total scale (ω = .84) and subscales (ω = .69–.83). **Conclusion:** The APO-11 is a valid and reliable tool for assessing engagement in fulfilling and meaningful occupations in Spanish undergraduates, contributing to well-being evaluation in this population.

Keywords: Life Satisfaction, Human Activities, Validation Study.

Resumo

Introdução: O Assessment of Positive Occupations (APO) é uma escala de autorrelato desenvolvida para medir o engajamento em ocupações gratificantes e significativas com base no modelo PERMA de bem-estar psicológico. Embora o engajamento nessas atividades esteja relacionado ao bem-estar em universitários, existem poucos instrumentos validados para populações hispanofalantes não clínicas. **Objetivo:** Este estudo examinou a estrutura fatorial e as propriedades psicométricas da versão de 11 itens do Assessment of Positive Occupations (APO-11) por meio de análise fatorial confirmatória (AFC) em uma amostra de universitários espanhóis. **Método:** Participaram 363 universitários (84,8% mulheres; M = 20,32, DP = 2,21). Eles responderam ao APO-11, à Escala de Satisfação com a Vida, à versão breve do Propósito de Vida, ao Seeking of Noetic Goals-8 e ao Engagement in Meaningful Activities Survey. A AFC foi realizada utilizando mínimos quadrados ponderados diagonalmente. Foram avaliadas a validade convergente, discriminante e de construto, bem como a confiabilidade (omega de McDonald). **Resultados:** O modelo de quatro fatores apresentou bom ajuste (CFI = 0,939, TLI = 0,911, RMSEA = 0,067, SRMR = 0,047). A validade convergente foi confirmada por correlações positivas com satisfação com a vida, propósito de vida, engajamento em atividades significativas e expectativas (r = 0,18–0,62, p < 0,05); a validade discriminante foi evidenciada por correlações negativas com vazio existencial (r = – 0,06 a –0,36, p < 0,05). No entanto, a dimensão de Significado apresentou validade discriminante mais fraca (AVE = 0,44). A consistência interna foi aceitável para a escala total (ω = 0,84) e para as subescalas (ω = 0,69–0,83). **Conclusão:** O APO-11 é um instrumento válido e confiável para avaliar o engajamento em ocupações gratificantes e significativas em universitários espanhóis, contribuindo para a avaliação do bem-estar psicológico nesta população.

Palavras-chave: Satisfação com a Vida, Atividades Humanas, Estudo de Validação.

Introduction

Mental health problems among undergraduates have become a growing concern for both academics and the public, given their prevalence and impact. Emerging adults face numerous challenges during university. These include the assimilation of new responsibilities, role transitions, and lifestyle changes which can negatively impact academic performance, quality of life, and interpersonal relationships (Auerbach et al., 2018; Ribeiro et al., 2018). These challenges increase the risk of psychological distress and the development of mental health problems, with emotional disorders being particularly prevalent among this population in Spain (Labrador et al., 2016; Miranda-Mendizabal et al., 2019).

Solmi et al. (2022) emphasize that the onset of mental illness begins in youth, with 48.4% of cases starting before the age of 18 and 62.5% before age 25. In particular, mental health during university years has been recognized as a significant public health concern (Sheldon et al., 2021). Among the various contributing factors, academic pressure and financial stress have been identified as especially relevant challenges that can negatively impact university students (Córdova-Olivera et al., 2023; Sheldon et al., 2021). Despite these high prevalence rates, few students seek professional help (Auerbach et al., 2016). When they do, it is often several years after the onset of symptoms (Bienvenu & Ginsburg, 2007; Broglia et al., 2021). This delay complicates treatment, leading to low rates of spontaneous remission and an increased risk of chronicity (Craske & Zucker, 2001; Pedrelli et al., 2015).

Since mental disorders typically begin during youth and delays in intervention worsen outcomes, it is crucial to develop preventive strategies within university settings. These strategies should not only address risk factors but also promote protective factors. In this regard, prevention and health promotion strategies centered around participation in meaningful occupations may be particularly valuable. Moreover, the literature has highlighted the strong association between occupation, well-being, and health (Eklund et al., 2017; Hammell, 2014; Townsend & Polatajko, 2007). In this sense, occupational engagement is recognized as an important factor related with well-being and health (Rodriguez-Bailon et al., 2024). Participation in meaningful and fulfilling activities provides structure, purpose, and opportunities for personal growth, which in turn foster psychological well-being and life satisfaction (Eakman, 2013, 2014).

Nevertheless, despite the high prevalence of mental illness among undergraduates and the established relationship between mental health and well-being, there are an assessment tools specifically designed to measure occupational well-being and, more precisely, engagement in fulfilling and meaningful occupations (Özkan et al., 2024).

Assessment of Positive Occupations (APO-15): development and description

Among the instruments available to assess the relationship between occupation and well-being, the Canadian Occupational Performance Measure - COPM (Law et al., 1990) and the Occupational Self-Assessment - OSA (Kielhofner et al., 2010) are often used in clinical settings. However, while both tools help identify meaningful activities and support intervention planning, they do not comprehensively address all the dimensions of well-being outlined in the PERMA (Positive emotions, Engagement, Relationships, Meaning, Achievement) model (Seligman, 2018). This limitation highlights the need for instruments that specifically evaluate engagement in positive occupations across multiple domains of well-being.

A recently developed test, the Assessment of Positive Occupation-15 Item - APO-15 (Noguchi & Kyougoku, 2016, 2021), was designed to assess participation in positive occupations, measuring engagement in activities that promote well-being and meaning in life. The APO-15 is a scale based on the PERMA model (Seligman, 2018) of positive psychology (Noguchi et al., 2023). This theory offers a novel perspective on well-being, encompassing five key dimensions -positive emotions, engagement, positive relationships, meaning, and achievement- that explain this construct (Hone et al., 2014; Seligman, 2011).

Positive emotions (P) are understood as hedonic feelings of happiness, closely related to the positive aspect of affective well-being in subjective well-being. Engagement (E) refers to a positive mental state characterized by vigor, dedication, and absorption in activities of personal interest. The positive relationships (R) dimension involves the perceived quality and quantity of social connections (Seligman, 2011) and is associated with better social adjustment (Morrish et al., 2018). Meaning (M) is linked to transcendence, often through fostering social relationships or connecting to a defined purpose (Schueller & Seligman, 2010). Finally, the achievement (A) dimension involves the development of individual potential, characterized by persistence in pursuing personal goals despite challenges (Norrish et al., 2013).

The APO-15 scale assesses four of the five dimensions described by Seligman (2018) in the PERMA model through 15 items (positive relationships, achievement, meaning and engagement).

Psychometric studies of APO-15 and adapted versions in different samples and languages

In its initial development with Japanese populations, the authors validated the APO-15 using a sample of 408 individuals with severe mental illness (SMI) (Noguchi & Kyougoku, 2021) and 761 older adults with physical disabilities (Noguchi & Kyougoku, 2016). The results demonstrated excellent psychometric properties, including construct validity, convergent and discriminant validity, structural validity and reliability. In a subsequent study, cross-regional validation was conducted with a sample of 3,003 subjects with physical pathology, geriatric conditions, and mental illness (Noguchi et al., 2023).

Given these psychometric properties, the APO-15 has been identified as a promising instrument for assessing engagement in positive occupations; however, due to its recent publication, it has not yet been utilized in a substantial number of studies. Likewise, it seems reasonable to suggest that a larger number of individuals could benefit from the assessment of positive occupations in various settings if this instrument were translated into other languages. To the best of our knowledge, the APO-15 has only been translated and validated in Turkish (Özkan et al., 2024) and Spanish (Mayordomo-Rodríguez et al., 2024) populations.

Regarding the target population, the APO-15 has primarly been validated with clinical samples, including individuals with severe mental disorders (Noguchi & Kyougoku, 2021; Özkan et al., 2024), older adults with physical disabilities (Noguchi et al., 2021), and older adults with age-related conditions (Noguchi et al., 2023). However, the study by Mayordomo-Rodríguez et al. (2024) is the only one that has addressed the adaptation and validation of the APO-15 with a non-clinical sample, specifically Spanish undergraduates.

In their work, Mayordomo-Rodríguez et al. (2024) conducted an exploratory factor analysis (EFA) on a sample of 222 undergraduates, which resulted in the reduction of the scale to 11 items (APO-11). However, neither its structural validity nor its convergent and discriminant validity were investigated. This reduction preserved the factor structure, which includes four second-order latent factors (Positive Relations, Achievement, Meaning, and Engagement). Furthermore, the reliability of the APO-11 was evaluated through an internal consistency analysis of its four dimensions, while its construct validity was assessed by correlating APO-11 with various measures of well-being, meaning in life, and occupational engagement.

In summary, while the APO-15 has shown promising psychometric properties in clinical and specific cultural contexts, its applicability and validity in non-clinical populations remain underexplored. Although Mayordomo-Rodríguez et al. (2024) provided an initial approach to the validation of the APO in a Spanish non-clinical sample through EFA, confirmatory validation is still lacking. Given the importance of positive occupational engagement for psychological well-being, there is a clear need to validate this instrument in non-clinical samples using confirmatory procedures. Finally, for a comprehensive overview of previous studies that have examined the psychometric properties of the APO-15, see Table Supplementary 1.

Objectives

The aim of the present study was to confirm the factor structure of the APO-11 and to analyze its psychometric properties in a sample of Spanish undergraduates.

The aforementioned aims were operationalized into the following specific objectives: i) to confirm the APO-11 factorial structure through the application of confirmatory factor analysis (CFA) procedures; ii) to conduct hypothesis testing (convergent and divergent validity) of the APO-11; iii) to verify the construct validity of the APO-11 when correlated with other measures related to personal well-being [Satisfaction With Life Scale (SWLS)], meaning in life [Purpose In Life-Short Form (PIL-SF) and Seeking of Noetic Goals - 8 Item (SONG-8)] and occupational engagement [Engagement in Meaningful Activities Survey (EMAS)]; and iv) to analyze the APO-11 reliability by estimating its internal consistency.

Methods

Participants

Participants were 363 Spanish non-clinical undergraduates (308 women, 84.8%, and 55 men, 15.2%) aged 18 to 26 years, M = 20.32, SD = 2.21, enrolled in psychology, speech therapy, and/or occupational therapy degree programs. Inclusion criteria for participation in the study were as follows: (i) being between 18 and 26 years old; (ii) being enrolled in an undergraduate degree program; and (iii) not having a diagnosis of severe mental disorder as reported by the university's student support office.

An incidental sampling method was used. The sample size employed in this study is consistent with methodological recommendations for CFA. Some authors have indicated that a ratio of at least 5 to 10 participants per observed variable is advisable to obtain reliable and valid results in CFA (Jackson, 2003; Kline, 2005).

Informed consent was obtained from all the participants, who collaborated voluntarily and anonymously and did not receive any compensation for their participation.

Instruments

Assessment of Positive Occupations-11 item (APO-11) (Mayordomo-Rodríguez et al., 2024). This Spanish version of the APO-15 (Noguchi & Kyougoku, 2016, 2021) is a self-administered scale comprising 11 items designed to assess how engaged one is in occupations that promote well-being according to four factors: i) Positive Relationships

(PR; 2 items), ii) Meaning (M; 3 items), iii) Achievement (A; 3 items) and iv) Engagement (E; 3 items). Each item is evaluated on a Likert-type scale, with responses ranging from 1 (indicating disagreement) to 4 (indicating agreement). A higher score indicates a higher level of perceived well-being and meaning derived from participation in occupations. The items of the APO-11 scale translated into Spanish are presented in Table Supplementary 2.

Satisfaction With Life Scale (SWLS) (Diener et al., 1985). The Spanish adaptation of the SWLS by Arce (1994) was employed. The SWLS comprises 5 items, rated on a scale of 1 (strongly disagree) to 7 (strongly agree), which evaluate global cognitive judgments of life satisfaction. The total score ranges from 5 to 35, with higher scores indicating greater life satisfaction. In the present study, the SWLS demonstrated good internal consistency, ω = 0.86. In the initial Spanish translation of the scale by Arce (1994), internal consistency data were not reported. However, subsequent validations in other populations, such as pregnant women and adolescents (using the same structure) obtained α values ranging from 0.82 to 0.84 (Atienza et al., 2000; Cabañero-Martínez et al., 2004). Similarly, a recent study by Álvarez-Merlano & Castro-Bocanegra (2022), which applied the instrument to undergraduates, reported an ω = 80.

Purpose In Life-Short Form (PIL-SF) (Schulenberg et al., 2011). The PIL-SF is an abbreviated version of the Crumbaugh & Maholick (1969) scale for the assessment of the presence of Meaning in Life (MiL). The Spanish version of Rubio-Belmonte et al. (2023) was employed. The PIL-SF comprises 4 items, rated on a scale of 1 to 7, that assess satisfaction with life and purpose and goals in life. The total score ranges from 4 to 28. A higher PIL-SF score indicates a higher level of MiL. In the present study, the PIL-SF demonstrated good internal consistency (ω = .83), which is the same value reported by the authors of the Spanish version (Rubio-Belmonte et al., 2023).

Seeking of Noetic Goals - 8 Item (SONG-8) (García-Alandete et al., 2020). This Spanish adaptation of the Seeking of Noetic Goals - SONG (Crumbaugh, 1977) assesses the motivational intensity of Search for Meaning (SfM) in life using 8 items, each rated on a 7-point Likert scale ranging from 1 (never) to 7 (always), resulting in a total score range from 8 to 56. The scale exhibits a two-factor structure: Need for Meaning (NfM) and Expectations (EX), comprising 5 and 3 items, respectively. The score range is 5 to 35 for the first factor and 3 to 21 for the second. A high score is indicative of a high level of motivation to engage in the SfM. In the present study, SONG-8 showed acceptable internal consistency, ω = 0.76. In the Spanish adaptation by García-Alandete et al. (2020), the internal consistency value was α = 0.81.

Engagement in Meaningful Activities Survey (EMAS) (Goldberg et al., 2002). The Spanish adaptation of the EMAS by Fernández-Solano et al. (2022) was employed. The EMAS is a 12-item instrument scored on a Likert scale from 1 (never) to 5 (always), designed to assess the extent to which an individual engages in meaningful and fulfilling occupations. The total score ranges from 12 to 60. A higher score indicates a greater attribution of meaning to daily activities. In the present study, the EMAS showed good internal consistency, ω = 0.89. A recent study, conducted with a sample of Spanish undergraduates, reported a value of α = 0.81 (Rodriguez-Bailon et al., 2024).

Procedure

To recruit the sample, the authors of this study obtained the requisite permission from the academic superior of the faculty where the participants were studying. Subsequently, the students were invited to participate in the research on a voluntary and unpaid basis. Individual informed consent was obtained from all participants, who completed the questionnaire protocol in their classrooms under the supervision of the study authors. The authors provided a concise overview of the study's purpose and methodology, ensuring that no particular aspects were highlighted that might influence the responses. Any queries regarding the procedure were addressed, and the students were assured of anonymity and confidentiality. It was imperative that participants provide accurate and truthful responses to ensure the integrity and reliability of the data.

Data collection was carried out at the beginning of the first semester of the 2024–2025 academic year, during the month of October. All participants completed the questionnaires in the same order, at the start of the second hour of class, immediately after the break, in their regular classroom setting. All scales were administered on a single day, with completion times ranging from 10 to 15 minutes (M = 10:49). The order of administration was as follows: APO, SWLS, PIL-SF, SONG-8, and EMAS.

Statistical analyses

The initial step was to conduct a Confirmatory Factor Analysis (CFA) of the APO-11. Given that the scale is ordinal and that it was not possible to assume multivariate normality (Mardia's coefficient was $z = 21.951$, $p < 0.001$; this statistic reports multivariate kurtosis) (Thompson, 2004), the Diagonally Weighted Least Squared (DWLS) method with robust estimation was employed (Li, 2016). The fit indices included the Comparative Fit Index (CFI) (Hu & Bentler, 1999) and the Tucker–Lewis Index (TLI) (Bentler & Bonett, 1980). Acceptable fit was indicated by values of ≥ 0.90, while values of ≥ 0.95 indicates good model fit. Additionally, the Root Mean Square Error of Approximation (RMSEA)and the Standardized Root Mean Square Residual (SRMR) (Browne & Cudeck, 1992) were used to assess the model fit. A value of ≤ 0.08 indicates an acceptable fit, while a value of ≤ .05 indicates a good fit (Hair et al., 2010).

Second, the convergent and discriminant validity of the APO-11 scale was determined through the calculation of the square root of the average variance extracted (AVE) for the four latent factors that had been confirmed in the CFA, in addition to the estimation of Pearson correlation coefficients between these factors. Convergent validity was evaluated by determining whether the square root of each AVE value associated with each latent construct was ≥ 0.50. Discriminant validity was assessed by comparing the square roots of the AVEs of the four subdimensions, which should be greater than the factor correlation coefficients (Fornell & Larcker, 1981).

Third, the construct validity of the APO was tested by calculating the correlations with the SONG-8 (García-Alandete et al., 2020), SWLS (Arce, 1994), PIL-SF (Rubio-Belmonte et al., 2023) and EMAS (Fernández-Solano et al., 2022). The SONG-8NfM (Need for Meaning) was selected for the analysis of divergent validity as a measure of existential vacuum. The SWLS, PIL-SF, EMAS and SONG-8EX

(Expectations) were chosen for the analysis of convergent validity as measures of satisfaction with life, presence of MiL, engagement in meaningful activities, and future-oriented determination to identify and establish MiL, respectively. Spearman's rho (ρ) was employed to calculate these correlations. The effect size of the correlations was interpreted according to Cohen (1988) (values from 0.20 to 0.49 indicate weak effect, values from 0.50 to 0.79 indicate moderate effect, and values ≥ 0.80 indicate strong effect). Item-total correlations were examined to evaluate the contribution of each item to the overall construct measured by the scale. An item that is well-constructed and aligned with the intended construct should demonstrate a positive correlation with the total score.

Finally, descriptive analysis, distribution of data, and internal consistency as a test of reliability of the APO-11 were performed. McDonald's omega (ω) (McDonald, 1999) was used to estimate the internal consistency of the scales used in this study, given that the scales in question are ordinal, and Cronbach's alpha is known to underestimate the internal consistency of such scales (Ventura-León & Caycho-Rodríguez, 2017). This index has a value between 0 and 1, and internal consistency is deemed acceptable if ω is ≥ .70 (McNeish, 2018).

The JASP 0.18.3 free software for Windows (JASP Team, 2024) was used to conduct all these statistical analyses.

Results

Structural validity of APO-11

A CFA was conducted to test the proposed structure of the APO-11. The model showed an adequate fit: $\chi2(38) = 117.69$, $p = 0.001$, CFI = 0.939, TLI = .911, RMSEA = 0.067 (90% CI [0.054, 0.084], SRMR= 0.047). All parameters were significant at the 0.05 level. However, it should be noted that 3 items (9, 12 and 13) did not reach optimal values ($r > 0.70$) (Kline, 2005).

The four latent factors were significantly correlated, rs from .254 to .532 ($p < 0.001$), with weak and intermediate size effects (Cohen, 1988). The correlation between the factors of the APO-11 suggested two models: a model with four correlated factors, and a model with a second-order factor. Thus, the following two models were specified for the APO-11: a model with four correlated latent variables (Positive Relations, Achievement, Meaning and Engagement; Model 1), and a hierarchical model with four first-order latent variables (Positive Relations, Achievement, Meaning and Engagement) and a second-order latent variable (Engagement in Positive Occupations; Model 2). Both models showed a good fit, although Model 2 showed a lower SBχ2, slightly lower fit indexes (CFI and TLI) and slightly higher error values (RMSEA and SRMR) than Model 1 (Table 1).

Table 1. Confirmatory Factor Analysis of the two models proposed for the APO-11.

Model	Mardia´s Coefficienta	SBχ2 (df)	p	CFI	TLI	RMSEA [90% CI]	SRMR
1	43.52	117.69 (38)	0.001	0.939	0.911	0.067 [0.054, 0.084]	0.047
2	43.52	113.18 (40)	0.001	0.928	0.901	0.089 [0.072, 0.105]	0.055

APO-11 = Assessment of Positive Occupation-11 Item; SBχ2 = Satorra-Bentler chi square; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; 1 = four latent variables correlated model; 2 = four latent variables of first-order and second-order latent variable model.a Normalized estimation.

The initial model comprising four correlated latent factors (Model 1) exhibits better values in the fit and error indices. Figure 1 illustrates the standardized solution for this model.

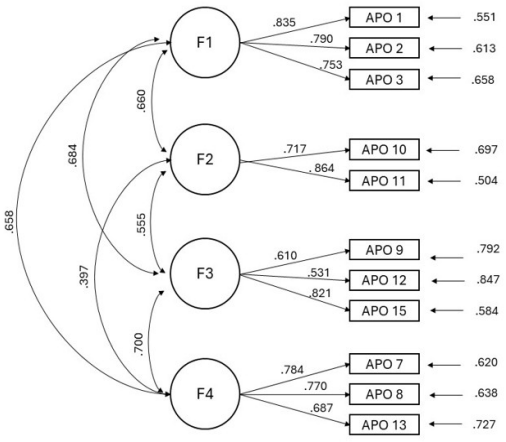

Figure 1. Standardized solution of the APO-11.

The values on the left of each item indicate the standardized regression coefficients. The values on the right of each item represent the errors. F1 = Achievement (A); F2 = Positive Relations (PR); F3 = Meaning (M); F4 = Engagement (E).

Discriminant validity of APO-11

Table 2 presents the correlation coefficients and square root AVEs between the APO-11 scale subdimensions. As observed in Table 2, the square root of the AVEs for three of the four latent factors (Positive Relations = .638; Achievement = .619; and Engagement = .560) were higher than the correlation coefficients. Furthermore, these three latent factors of the APO-11 showed discriminant validity as the AVEs were greater than .50. However, regarding the Meaning factor, the square root of the AVEs was lower than the correlation coefficients of this latent factor with Achievement and Engagement, and the value of the AVE was lower than .50 (.438), which makes us question the discriminant validity of this factor in relation to the others. However, overall the APO-11 exhibited good convergent and discriminant validity.

Table 2. AVE and correlations between APO-11 latent factors.

	Achievement	**Meaning**	**Engagement**
			Square root (AVE) = 0.560
Positive relationship	0.400	0.373	0.254
Square root (AVE) = 0.638			
Achievement	-	0.487	0.520
Square root (AVE) = 0.619			
Meaning	-	-	0.532
Square root (AVE) = 0.438			

Construct validity of APO-11

As shown in Table 3, divergent validity was obtained as SONG-8NfM correlates negatively with all dimensions of the APO-11. In terms of convergent validity, positive relationships are observed with SWLS, PIL-SF, EMAS and SONG-8EX. Table 3 shows the correlation coefficients obtained. The APO-11 showed significant correlations in the hypothesized direction, consistent with the intended assessment of the scales.

Table 3. Correlations of APO-11.

	APO-11PR	APO-11A	APO-11M	APO-11E	SONG-8NfM	SONG-8EX	SWLS	PIL-SF
APO-11A	0.400*							
APO-11M	0.373*	0.487*						
APO-11E	0.254*	0.520*	0.532*					
SONG-8NfM	-0.056***	-0.222*	-0.117**	-0.355*				
SONG-8EX	0.146**	0.318*	0.188**	0.109***	0.294*			
SWLS	0.183**	0.442*	0.408*	0.548*	-0.281*	0.162**		
PILSF	0.249*	0.620*	0.448*	0.452*	-0.198*	0.345*	0.456*	
EMAS	0.167**	0.432*	0.434*	0.487*	-0.226*	0.181*	0.420*	0.507*

APO-11PR = Assessment of Positive Occupations-11 Item Positive Relations; APO-11A = Assessment of Positive Occupations-11 Item Achievement; APO-11M = Assessment of Positive Occupations-11 Item Meaning; APO-11E = Assessment of Positive Occupations-11 Item Engagement; SONG-8NfM = Seeking of Noetic Goals-8 Item Need for Meaning; SONG-8Ex = Seeking of Noetic Goals-8 Item Expectations; SWLS = Satisfaction With Life Scale; PIL-SF = Purpose in Life Test-Short Form; EMAS = Engagement in Meaningful Activities Survey. * $p < .001$; ** $p < .005$; *** $p < .05$.

Descriptive statistics and internal consistency of the APO-11

The mean and standard deviation of the APO-11 total score were M = 35.99, SD = 6.46. The reliability of APO-11 was evidenced by its internal consistency, which yields a Mc Donald's omega coefficient of $\omega = .844$. With regard to the reliability of the four dimensions that constitute the APO-11, all of them achieved a score above 0.70, with the exception of the Meaning dimension, which obtained a value of 0.691. This indicates an acceptable internal consistency, particularly given the limited number of items (2-3) in each subscale (Streiner et al., 2015). It is worth noting that the elimination of any item from the subscales did not result in an improvement in the values. The corrected item-total correlations were moderate (ranging from 0.42 to 0.71).

Table 4 shows the McDonald's omega (ω) values obtained for each of the dimensions, ϖ value if item dropped, as well as the mean scores and standard deviations of the items, and the values of the relationship between each item with the APO-11.

Table 4. Descriptive statistics of the scales used in the present study.

Items of the APO-11 and scales	M	SD	Sk (SE)	Ku (SE)	r Item-test	ϖ if item dropped
ACHIEVEMENT (ϖ = .826)						
APO 1	3.41	0.77	-1.26 (0.14)	1.14 (0.28)	0.69	0.767
APO 2	3.62	0.59	-1.52 (0.14)	2.25 (0.28)	0.71	0.743
APO 3	3.56	0.64	-1.29 (0.14)	0.82 (0.28)	0.68	0.759
POSITIVE RELATIONS (ϖ = 0.763)						
APO 10	3.62	0.60	-1.5 (0.14)	2.18 (0.28)	0.52	-
APO 11	3.73	0.53	-2.0 (0.14)	4.08 (0.28)	0.58	-
MEANING (ϖ = 0.691)						
APO 9	3.26	0.75	-.68 (0.14)	-0.32 (0.28)	0.48	0.352
APO 12	3.27	0.83	-.89 (0.14)	-0.03 (0.28)	0.42	0.391
APO 15	3.17	0.80	-.61 (0.14)	-0.40 (0.28)	0.58	0.463
ENGAGEMENT (ϖ = .793)						
APO 7	3.05	0.86	-.62 (0.14)	-.30 (0.28)	0.71	0.706
APO 8	2.77	0.92	-.23 (0.14)	-.83 (0.28)	0.59	0.585
APO 13	2.95	0.89	-.45 (0.14)	-.62 (0.28)	0.61	0.608
APO TOTAL	35.99	6.46	-1.73 (0.14)	5.44 (0.28)		
SWLS	25.03	5.46	-.74 (0.12)	0.42 (0.25)		
PIL-SF	22.33	3.64	-1.28 (0.12)	2.41 (0.25)		
EMAS	33.04	7.2	-.86 (0.12)	2.06 (0.25)		
SONG-8NfM	19.89	6.35	-.10 (0.12)	-.49 (0.25)		
SONG-8EX	16.25	3.24	-.62 (0.12)	0.04 (0.25)		

N = 363. The numbering of the items of the original version was preserved. Sk = Skewness; Ku = Kurtosis; SE = Standard Error; APO-11: Assessment of Positive Occupations-11 Item; PIL-SF = Purpose in Life Test-Short Form; SWLS = Satisfaction With Life Scale; EMAS = Engagement in Meaningful Activities Survey; SONG-8 = Seeking of Noetic Goals-8 Item; NfM = Need for Meaning; EX = Expectations. * p < .001.

Discussion

The aim of the present study was to confirm the factor structure of the APO-11 and to analyze its psychometric properties in a sample of Spanish undergraduates. The following hypotheses were tested: i) the APO-11 would show an adequate fit as a four-dimensional model (Positive Relations, Achievement, Meaning and Engagement) with four latent factors correlated with each other; ii) the APO-11 would demonstrate good convergent and discriminant validity; iii) the APO-11 would exhibit good construct validity; and iv) the four sub-dimensions of the APO-11 would demonstrate acceptable reliability, as indicated by internal consistency.

The Spanish adaptation of the APO (APO-11) demonstrated adequate structural validity and internal consistency. The engagement in meaningful and fulfilling occupations

was found to be positively correlated with satisfaction with life, presence of MiL and future-oriented determination to find meaning (Ex), and negatively correlated with the Need for Meaning (NfM). The results demonstrate that the APO-11 is a reliable and valid instrument for assessing the engagement in meaningful and fulfilling occupations in undergraduates.

Structural validity of APO-11

The four-dimensional model (Positive Relations, Achievement, Meaning and Engagement) proposed by Noguchi & Kyougoku (2016) demonstrated an adequate fit in the present study, thereby confirming the appropriateness of this model for the Spanish adaptation and reduction of the APO-15 (APO-11) for its use in undergraduates. The comparative fit index (CFI = .939) and Tucker-Lewis Index (TLI = 0.911) demonstrated an acceptable fit, while the root mean square error of approximation (RMSEA = 0.067 [0.054 – 0.084]) and the standardized root mean square residual (SRMR = 0.047) exhibited a good fit, indicating that the structure identified by Noguchi & Kyougoku (2016) can be replicated. The fit indices obtained are consistent with the findings of other studies that have employed CFA procedures to test the factor structure of the APO-15 in individuals diagnosed with SMI (e.g., Noguchi et al., 2021; Özkan et al., 2024) and older adults with disabilities of diverse etiologies (e.g., Noguchi et al., 2023; Noguchi & Kyougoku, 2016).

The CFI values reported in the present study are comparable to those found by Noguchi & Kyougoku (2016, 2021) and are slightly lower than those obtained by Noguchi et al. (2023) and Özkan et al. (2024). In contrast, the TLI values in the present study, being appropriate, are lower than those obtained in the aforementioned works. With regard to the RMSEA, the value obtained in the present study is similar to that found by Noguchi et al. (2023) and lower than those reported by the remaining studies (Noguchi & Kyougoku, 2016, 2021; Özkan et al., 2024) with values above .080. It is notable that no previous research has reported the SRMR value, which has demonstrated an optimal value (below .05) in the present study.

An examination of the factor loadings indicates that all items exhibit scores above 0.70, which aligns with the findings of previous studies (Noguchi & Kyougoku, 2016; Özkan et al., 2024), with the exception of items 9, 12, and 13. While the score for item 9 falls below 0.70, the value obtained is slightly higher than that reported by Özkan et al. (2024), who recorded a value of 0.548. With regard to item 13, the factor loading is approximately 0.70, which is lower than that reported in previous studies. Nevertheless, the percentage of variance explained by both items within their respective factor remains satisfactory (Ventura-León, 2019).

With regard to the lower factor loadings observed for items 9, 12 and 13, several possible explanations can be considered. For item 9 ("I live based on my beliefs"), it is plausible that the meaning participants attribute to this statement is influenced by their developmental stage. As university students, many are still in the process of exploring, shaping, or questioning their core beliefs and values. This variability in interpretation may result in weaker associations between the item and the underlying latent factor. As for item 13 ("I can concentrate on my hobby"), the lower loading could be attributed to differences in how participants define or relate to the concept of a hobby.

Some students may not have a specific hobby, or may not regard their leisure activities as meaningful or significant aspects of their lives. This diversity in experience and personal relevance could account for the reduced coherence of the item with the rest of the scale. On the other hand, the factor loading for item 12 ("I'm working to be able to concentrate") requires closer examination of its content. In the present study, item 12 is included within the "Meaning" factor, in accordance with the findings of the exploratory study conducted by Mayordomo-Rodríguez et al. (2024). This is a distinction from the original version (Noguchi & Kyougoku, 2016, 2021), in which the item was included within the "Engagement" factor. From an evolutionary perspective, the observed discrepancy may be attributed to the differing significance assigned to this item by the population under study. Emerging adulthood may therefore be conceptualized as a life stage in which emphasis on productivity -in this context, academic pursuits- is closely linked to a sense of purpose and fulfillment. Consequently, a focus on academic development may promote a sense of personal coherence, alongside a commitment to and realization of one's values (Dezutter et al., 2014).

To the best of our knowledge, no other studies have verified the factor structure of the APO with non-clinical samples, particularly with undergraduates. The goodness of fit indices demonstrated the statistical significance of the factor loadings, thereby supporting the structural validity of the four-dimensional structure of the APO-11 scale.

Finally, these results are consistent with previous literature, which highlights that, in multidimensional psychological constructs, correlated-factor models often provide a better fit than hierarchical models unless there is very strong empirical and theoretical justification for a general factor (Brown, 2015).

Convergent and discriminant validity

The hypothesis testing demonstrated good values for the convergent and discriminant validity of three APO-11 sub-dimensions (Positive Relations, Achievement and Engagement). However, the Meaning latent factor obtained a rather small value in discriminant validity, which overall does not seem to compromise the discriminant validity of the APO-11 but may need to be reviewed in the future. This could be due to the specific content of the items, the developmental characteristics of the undergraduate sample, or the broad nature of the "meaning" construct itself. In previous studies, the original authors of the scale (APO-15) obtained discrete values for the AVE of the Positive Relations factor (Noguchi & Kyougoku, 2021) and, as in the present study, for the Meaning factor (Noguchi & Kyougoku, 2016).

Although the Meaning factor exhibited a somewhat smaller value than the established criteria, the four factors, when considered collectively, demonstrated the capacity to effectively assess the construct of being "engaged in positive occupations". The findings lend support to the notion that these four factors measure distinct, yet interrelated, aspects.

Construct validity of APO-11

Prior research has indicated a positive correlation between the APO-15, psychological well-being, and recovery in individuals with SMI. In contrast, those studies have reported

a negative correlation between the APO-15 and various measures of psychological distress in older adults and those diagnosed with SMI. In the study by Noguchi & Kyougoku (2021), a sample of 408 individuals diagnosed with SMI was used to test the correlation between the APO-15 and happiness, as well as various measures of recovery (Self-Identified Stage of Recovery Part B [SISR-B, Andresen et al., 2006] and Recovery Assessment Scale (RAS) (Giffort et al., 2014), and a measure of the severity of mental problems which assessed anxiety/depression and perceived disability in recent weeks (General Health Questionnaire 12-item - GHQ-12) (Goldberg & Williams, 1988). The APO-15 demonstrated convergent validity with happiness (r = 0.128 to .317) and with measures of recovery in SMI (r = 0.256 to 0.660). Conversely, it exhibited divergent validity with the severity of mental problems (r = -0.206 to -0.470). Özkan et al., (2024) investigated the relationships between the APO-15 and a measure of psychological well-being (PWB); (Diener et al., 2010), a measure of recovery (RAS-DS) (Giffort et al., 2014) and the GHQ-12 (Goldberg & Williams, 1988) in a sample of 106 individuals with SMI. Their results demonstrated the convergent validity of the APO-15 with the PWB (r = 0.583) and the RAS-DS (r = 0.640), as well as divergent validity with the GHQ-12 (r = -0.587). Finally, Noguchi & Kyougoku (2016), with a sample of 716 Japanese older adults, examined the correlation between the APO-15 and Kessler Psychological Distress Scale (K6) (Cornelius et al., 2013), yielding negative relationships (r = -0.201 to -0.310), thereby substantiating its divergent validity.

The present study's findings were consistent with those of Noguchi & Kyougoku (2016, 2021) and Özkan et al. (2024). In the present study, the convergent validity of the APO-11 was confirmed by the significant positive correlations observed with those measures used related to well-being, meaning in life, future-oriented determination to find meaning (expectations) and engagement in meaningful occupations (SWLS, PIL-SF, SONG-8EX and EMAS). Additionally, divergent validity of the APO-11 was confirmed by the significant negative correlations observed with measures related to meaninglessness and existential vacuum (SONG-8NfM).

The results of this study indicate that the degree of engagement in positive occupations, as measured by the APO-11, is associated with undergraduates' well-being and sense of MiL. Additionally, there is a substantial body of evidence suggesting that engagement in meaningful occupations not only promotes well-being, but also alleviates psychological distress (Lis et al., 2008; Rahimi et al., 2015).

Internal consistency of the APO-11

Regarding the internal consistency of the four sub-dimensions of the APO-11, the McDonald's omega coefficient ranged from 0.69 to 0.83. This result is consistent with other studies that employed the 15-item original version (Noguchi & Kyougoku, 2016, 2021; Özkan et al., 2024), which demonstrated coefficients indicating acceptable internal consistency, with values averaging above 0.70.

Considering the values of the consistency indices obtained for each of the APO-11 subdimensions, it can be observed that i) Positive Relations (ω = 0.763) exhibited a higher value than that reported by Noguchi & Kyougoku (2021) and a lower value than that reported by Özkan et al. (2024) and Noguchi & Kyougoku (2016); ii) Achievement (ω = 0.826) yielded a value comparable to that documented by Noguchi & Kyougoku, (2016) and higher

than that observed in the studies of Noguchi & Kyougoku (2021) and Özkan et al. (2024); iii) Engagement (ω = 0.793) achieved a value equal to that obtained by Noguchi & Kyougoku (2021) and higher than the indices reported by Noguchi & Kyougoku (2016) and Özkan et al. (2024); and, iv) Meaning (ω = 0.691) obtained values close to those of the study by Özkan et al. (2024) and lower than those of both studies by Noguchi & Kyougoku (2016, 2021).

It is worth noting that the reduction of the original scale (APO-15) to eleven items did not result in a loss of reliability for each of the sub-dimensions. Positive Relations underwent a reduction from five items in the original version (APO-15) to two in the Spanish version (APO-11), while Achievement experienced a reduction from four items in the APO-15 to three items in the APO-11. In both cases, there is no reduction in the value of the internal consistency indices, and in some instances, there is an increase (e.g., Achievement). With regard to Engagement and Meaning, the number of items is maintained at three in each case. However, in the EFA developed in the Spanish translation and adaptation of the scale by Mayordomo-Rodríguez et al. (2024), an exchange of items between the two sub-dimensions was reported. Consequently, item 8 was transferred from Meaning (APO-15) to Engagement (APO-11), while item 12 was relocated from Engagement (APO-15) to Meaning (APO-11). This alteration does not have a detrimental impact on the internal consistency indices of the Engagement sub-dimension, which even exhibits an improvement in reliability values. Nevertheless, it appears to impact the internal consistency index of the Meaning subdimension, which is marginally below .70. It is notable, however, that Özkan et al. (2024) reported consistency indices slightly above .70.

Strenghts of the study

The APO-11 is a brief, self-administered scale that has demonstrated optimal psychometric properties in undergraduates. To the best of our knowledge, this is the first study to examine the factor structure of the APO-11 through the application of CFA procedures in a non-clinical and Spanish-speaking population. It is notable that the American Psychological Association has issued guidelines recommending that psychological instruments should undergo validation and testing in diverse samples, particularly when they are employed in populations that may differ from those in which the test was originally developed (American Psychological Association, 2020).

Regarding its usefulness and applicability, the APO-11 demonstrates promise as a valid instrument for assessing and intervening through engagement in positive occupations within intervention or enhancement programs. Existing literature suggests that such programs may reduce both symptoms and vulnerability factors, thereby lowering the incidence of disorder onset (Brent et al., 2015; Stockings et al., 2016). Recent studies with individuals diagnosed with SMI have shown that positive occupation-based practices have a positive impact on positive emotions and the perception of personal achievement (Noguchi et al., 2021) and effectively contribute to enhanced subjective well-being (Noguchi et al., 2024). The findings of the present study support the validity of an assessment instrument designed to measure occupational engagement among undergraduates, which may serve as a valuable tool for promoting positive occupations as a preventive strategy in targeted programs.

Clinical applications

The APO-11 may be of particular relevance in the context of the United Nations Sustainable Development Goals (SDGs). Specifically, they contribute to SDG 3, which aims to ensure healthy lives and promote well-being for all ages, by facilitating the identification and promotion of protective factors related to mental health and psychological well-being in young adults. Furthermore, the use of the APO-11 by clinical professionals could help detect specific needs, design tailored interventions, and monitor the impact of programs aimed at both prevention and mental health promotion in various contexts. The application of validated instruments such as the APO-11 can also support the implementation of preventive and health promotion programs in university settings, aligning with SDG 4 goals focused on ensuring inclusive, equitable, and quality education, and promoting lifelong learning opportunities. In this way, the use of the APO-11 by health and education professionals could contribute to the development of policies and strategies that foster comprehensive well-being and sustainable development within the university population, in accordance with the principles of equity and sustainability promoted by the SDGs.

Limitations

The sampling method and sample composition limit the extent to which the results can be generalized. The age range of 18 to 26 years did not allow for comparative analyses to test the effect of age on the variables under study, and consequently, the discussion of differences at varying stages of the developmental cycle. Similarly, the number of women participating (n = 308) was significantly higher than that of men (n = 55). While the number of participants is adequate for the statistical analyses performed, future studies should focus on recruiting samples that are both representative and sufficiently powered for the planned analyses. Special attention should be given to achieving gender balance and including a broader age range, as these factors are important for enhancing the generalizability and relevance of the findings. This approach will ensure the efficient use of resources while providing the opportunity to conduct supplementary psychometric analyses, such as those examining the invariance of age and gender.

Another limitation of this study is that, apart from the participants' degree programs, no additional socio-demographic data (such as socioeconomic status or place of residence) were collected. This lack of information may limit the interpretation and generalizability of the findings.

Finally, the cross-sectional design of the study represents a limitation in terms of the possibility of examining test-retest reliability.

Future research/implications

Further studies employing a longitudinal design could extend the results of the temporal reliability of this scale. Additionally, it would be interesting to conduct further examination of the psychometric properties of the APO-11 in clinical samples, including but not limited to older adults, individuals with mental disorders, caregivers of dependents, people with chronic or terminal illnesses, among others.

It is also advisable to conduct longitudinal and cross-cultural studies related to each of the variables investigated and the relationship between them, as such studies are currently underrepresented in existing literature. In this way, prevention strategies could prioritize enhancing well-being and quality of life through engagement in meaningful occupations, rather than focusing solely on managing disorder-specific symptoms (Sauer-Zavala et al., 2017).

Finally, the literature does include clinical applications and experiences with the PERMA framework in the field of occupational therapy, such as interventions with individuals diagnosed with SMI or Parkinson's disease (Noguchi et al., 2021; Yao et al., 2024), among others. However, to date, there appear to be no studies that explicitly address the relationship between the PERMA model and occupation from a theoretical or conceptual perspective, which has been noted as a limitation in some works utilizing this model (Noguchi et al., 2021). Future studies should further explore the theoretical and conceptual relationships between the PERMA model and occupational therapy's own conceptual models, in order to strengthen the integration and application of positive psychology principles within the discipline.

Concluding comments

To the best of our knowledge, this is the first study to validate the factor structure of the APO-11 in a non-clinical and Spanish-speaking population using CFA, as well as to examine its convergent and discriminant validity. The Spanish version of the APO (APO-11) appears to be a reliable and valid instrument for measuring engagement in meaningful and fulfilling occupations in undergraduates. Nevertheless, further research is required to enhance the evidence base for the psychometric properties of the APO-11 and to validate this adaptation in clinical samples.

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Authors' Contributions

Teresa Mayordomo-Rodríguez: Conceptualization, Methodology, Formal Analysis, Investigation, Writing - Original Draft), Writing - Review & Editing. Adrià Marco-Ahulló: Conceptualization, Formal Analysis, Investigation, Writing - Original Draft), Writing - Review & Editing. Inmaculada Aragonés-Barberá: Conceptualization, Investigation, Writing - Original Draft), Writing - Review & Editing. César Rubio-Belmonte: Conceptualization, Methodology, Formal Analysis, Investigation, Writing - Original Draft), Writing - Review & Editing, Supervision. All authors approved the final version of the text.

Data Availability

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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Appendix A. Supplementary information.

Table Supplementary 1. Studies that have analyzed the psychometric properties of the APO.

Authors (year)	Sample		Reliability		Construct validity		Structural validity			
Version	N	Age: *Mean (SD)*	α	ω	Convergent validity	Divergent validity	χ^2	CFI	TLI	RMSEA
Noguchi & Kyougoku (2016)	716	75.36	APO 0.91			K6				
APO-15	Japanese	(12.09)	PR 0.78	NR	NR	-0.201 to -0.310	NR	0.949	0.944	0.089
			A .83							
	Older adults		M 0.76			PH				
			E 0.78			-0.378 to -0.532				
Noguchi & Kyougoku (2021)	408	52.4		*APO 0.89*	SISR-B/RAS	GHQ-12				
APO-15	Japanese	(13.05)	NR	*PR 0.74*	0.256 to 0.660	-0.206 to -0.470	NR	0.946	0.932	0.087
	SMI people			*A 0.80*						
				M 0.78						
				E 0.79						
Noguchi et al. (2023)	3003	67.41								
APO-15	Japanese	(16.63)	NR	NR	NR	NR	NR	0.971	0.966	0.063
	1184SMI/922 GI/897PI									
Özkan et al. (2024)	106	41.55	APO 0.92	APO 0.92	PWB	GHQ-12				0.091
APO-15	Turkish	*(9.09)*	PR 0.83	PR 0.83	0.583	-0.587	154.87	0.964	0.955	[0.068, 0.113]
	SMI people		A .81	A .82						
			M 0.71	M 0.72	RAS-DS					
			E 0.67	E 0.73	0.640					
Mayordomo-Rodríguez et al. (2024)	222	20.16		PR 0.64	PIL-SF	SONG-8NfM				
APO-11	Spanish Undergraduates	*(1.93)*	NR	A 0.86	0.296 to 0.615	0.006 to -0.365	NR	NR	NR	NR
				M 0.70						
				E 0.79	EMAS					
					0.271 to 0.487					
					SWLS					
					0.291 to 0.545					
					SONG-8EX					
					0.155 to 0.346					
Current study	363	20.32		APO 0.84	PIL-SF	SONG-8NfM				0.067
APO-11	Spanish	(2.21)		PR 0.76	0.249 to 0.620					
	Undergraduates		NR	A 0.083		-0.056 to -0.355	117.69	0.939	0.911	[0.054, 0.084]
				M 0.69	EMAS					
				E 0.79	0.167 to 0.487					
					SWLS					
					0.183 to 0.548					
					SONG-8EX					
					0.109 to 0.318					

Table Supplementary 2. Items of the APO-11 scale in English and translated into Spanish (Mayordomo-Rodríguez et al., 2024)

ACHIEVEMENT
APO-1 I'm motivated to fulfill the hope.
Estoy motivado/a para satisfacer mis esperanzas.
APO-2 I have a thing that you want to achieve there is a purpose.
Tengo una cosa que quiero lograr, tengo un propósito.
APO-3 I am now making efforts to accomplish my goal.
Actualmente estoy haciendo esfuerzos para lograr mis objetivos.
ENGAGEMENT
APO-7 I can tackle it concentrate in favorite activities.
Puedo abordar mis actividades favoritas de manera concentrada.
APO-8 I have the utmost living my life.
Vivo mi vida al máximo.
APO-13 I can concentrate on my hobby.
Puedo concentrarme en mis pasatiempos.
MEANING
APO-9 I live based on my beliefs.
Vivo en base a mis creencias.
APO-12 I'm working to be able to concentrate.
Trabajo para poder concentrarme.
APO-15 I have chosen the way of life of my own proactively.
He elegido mi propia forma de vida de forma proactiva.
POSITIVE RELATIONS
APO-10 When I have people who are in trouble, I want to give help immediately.
Cuando hay personas que tienen problemas quiero ayudar de inmediato.
APO-11 I feel fulfilled when I can help each other with people around me.
Me siento realizado/a cuando puedo ayudar a las personas que me rodean.

In italics items as were originally published in English by Noguchi & Kyougoku (2016, 2021). Items of the APO-11 are reproduced with permission from the Spanish adaptation authors (Mayordomo-Rodríguez et al., 2024).