

**A first study on interpersonal mindfulness profiles using the Spanish version of the
Interpersonal Mindfulness Scale**

Laura Galiana*, Javier Sánchez-Ruiz, Gabriel Vidal-Blanco, Mireia Guillén-Solà, &
Noemí Sansó*

Filiations:

Laura Galiana, Advanced Research Methods Applied to Quality of Life promotion – ARMAQoL, Department of Methodology for the Behavioral Sciences, University of Valencia, Spain.

Javier Sánchez-Ruiz, Advanced Research Methods Applied to Quality of Life promotion – ARMAQoL, Department of Methodology for the Behavioral Sciences, University of Valencia, Spain.

Gabriel Vidal-Blanco, Advanced Research Methods Applied to Quality of Life promotion – ARMAQoL, Department of Nursing, University of Valencia, Spain.

Mireia Guillén-Solà, Department of Nursing and Physiotherapy, University of Balearic Islands, Spain. Balearic Islands Health Research Institute (IDISBA), Spain.

Noemí Sansó, Department of Nursing and Physiotherapy, University of Balearic Islands, Spain. Balearic Islands Health Research Institute (IDISBA), Spain.

Corresponding authors:

Laura Galiana, laura.galiana@uv.es. Advanced Research Methods Applied to Quality of Life promotion – ARMAQoL, Department of Methodology for the Behavioral Sciences, University of Valencia, Av. Blasco Ibañez, 21, 46010 Valencia, Spain. ORCID: 0000-0002-5342-5251

Noemí Sansó, noemi.sanso@uib.es. Department of Nursing and Physiotherapy, University of Balearic Islands, 07122 Palma, Spain. Balearic Islands Health Research Institute (IDISBA), 07120 Palma, Spain. ORCID: 0000-0002-5847-9654

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Abstract

Objectives: This study aimed to: (1) present a Spanish version of the Interpersonal Mindfulness Scale (IMS), while studying its psychometric properties; and, (2) explore interpersonal mindfulness profiles, focusing on its similarities and differences when compared to previous evidence on intrapersonal mindfulness.

Methods: Cross-sectional data on 683 Spanish nursing students were gathered. Together with the IMS, participants' information on sociodemographic characteristics, intrapersonal mindfulness, positive and negative affect, dispositional hope, general self-efficacy, and resilient coping was gathered. Analyses included a sequence of confirmatory factor analyses and latent profile analysis (LPA), among others.

Results: Evidence pointed to a good fit for the four-factor with correlated factors solution, with adequate evidence of reliability. Four profiles were identified: (1) the *low mindfulness group*, with the most maladaptive psychosocial behavior; (2) the *reactingly present* group, with high levels in Presence and low in Nonreactivity, with a similar behavior to the intrapersonal *judgmentally observing* profile; (3) the *nonreactingly – not present*, with low levels of Presence and high in Nonreactivity, with a pattern of relationships close to the intrapersonal *non-judgmentally aware* profile; and (4) the *high mindfulness* profile, with the best psychosocial outcomes.

Conclusions: This study validates the IMS in Spanish and offers a reliable tool with which to measure interpersonal mindfulness. The four identified profiles present a number of similarities with those previously found in the intrapersonal mindfulness literature. We can talk of positive (*high mindfulness* and *nonreactingly – not present*)

and negative (*low mindfulness* and *reactingly present*) profiles of interpersonal mindfulness.

Key words: interpersonal mindfulness; latent profile analysis; Spain; nursing students.

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During the 21st century, there has been a growing interest in mindfulness and its benefits in Western cultures. Defined as paying attention on purpose, in the present moment, and non-judgmentally (Kabat-Zinn, 2013), the practice of mindfulness has been proved to increase empathy levels (Rimes & Wingrove, 2011), compassion for others (Nila et al. 2016), emotional competencies (Lamothe, 2016) and active listening skills (Newsome, 2006). In particular, in the context of healthcare professionals, mindfulness has been related to a reduction in the perceived levels of stress (Vonderlin et al., 2020), depression and anxiety (Fortney et al., 2013) and an increase in self-compassion (Bazarko et al., 2013). Most of this research, however, has been carried out using measures based on self-awareness (trait or dispositional mindfulness) leaving the interpersonal aspect of mindfulness aside until a few years ago.

Nevertheless, evidence supports the idea that mindfulness may have an interpersonal branch as trait mindfulness has been shown to lead to the development of more effective communication techniques (Burgoon et al., 2000), higher levels of empathy (Dekeyser et al., 2008), greater social cognition (Campos et al., 2019), and a higher perceived partner responsiveness in couples (Adair et al., 2018). In more specific settings such as parenting, greater levels of interpersonal mindfulness have been shown to predict lower levels of negative parenting behaviors (Parent et al., 2016), greater disclosure between children and their parents (Lippold, 2015), fewer internalizing and externalizing problems in the children (Han et al., 2019) and greater attunement between family members (Siegel, 2007). Therefore, interpersonal mindfulness is a natural extension of the internal process of mindful awareness from one's own

intrapersonal experience to the interpersonal aspect of daily life (Duncan, 2025; Khoury et al., 2022).

Regarding healthcare professionals, mindfulness has been related to a greater attunement to clients (Schomaker & Ricard, 2015) and may be at the base of strong therapeutic relationships between professionals and patients (Bruce et al., 2010; Siegel, 2010). Furthermore, some studies have shown that it may be highly related to the development of both an increase in compassion for others and a reduction in compassion fatigue (Bartels-Velthuis et al., 2020). This leads to the idea that, as interpersonal mindfulness is the ability to maintain awareness of self and others accompanied by a non-judgmental attitude and a non-reactive presence (Pratscher et al., 2019), it may be a prerequisite for compassionate action to occur, as compassionate behaviors require the subject not to be overwhelmed by the suffering that is taking place (Neff, 2003; Pommier et al., 2020). In this same direction, other authors suggested that mindfulness practice increases self-transcendancy, decentering of the self, and greater cognizance of the interdependence between self and others (Miller & Verhaeghen, 2022), abilities that favor the appearance of compassionate behaviors.

Based on the idea that mindfulness is an essential skill in healthcare professionals (White, 2014) and that its development enables the blooming of other basic abilities for healthcare practitioners (i.e., compassion, empathy, and a greater attunement to the patients' needs), healthcare institutions host a myriad of mindfulness-based interventions (Bartels-Velthuis et al., 2020; Cohen & Miller, 2009; Creswell, 2017; Veehof et al., 2016). One of these interventions has shown promising results (such as an increase in compassion and empathy) in healthcare professionals is the Interpersonal Mindfulness Program (IMP) by Bartels-Velthuis et al. (2020). Another example, in this case in a population of psychology graduate students, is the

Interpersonal Mindful Training (IMT) by Cohen and Miller (2009) which increased social connectedness and emotional intelligence. As the list of these programs expands over time, the need for a sound measurement that focuses on the effects of being mindful in a relational context increases, as it may serve to deepen insight into what heals and hampers the formation of interpersonal relationships (Bartels-Velthuis et al., 2020). In order to check the efficacy and efficiency of these types of interventions, the necessity for the development of reliable scales that enable researchers to share trustworthy results emerges.

To this day, some instruments have been proposed for the measurement of interpersonal mindfulness. As previously mentioned, great advances have come from the research on parenting; for example, the Interpersonal Mindfulness in Parenting Scale (IM-P) originally put forward by Duncan (2007), which has also been validated in other populations and languages such as Chinese (Lo et al., 2018), Portuguese (Moreira & Canavarro, 2017), Korean (Kim et al., 2018) or Dutch (de Bruin et al., 2014). In this case, the factors are specifically suited for the interpersonal situation of parenting, leaving five dimensions (Duncan et al., 2009): (1) listening with full awareness, (2) present-centered awareness of emotions, (3) openness, acceptance, and receptiveness, (4) self-regulation, and (5) compassion for self and others. Moreover, there are other instruments that also share this focus on parenting, such as the Mindfulness In Parenting Questionnaire (MIPQ; McCaffrey et al., 2017), conformed by two dimensions: (1) mindful discipline, and (2) being in the present with the child (McCaffrey et al., 2017).

When it comes to the more general measurements of interpersonal mindfulness, the first to appear and the most used up-to-date was the Interpersonal Mindfulness Scale (IMS) proposed by Pratscher et al. (2019). The IMS defines interpersonal mindfulness as the ability to maintain awareness of self and others accompanied by a non-

judgmental attitude and a non-reactive presence. It is composed of 27 items that measure four dimensions of interpersonal mindfulness: (1) Presence, which refers to the ability to pay attention to the present moment while interacting with another person; (2) Awareness of Self and Others, referring to noticing one's own moods and emotions and also being aware of the moods and nonverbal cues of others during interpersonal interactions; (3) Nonjudgmental Acceptance, alluding to the capacity of listening without judgment and accepting interpersonal experiences as they occur, and (4) Nonreactivity, which points to the skill of taking time to respond instead of thoughtlessly reacting to another person (Pratscher et al., 2019). Recent research has offered evidence of its adequate psychometric properties (Chalmers et al., 2021; Medvedev et al., 2020) and potential utility (Pratscher et al., 2018). These preliminary results are very encouraging as they suggest a robust four-factor structure and the possibility of using a final total score, based on a second-order factor (Medvedev et al., 2020). To date, this scale has not been translated and validated, as far as we know, in the Spanish context.

Some studies, based on previous (intrapersonal) measurements of mindfulness, have found negative relations between the dimensions of mindfulness (see, for example, Baer et al., 2006; Brown et al., 2015; Fernández et al., 2010; Roos et al., 2015). Taking into account these counterintuitive patterns of relationships, some authors have claimed for the use of person-centered analyses while studying the relationships among mindfulness facets (i.e., Lilja et al., 2013; Pearson et al., 2015).

This incipient body of literature has provided interesting results over the last ten years. For example, Pearson et al. (2015) distinguished four latent profiles of mindfulness in college students, including: (1) a *judgmentally observing* profile, high on observing but very low on non-judging of inner experience and acting with awareness,

(2) a *non-judgmentally aware* group, high on non-judging of inner experience and acting with awareness, (3) a *high mindfulness* class, and (4) a *low mindfulness* group. Bravo et al. (2016) replicated the four-class solution offered by Pearson et al. (2015), this time in two subsamples of meditators and non-meditators. These same profile shapes have been found when tested in the standardized scale scores of FFMQ in a sample of workers (Ford et al., 2020). Bravo et al. (2018) also replicated these results in college students, although profiles grouped into three in the subsample of military personnel: (1) a *non-judgmentally aware* group, high on non-judging of inner experience and acting with awareness, (2) a *high mindfulness* group, and (3) a combined *low mindfulness/judgmentally observing* group. Similarly, Gu et al. (2020) found four profiles of mindfulness in their data: the *non-judgmentally aware* group, the *high mindfulness* group, the *very low mindfulness* group, and a *moderate mindfulness* one. In comparison to previous results, the *judgmentally observing* profile was not reported. In a representative sample of Americans, Sahdra et al. (2017) found the aforementioned *judgmentally observing* and *non-judgmentally aware* profiles, together with a *moderately non-judgmental* group, characterized by slightly above-average scores in the dimension of Non-judging, and an *average mindfulness* group, with average levels of specific aspects of mindfulness. Marques et al. (2020), in turn, reduced mindfulness profiles to two: *low* and *high mindfulness* groups. More recently, Lecuona et al. (2022) have found evidence of similar profiles in a Spanish sample of attendees from a mindfulness center. However, together with the *judgmentally observing* and the *non-judgmentally aware* profiles, they only found a *general mindfulness* profile, which authors interpreted as a homogeneous profile with average levels in all facets. Their results also contradicted previous literature, insofar as the relationships of the *judgmentally observing* and *non-judgmentally aware* profiles with relevant

psychological constructs were not as expected (Lecuona et al., 2022). Finally, Stanmyre et al. (2022) reported a four-factor solution in a sample of gamblers somewhere in between the results presented by Lecuona et al. (2022) and the ones found by Gu et al. (2020): no *judgmentally observing* profile was reported, and the three classes in the results by Gu et al. (2020) study were found, together with a fourth class of *moderate mindfulness*, similar to the *general mindfulness* profile found by Lecuona et al. (2022).

We could say that, in conclusion and with regard to intrapersonal mindfulness or self-awareness, the literature supports the existence of people who maintain a stable level in the different dimensions of mindfulness, either grouped in a single cluster (*general mindfulness*; Lecuona et al., 2022), in two (*high mindfulness* and *low mindfulness* groups; Bravo et al., 2016, 2018; Ford et al., 2020; Pearson et al., 2015; Sahdra et al., 2017), or in three profiles (*low*, *moderate*, and *high mindfulness* groups; Stanmyre et al., 2022), in addition to the existence of two patterns in which some dimensions are more prevalent (high scores are found) than others (low scores are found), which would be, in this case, the *judgmentally observing* (Bravo et al., 2016, 2018; Ford et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017) and the *non-judgmentally aware* profiles (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017). Nevertheless, the psychometric properties of these latest profiles remain unclear (Lecuona et al., 2022). However, although the literature on mindfulness profiles is increasingly abundant, we have not been able to find any evidence regarding possible interpersonal mindfulness profiles.

Taking into account the hitherto exposed, this study had two main aims. The first one was to develop and validate a Spanish version of the Interpersonal Mindfulness Scale (IMS; Pratscher et al., 2019), while studying its psychometric properties. The

second, to explore, for the first time, interpersonal mindfulness profiles, focusing on their similarities and differences when compared to previous evidence on intrapersonal mindfulness, and studying profiles relations with demographic characteristics, a measure of general mindfulness and mindfulness-related psychological outcomes.

Methods

Translation and adaptation procedure

For the translation of the Interpersonal Mindfulness Scale (IMS; Pratscher et al., 2019) into Spanish, we used the forward and backward translation process. First, the scale was translated into Spanish by a professional native speaker; it was then translated back into English by another native professional speaker. The final version was revised by four experts in Psychometrics, Nursing and Mindfulness.

Study design and setting

The study is part of a larger research project that has a longitudinal design. In this research project, the 2021-2022 and 2022-2023 classes of nursing students are assessed after the end of the course in each year of the Nursing Degree (first, second, third, and fourth year). For this specific study, cross-sectional data of first-year nurses were used.

Nursing students in their first year of training at the University of Valencia and the University of the Balearic Islands (Spain) were encouraged to participate. Participants' involvement was entirely voluntary. They were accessed via the universities' list of registered students. For inclusion, the participants had to be nursing students in their first year of the Degree in Nursing. The students filled out the questionnaire online in approximately 20 minutes. Participants were not offered any

form of compensation or credit for their participation. Data were gathered in May 2022 and May 2023.

Participants

Raosoft® software was used to calculate the minimum sample size needed in order to adequately represent the nursing student population from the two participating universities. The population of the first year of Nursing students was calculated to be $n = 892$, with a confidence interval of 95% ($\alpha = 5\%$) with an error limit of 5%, and $p = q = 0.50$, the number of elements of the sample to obtain was $n = 269$.

For this specific study on the psychometric properties of the IMS, we also calculated the sample size required for a confirmatory factor analysis. The calculation was based on the original structure, given the number of observed (27) and latent variables in the model (4 first-order and 1 second-order latent variables), the anticipated effect size (0.50), and the desired probability and statistical power levels (0.05 and 0.90, respectively). For this purpose, we used Daniel Soper's Free Statistics Calculator version 4.0. The recommended minimum sample size was $n = 129$.

The final sample was composed of 683 nursing students. 54.8% ($n = 374$) were University of Valencia students, and 45.2% ($n = 309$) were students of the University of the Balearic Islands. 83.5% ($n = 570$) were women. The mean age was 22.74 ($SD = 7.65$) years old. The majority of the students were not working at the time of the survey (70.4%, $n = 481$). 13.5% ($n = 92$) were working as healthcare professionals. For more details, see Table 1.

INSERT HERE TABLE 1, PLEASE

Variables and measures

For the present study, we used participants' information on sociodemographic characteristics, including: (a) gender, with three response categories: women, men,

other; (b) age; (c) University, with two categories: University of Valencia University of the Balearic Islands; (d) job, with three categories: unemployed, part-time job, full-time job; and (e) healthcare professional, with two answers: yes, or no.

Interpersonal mindfulness was assessed using the Spanish version of the IMS (Pratscher et al. 2019). This is a 27-item self-report measure of four dimensions of interpersonal mindfulness: Presence, Awareness of Self and Others, Nonjudgmental Acceptance, and Nonreactivity. Items score on a 5-point Likert scale of 1 (*almost never*) to 5 (*almost always*). Negatively-worded items (5, 10, 13, 17, and 21) were reverse-coded prior to data analysis.

For the assessment of intrapersonal mindfulness, the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006), in its Spanish version (Pérez-Verduzco & Lacarocena, 2017) was used. The FMI is a 14-item scale, assessing a general factor of mindfulness. Responses were made on a Likert-type scale and ranged from 1 (*almost never*) to 4 (*almost always*). Reliability estimates in this sample were $\alpha = 0.84$ and $\omega = 0.88$.

For positive and negative affect assessment, we used the Positive and Negative Affect Scales (PANAS; Watson et al., 1988) in its Spanish version (López-Gómez et al., 2015). It consists of two 10-item mood scales. Responses were made on a Likert-type scale and ranged from 1 (*very slightly or not at all*) to 5 (*very much*). Estimates of reliability in this sample were $\alpha = 0.88$ and $\omega = 0.91$ for the positive affect, and $\alpha = 0.84$ and $\omega = 0.86$ for the negative one.

Hope was measured using the Dispositional Hope Scale (DHS; Snyder et al., 1991) in its Spanish version (Galiana et al., 2015). The DHS is a 12-item instrument, with 8 items measuring abilities to identify feasible ways to goals, attainment measuring

motivations for pursuing goals, and 4 filler items. Items score from 1(*definitely false*) to four (*definitely true*). Estimates of reliability in this sample were $\alpha = 0.75$ and $\omega = 0.81$.

The scale used to measure general self-efficacy was the 5-item GSE scale (GSES; Tambs and Røysamb, 2014) in its Spanish version (Galiana et al., 2024). This scale is formed by 5 items that assess general self-efficacy. The 5-item GSE has four response categories: *not at all true* (1), *hardly true* (2), *moderately true* (3), and *exactly true* (4). For the total score, a mean score of the 5 items needs to be calculated. Estimates of reliability in this sample were $\alpha = 0.73$ and $\omega = 0.80$.

Finally, resilient coping was measured with the Brief Resilience Coping Scale (BRCS; Sinclair & Wallston, 2004), in its Spanish version (Tomás et al., 2012). Its items describe an effective, active problem-solving coping pattern that reflects a resilient coping behavior tendency. Examples of its items are “*I look for creative ways to alter difficult situations*” (Item 1) or “*I actively look for ways to replace the losses I encounter in life*” (Item 4). Items are scored on a four-point Likert-type scale, from 1 (*not at all true for me*) to 4 (*very true for me*). The total score is the mean of the 4 items on the scale. Estimates of reliability in this sample were $\alpha = 0.57$ and $\omega = 0.65$.

Data analysis

Before other statistical analyses, descriptive statistics for the items and the total scores of the Spanish version of the Interpersonal Mindfulness Scale were calculated. These included means, standard deviations, minimum and maximum scores, skewness and kurtosis. All the values for univariate skewness and kurtosis for all the variables analyzed were satisfactorily within conventional criteria for normality (−3 to 3 for

skewness and –10 to 10 for kurtosis), according to the guidelines suggested by Kline (2023).

To achieve Aim 1 of the study, “*to present a Spanish version of the Interpersonal Mindfulness Scale, while studying its psychometric properties*”, we studied the internal structure of the Spanish version of the IMS together with its reliability. For the study of the internal structure, we used a sequence of models, including three confirmatory factor analyses that were hypothesized, estimated and tested. A first one-factor model was hypothesized, in which a single latent factor of interpersonal mindfulness explained the 27 items of the scale, based on recent evidence pointing to a unidimensional structure for the IMS (Medvedev et al., 2020). A second structure was tested, in which the four-correlated factors of interpersonal mindfulness proposed by Pratscher et al. (2019) were hypothesized: (1) *Presence*, explaining items 2, 5, 10, 13, 17, 21, and 25; (2) *Awareness of Self and Others*, explaining Items 1, 7, 15, 16, 18, 19, 23, 24, 26, and 27; (3) *Nonjudgmental Acceptance*, explaining Items 3, 9, 14, and 20; and (4) *Nonreactivity*, which explained Items 4, 6, 8, 11, 12, and 22 (Pratscher et al., 2019). Finally, also based on the work of Pratscher et al. (2019), a simpler structure was tested. This latest model hypothesized a second-order factor of interpersonal mindfulness that explained the four factors mentioned above.

To assess the models’ overall fit, several criteria were used: the chi-square statistic (χ^2), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). CFI values above 0.90 (better over 0.95) and SRMR and RMSEA values below 0.08 (better under 0.06) were indicative of good fit (Hu & Bentler, 1999; Perry et al., 2015). Particular relationships within the model were also examined, including factor loadings and correlations between factors. In addition, following the recommendations of Kline

(2023), modification indices were checked to ensure the absence of cross-loadings and unmodeled relationships, as well as a visual inspection of the residuals.

Model comparison was done using delta indices. Specifically, differences between models' CFI were calculated. CFI differences of 0.05 or less (Little, 1997) or 0.01 or less (Cheung & Rensvold, 2002) can be interpreted as negligible. Each model was compared to the simpler one: the second-order factor model was compared to one-factor model in terms of Δ CFI, and the four-factor with correlated factors model was compared to the second-order factor model.

The models were estimated using the weighted least squares mean and variance adjusted (WLSMV) estimation method, according to the ordinal nature of the data (Flora & Curran, 2004; Muthén & Muthén, 2017).

Once the internal structure of the scale was evidenced, estimates of reliability were calculated. For this purpose, both Cronbach's alpha and McDonald's omega were calculated. Additionally, evidence of convergent validity was gathered, calculating Pearson correlations between the IMS and the FMI scores. Finally, discriminant validity was examined by calculating zero-order correlations between the IMS subscales with intrapersonal variables.

In order to achieve Aim 2, *“to explore, for the first time, interpersonal mindfulness profiles, focusing on their similarities and differences when compared to previous evidence on intrapersonal mindfulness, and studying profile differences in gender distribution, a measure of general mindfulness and mindfulness-related psychological outcomes”*, we applied latent profile analysis (LPA; Williams & Kibowski, 2016) to the interpersonal mindfulness dimensions. An LPA is a variant of cluster analysis (Nylund et al., 2007) used to examine similarities and differences between individuals in relation to a number of quantitative variables. We estimated

several solutions, and the number of profiles retained were based on both statistical criteria and theoretical interpretability. The statistical criteria included (Spurk et al., 2020; Tein et al., 2013): (1) information criteria, including the Akaike Information Criterion (AIC), the Bayesian Information Criteria (BIC), and the sample size—adjusted BIC (ABIC), and with smaller values indicating a better fit; (2) entropy, an index assessing accuracy, ranging from 0 to 1 (perfect accuracy), with values above 0.70 considered reasonable and values above 0.80 deemed good (Clark & Muthén, 2009); (3) mean posterior assignment probabilities (with values of 0.70 or higher considered optimal (Nagin, 2005); (4) the Lo–Mendell–Rubin (LMR) statistical test (Lo et al., 2001), which was used to compare the improvement between neighbouring class models (i.e., two vs three classes, three vs four classes, and so forth) (statistically significant results indicate that the extra class improves adequacy) (Muthén & Muthén, 2017); and (5) the examination of the proportion of classified participants, favouring those models that encompassed 5% of the sample or more (Nagin, 2005). In addition to these statistical criteria, the selection of the number of profiles remains subjective and requires theoretical justifications, making the interpretability of the results of utmost importance (Lukočienė et al., 2010). For this purpose, we considered previous literature on (intrapersonal) mindfulness latent profiles (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017; Stanmyre et al., 2022). LPA models were explored using the robust (full information) maximum likelihood estimation (MLR) method, an estimation procedure for handling missing data using all available data points (Little et al., 2014).

Once a solution for the profiles was settled, individuals were assigned to the latent profile where their membership had the highest probability. For the interpretation of the profiles, we inspected the content of the single profiles and conducted a

multivariate analysis of variance (MANOVA) comparing the centered means of the different dimensions of interpersonal mindfulness across profiles. Labels to the identified profiles were assigned.

Finally, we gathered evidence of criterion-related validity of the profiles. For this purpose, we first conducted two chi-squared tests; the first one studied the existence of differences in gender distribution; whereas the second tested distributions of the profiles in terms of previous experience as healthcare professional. Then, we performed an analysis of variance (ANOVA) to study age differences across the profiles. Finally, we compared the profiles in terms of several mindfulness-related outcomes, including: intrapersonal mindfulness, positive and negative affect, dispositional hope, general self-efficacy, and resilient coping. For this purpose, we calculated several ANOVAs and a MANOVA. For the statistical analyses, SPSS version 28 (IBM Corp, 2021) and Mplus version 8.10 (Muthén & Muthén, 2017) were used.

Results

Spanish version of the Interpersonal Mindfulness Scale

The Interpersonal Mindfulness Scale was translated into Spanish. The forward-backward translation process was used: first, the scale was translated into Spanish by a native-speaking professional; it was then translated back into English by another native professional speaker. No differences were found. The final version was revised by four experts in Psychometrics, Nursing and Mindfulness, who agreed on the adequacy of item content on the Spanish version of the Interpersonal Mindfulness Scale. The resulting Spanish version of the scale can be consulted in Table 2.

INSERT HERE TABLE 2

Descriptive statistics

Once the scale was translated, we first calculated descriptive statistics for the items of the IMS. The lowest mean was found for Item 10 ($M = 2.93$, $SD = 0.98$), whereas the highest one was for Item 3 ($M = 4.25$, $SD = 0.77$). All items scored above the midpoint of the scale (3), except for Item 10. Values of skewness and kurtosis were adequate. More details can be consulted in Table 2.

Psychometric properties of the Spanish version of the Interpersonal Mindfulness Scale

When the different models' fits were studied, the one-factor model was discarded, as its fit was not acceptable (see Table 3). When the second-order model and the four-correlated factor with correlated factors were compared, negligible CFI differences were found, with the latter showing adequate fit, whereas the second-order model factor showed no adequate fit. We also examined the correlation values among factors, which ranged from 0.17 to 0.71 (see Table 4). Indeed, they were very low for the correlation between Presence and Nonreactivity, and quite low for the correlation between Presence and Awareness of Self and Others, and Presence and Nonjudgmental Acceptance. Taking this evidence into account, the four-factor with correlated factors model was retained as the best structure to represent the Spanish version of the IMS internal structure.

INSERT HERE TABLE 3

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As regards the analytical fit of the four-factor with correlated factors model, correlations among factors, they were all positive and statistically significant (see Table 4). Regarding items' loadings, for Awareness of Self and Others, factor loadings ranged from 0.58 (Item 16) to 0.79 (Items 15 and 23); for Presence from 0.21 (Item 10) to 0.75 (Item 21); for Nonjudgmental Acceptance from 0.59 (Items 14 and 20) to 0.73 (Item 9);

and for Nonreactivity from 0.55 (Item 4) to 0.79 (Item 12) (see Table 2). Therefore, the analytical fit was considered adequate, except for Item 10, which showed a poor performance. As regards the modification indices, two cross-loadings emerged, both referred to Item 10. Specifically, they pointed out Item 10 loading in the factor of Nonjudgmental Acceptance and also in Nonreactivity. However, we decided not to include these modifications due to several reasons. Firstly, there is consensus in the SEM methodological literature that advocates not to make modifications if pre-specified fit criteria have been met (Bollen 1989; Byrne, 1989; Kline, 2011; MacCallum et al., 1992). As the four-correlated factor models presented a CFI value of 0.90 and SRMR and RMSEA values of or below 0.08, we interpreted the model's fit as appropriate. Secondly, modification indices were mostly related to Item 10. Item 10, "*I find myself listening to someone with one ear while doing something else at the same time*", is a reversed item, and there is a vast amount of literature that points that the use of reversed items may affect the factorial structure of measures and usually leads to a poor fit of the expected model (Danner et al., 2015; Navarro-González et al., 2016; Soto et al., 2008). Finally, and specifically regarding the modification indices reported, it is widely known that cross-loadings also vary due to sampling error. Consequently, we did not make any modifications to the retained four-factor model.

To study the reliability of the Spanish version of the Interpersonal Mindfulness Scale, Cronbach's alpha and McDonald's Omega were used. Reliability estimates showed that all the dimensions displayed adequate levels, except for the value of Cronbach's alpha in the dimension of Nonjudgmental Acceptance. However, as the Omega value for this dimension exceeded 0.70, and Cronbach's alpha is sensitive to the number of items, overall, we considered the evidence of reliability gathered to be

adequate for the Spanish version of the Interpersonal Mindfulness Scale. The estimates can be consulted in Table 4.

Regarding evidence of convergent validity, Pearson correlations between FMI and IMS scores were positive and statistically significant. Specifically, the lower correlation was found for the dimension of Presence, followed by the correlation with Nonjudgmental Acceptance, next was Awareness of Self and Others, and the highest value was for the correlation between FMI and Nonreactivity scores (see Table 4).

Finally, discriminant validity was examined by calculating zero-order correlations between the IMS subscales with intrapersonal variables. Results pointed out a pattern of positive and statistically significant relations between the IMS dimensions and positive affect, dispositional hope, self-efficacy and resilient coping, except for specific cases, such as the correlation between Presence and resilient coping, which resulted non-significant. In this same line, correlations between IMS dimensions and negative affect were negative, but only statistically significant for the dimensions of Presence and Awareness of Self and Others. For specific details, see Table 4.

Identification of latent profiles of interpersonal mindfulness

We investigated the fit statistics for solutions with one to six interpersonal mindfulness profiles (Table 5). Entropy values and mean posterior assignment probabilities were adequate for all the tested solutions. According to the information criteria, the six-profile solution was the best fitting one, as it showed the lowest BIC-value. However, the LMR showed no improvement of this model compared to the five-profile solution, so this model was discarded. Thus, we considered the five-profile solution, which was better when compared to the four-profile solution in terms of information criteria, and a non-significant adjusted LMR-test when compared to the six profiles. However, the

proportion of classified participants showed a class with only two subjects, well below 5% of the sample, as recommended by Nagin (2005).

When the four-profile model was examined, it showed smaller values of information criteria when compared to one-, two- and three-profile solutions, adequate value of entropy (above 0.70), adequate mean posterior probabilities (above 0.80), the LMR showed improvement of this model compared to the three-profile model, and an adequate proportion of classified participants was found. In addition to these statistical criteria, the selection of the number of profiles was also theoretically driven to enhance the interpretability of the results (Lukočienė et al., 2010). For this purpose, we considered previous literature on (intrapersonal) mindfulness latent profiles (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017; Stanmyre et al., 2022), which pointed to the existence of a *high mindfulness* and a *low mindfulness* groups (Bravo et al., 2016, 2018; Ford et al., 2020; Pearson et al., 2015; Sahdra et al., 2017; Stanmyre et al., 2022), together with two specific patterns in which some dimensions were more prevalent than others, the *judgmentally observing* (Bravo et al., 2016, 2018; Ford et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017) and the *non-judgmentally aware* profiles (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017). Taking into account certain similarities that we will discuss later on between previous profiles evidence and our results, together

with the aforementioned statistical criteria, the four-profile solution was retained as the best solution.

INSERT HERE TABLE 5

Interpretation of extracted profiles

For the interpretation of the profiles, individuals were assigned to the latent profile where their membership had the highest probability. Figure 1 shows the pattern of means across the latent profiles. Scores were standardized so that positive values were displayed above the mean and negative values were shown below the mean. Profile 1 comprised 24.16% of the sample ($n = 144$), and we tentatively labeled this profile the *low mindfulness group*, as they were moderately low on all facets of mindfulness ($-1.208 < z - scores < -0.611$). Profile 2 comprised 42.45% of the sample ($n = 253$) and we labeled this profile the *reactingly present group*, as they were moderately high in Presence ($z = 0.441$), but moderately low in Nonreactivity ($z = -0.289$). Profile 3 comprised 15.60% of the sample ($n = 93$) and we labeled this profile the *nonreactingly – not present group*, as they were low in Presence ($z = -1.266$) and high in Nonreactivity ($z = 0.787$). Finally, Profile 4 was formed by 17.79% of the sample ($n = 106$) and was labeled the *high mindfulness group*, as they were relatively high on every facet of mindfulness ($0.888 < zs < 1.191$). z scores for each profile are presented in Table 6.

INSERT HERE TABLE 6

We compared these scores by conducting a multivariate analysis of variance (MANOVA) comparing the centered means of the different dimensions of interpersonal mindfulness across profiles (factor). The MANOVA resulted in statistically significant: Pillai's Trace = 1.384, $F(12, 1773) = 126.529$ ($p < 0.001$), $\eta^2 = 0.461$. Follow-up ANOVAs showed significant effects of the factor *profiles* for the four dimensions of

interpersonal mindfulness (Table 7). Post hoc comparisons pointed to statistically significant results for all the analyses ($p < 0.001$), except for the dimensions of Nonjudgmental Acceptance in the *reactingly present* and the *nonreactingly – not present* profiles.

INSERT HERE TABLE 7

Criterion-related validity evidence: profile differences in gender distribution, a measure of general mindfulness and mindfulness-related psychological outcomes

Finally, evidence for criterion-related validity of the interpersonal mindfulness profiles was studied. For this purpose, we first conducted a chi-squared test to study differences in gender distribution. This chi-squared showed statistical significance ($\chi^2(3) = 11.595$, $p = 0.009$, Kramer's $V = 0.140$). The examination of the corrected standardized residuals pointed out that these differences were found between the *low mindfulness* and the *high mindfulness* profiles. This may be due to the fact that in the *low mindfulness* profile women represented 77.1% of the cases ($n_{\text{women}} = 111$, $n_{\text{men}} = 33$), in the *high mindfulness* profile women represented 92.5% of the cases ($n_{\text{women}} = 98$, $n_{\text{men}} = 8$). Then, we studied the relation between profiles distribution and previous experience as healthcare professional. Results suggested that there was no relation between these variables ($\chi^2(3) = 4.738$, $p = 0.192$, Kramer's $V = 0.089$). In this same line, no age differences were observed across interpersonal mindfulness profiles ($F(3, 592) = 0.973$, $p = 0.405$, $\eta^2 = 0.005$).

We also compared the profiles in terms of intrapersonal mindfulness. For this purpose, we used the total score in the Freiburg Mindfulness Inventory, as a dependent variable in an ANOVA. The analysis pointed out statistically significant differences in the levels of intrapersonal mindfulness across the profiles: $F(3, 592) = 32.885$, $p < 0.001$, $\eta^2 = 0.143$. All the post-hoc comparisons resulted statistically significant ($p <$

0.010), except for the one that compared the levels of intrapersonal mindfulness between the *nonreactingly – not present* and the *high mindfulness* profiles ($p = 0.158$). The descriptive statistics, which can be consulted in Table 6, pointed to the lowest levels of intrapersonal mindfulness for the *low mindfulness* profile, and the highest ones for the *high mindfulness* profile.

To compare the levels of wellbeing between profiles, we used the Positive and Negative Affect Scale. The MANOVA showed statistically significant differences in the levels of positive and negative affect across the profiles: Pillai's Trace = 0.046, $F(6, 1184) = 4.667$ ($p < 0.001$), $\eta^2 = 0.023$. Follow-up ANOVAs showed significant effects of the factor *profiles* for the two dimensions of affect (Table 7). Post hoc comparisons in positive affect pointed to statistically significant differences when the *low mindfulness* group was compared to the *nonreactingly – not present* ($p = 0.034$) and the *high mindfulness* ($p < 0.001$) groups, with the first showing the lowest scores in positive affect. For negative affect, post hoc comparisons showed statistically significant differences when the *low mindfulness* group was compared to the *reactingly present* ($p = 0.001$) and the *high mindfulness* ($p = 0.025$) groups, with the profiles of *reactingly present* and *high mindfulness* showing the lowest means in negative affect. Descriptive statistics can be found in Table 6.

When it comes to dispositional hope, the ANOVA pointed out statistically significant differences in the levels of hope across the profiles: $F(3, 592) = 16.881$, $p < 0.001$, $\eta^2 = 0.079$. All the post-hoc comparisons showed statistically significant results ($p < 0.010$), except for the ones comparing the *reactingly present* and the *nonreactingly not present* groups ($p = 0.347$) and the *nonreactingly not present* and the *high mindfulness* profile ($p = 0.228$). The descriptive statistics, which can be consulted in

Table 6, pointed to the lowest levels of hope for the *low mindfulness* profile, and the highest ones for the *high mindfulness* profile.

Similarly, the ANOVA comparing the levels of general self-efficacy across the profiles showed statistically significant differences: $F(3, 591) = 17.684, p < 0.001, \eta^2 = 0.082$. All the post-hoc comparisons were statistically significant ($p < 0.010$), except for the ones comparing the *reactingly present* and the *nonreactingly – not present* groups ($p = 0.073$) and the *nonreactingly – not present* and the *high mindfulness* profile ($p = 0.440$). The descriptive statistics, which can be consulted in Table 6, pointed out that the lowest levels of general self-efficacy were found in the *low mindfulness* profile, and the highest ones for the *high mindfulness* profile.

Finally, the ANOVA comparing the levels of resilient coping across the profiles showed statistically significant differences: $F(3, 591) = 23.997, p < 0.001, \eta^2 = 0.109$. All the post-hoc comparisons showed statistical significance ($p < 0.010$), except for the one comparing the *low mindfulness* and the *reactingly present* groups ($p = 0.228$), and the one comparing the *nonreactingly – not present* and the *high mindfulness* groups ($p = 0.089$). The descriptive statistics, which can be consulted in Table 6, pointed to the lowest levels of resilient coping in the *low mindfulness* and the *reactingly present* profiles, and the highest ones in the *nonreactingly – not present* and the *high mindfulness* profiles.

Discussion

This study aimed to: (1) validating the Spanish version of the Interpersonal Mindfulness Scale, while studying its psychometric properties; and, (2) exploring interpersonal mindfulness profiles, focusing on its similarities and differences when compared to previous evidence on intrapersonal mindfulness, deepening the knowledge about

mindfulness latent profiles. To achieve these objectives, data on 683 first-year nursing students were gathered.

In order to succeed in our first aim, evidence on the validity and reliability of the Interpersonal Mindfulness Scale was gathered. Evidence pointed to a good fit for the four-factor with correlated factors solution, with the one-factor model and the second-order model not reaching the cut-off criteria. Items' functioning was correct, except for Item 10. We believe this could be explained by three main reasons. The first one is that Item 10, "*I find myself listening to someone with one ear while doing something else at the same time*", is an inversed item, and there is a vast amount of literature that points that the use of reversed items may affect the factorial structure of measures and usually leads to a poor fit to the expected model (Danner et al., 2015; Navarro-González et al., 2016; Soto et al., 2008). Although Item 10 showed a good performance in the initial development of the IMS (Pratscher et al., 2019), previous evidence on the IMS provided by Medvedev et al. (2020), pointed to residual correlations between Items 5, 10, 13, 17, and 21 of the Presence subscale, being all of them reversed items. Thus, the low factor loading of Item 10 in its original factor, Presence, could be explained as a method artifact. Second, it is widely known that cross-loadings also vary due to sampling error, and, so, Item 10's factor loading could be explained as a deviation from the population parameters due to estimates' uncertainty introduced by sampling error. Third, this could also be a problem with the application of the scale in a Spanish context. Unfortunately, no previous studies have been developed with the Spanish version of the scale, as this is the first time it has been translated, and so we are unable to compare its functioning in other Spanish contexts. Future studies deepening on Item 10's functioning in the Spanish context would be welcomed.

As the four correlated-factor model was retained as the best representation of the data, the structure of interpersonal mindfulness, as measured with the IMS, was better represented in Spanish nursing students by the dimensions of Presence, Awareness of Self and Others, Nonjudgmental Acceptance, and Nonreactivity. Evidence of reliability for these dimensions was also adequate. These results are in line with the vast literature that has been developed in the context of the dimensions of intrapersonal mindfulness. For example, Baer et al. (2006) noted the need to distinguish between mindfulness skills when examining how different facets of mindfulness can predict different outcomes. More recently, authors have highlighted the need to differentiate between the “what” skills, which in the context of interpersonal mindfulness would include observing, describing, and acting with awareness, and the “how” skills, which could include taking a nonjudgmental stance, focusing on one thing at a time, or on what works (Iani et al., 2017, 2020). In this sense, Presence, which refers to the ability to pay attention to the present moment, and Awareness of Self and Others, referring to noticing oneself and others, can be interpersonal mindfulness “what” skills, as they concern attending to experience as it unfolds in the present moment. In comparison, Non-judgmental Acceptance and Nonreactivity would be interpreted as “how” skills, as they refer to how individuals are mindful, that is, by not judging and not reacting to actions as they occur. These differential skills measured by the dimensions of mindfulness, and their consequent pattern of relationships, is one of the most important reasons why literature has pointed to the need to approach the study of mindfulness from a person-centered perspective. This moves us to our second goal, the study of interpersonal mindfulness profiles.

As regards evidence of convergent validity, the IMS was positively related to a measure of intrapersonal mindfulness, that is, the FMI. Although correlations were low

to medium in size, values were close to those found in the original validation carried out by Pratscher et al. (2019), when IMS scores were related to the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) The pattern observed was, however, a little different, insofar as in our study Presence was the dimension with less relation when it comes to intrapersonal mindfulness, while it was the closest related in the results presented by Pratscher et al. (2019). The rest of the correlations showed quite similar results.

When it comes to discriminant validity, the IMS dimensions showed low to medium positive correlations with dispositional hope, general self-efficacy, resilient coping, and positive affect, and some negative correlations with negative affect. The relation between (intrapersonal) mindfulness and constructs such as hope, self-efficacy and resilience has been widely studied, even in nursing students' samples. For example, Benada and Chowdhry (2017) found a low statistically significant relation between mindfulness and resilience in nursing students, in line with the ones found here. In this same line, Lin et al. (2019) found an increase in the levels of nurses' resilience after a mindfulness-based intervention. Also, Elnehray and Zewiel (2021) have found an increase in both levels of resilience and hope after the practice of mindfulness, this time in nursing professionals. As regards self-efficacy, evidence has also pointed out how mindfulness interventions can enhance this skill in nursing college students (Soleimani et al., 2021; Yeom & Choi, 2013). Regarding affect, a positive relation between mindfulness and positive affect has also been previously reported in nurses (Lin et al., 2019, 2020), and a decrease in negative affect after a mindfulness intervention has been observed (Lin et al., 2019). In all, we could say evidence of discriminant validity of the Spanish version of the IMS was gathered.

To achieve this second aim, we applied a latent profile analysis. The results pointed to a four-profile solution to better represent the subgroups of interpersonal mindfulness in the sample. This first depiction of interpersonal mindfulness profiles is compatible with the results previously found in the literature on intrapersonal mindfulness. The first profile, labeled *low mindfulness group*, consisted of people with moderately low levels in all facets of mindfulness. This profile has been recurrently found in the literature on intrapersonal mindfulness (Bravo et al., 2016; Ford et al., 2020; Gu et al., 2020; Marques et al., 2020; Pearson et al., 2015), and has been associated with poorer emotional outcomes (Pearson et al., 2015) and well-being (Ford et al., 2020).

The second profile, the *reactingly present* group, was characterized by moderately high levels of Presence, but moderately low on Nonreactivity. Taking into account previous research on “what” and “how” skills of intrapersonal mindfulness, this profile would consist of people with high levels of the “what” interpersonal mindfulness skills, and low levels of the “how” ones. It is not easy to find its counterpart among the profiles found in the literature on intrapersonal mindfulness, since Nonreactivity has not arisen as a dimension with value to discriminate between profiles, and *Presence* does not have a matching dimension in the FFMQ. However, as this profile is combined with a high “what” skill + a low “how” skill, the most similar one in the literature would be the *judgmentally observing* profile (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Marques et al., 2020; Pearson et al., 2015; Sahdra et al., 2017; Stanmyre et al., 2022), except for the obvious differences in the conforming dimensions. With that settled, we could expect from *reactingly present* people a less adaptive profile on mindfulness-related constructs, such as psychological flexibility,

decentering, self-regulation, depressive symptoms, or anxiety symptoms (Bravo et al., 2016, 2018).

When it comes to the third profile, we labeled it as the *nonreactingly – not present*, and it consisted of people with low levels of Presence and high in Nonreactivity. Considering that, again, the Nonreactivity dimension has never been a differentiating element in previous studies conducted with the FFMQ on intrapersonal mindfulness profiles, and that the Presence dimension has no equivalent in those studies, we have advocated the same argument to interpret this third profile: the combination of “what” and “how” skills, which, on this occasion, leaves us with a low “what” skill + a high “how” skill combination. Unfortunately, no such profile exists as such in the intrapersonal mindfulness literature either, and the closest one to it is the *non-judgmentally aware* profile (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Lecuona et al., 2022; Pearson et al., 2015; Sahdra et al., 2017), which combines high scores in a “how” skill with also high levels on a “what” skill. However, although named the *non-judgmentally aware*, the truth is that this profile includes low levels of Observing and Describing, that is, low levels in the remaining “what” skills (i.e., Bravo et al., 2016, 2018; Pearson et al., 2015). A deeper look when comparing the dimensions of Observing (FFMQ) and Presence (IMS) shows some similarities that both mindfulness dimensions share regarding attentional control. For example, the dimension of Observing is measured with items such as “*I pay attention to sensations, such as the wind in my hair or sun on my face*”, “*I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing*”, or “*I pay attention to how my emotions affect my thoughts and behavior*”, whereas the dimension of Presence is also measured with items regarding paying attention, this time to the interpersonal situations: “*When interacting with someone I know, I am often on autopilot, not really paying attention to what is*

actually happening in the moment” (reversed item), “*When I am with others, I am easily distracted and my mind tends to wander*” (reversed item), or “*Rather than being distracted, it is easy for me to be in the present moment while I am interacting with another person*”. Indeed, evidence gathered in a variable-centered context has pointed out how mechanisms of mindfulness such as attentional control and awareness, more related to the definition of Presence proposed by Pratscher et al. (2019) (the ability to pay attention to the present moment while interacting with another person), are primary mechanisms in the development of mindfulness, while the non-reactivity is a further step for the achievement of a final non-attachment (Cebolla et al., 2018). Taking into account this information, and the fact that previous intrapersonal mindfulness profiles pointed the *non-judgmentally aware* group had a more adaptive profile on the mindfulness-related constructs, although still less adaptive than the high mindfulness group (Bravo et al., 2016, 2018; Pearson et al., 2015), we could expect from the *nonreactingly – not present* profile more adaptive psychological health outcomes (Bravo et al., 2016, 2018; Pearson et al., 2015).

Finally, the latest interpersonal mindfulness profile was the *high mindfulness* one, which was characterized by relatively high scores on every facet of interpersonal mindfulness. This interpersonal mindfulness profile has been repeatedly found in the literature on intrapersonal mindfulness (Bravo et al., 2016, 2018; Ford et al., 2020; Gu et al., 2020; Marques et al., 2020; Pearson et al., 2015; Stanmyre et al., 2022), and has been associated with the most adaptive emotional outcomes (Bravo et al., 2016, 2018; Pearson et al., 2015).

In order to deepen the knowledge about mindfulness latent profiles, we studied their relationships with gender, age, previous healthcare work experience, a measure of general mindfulness and mindfulness-related psychological outcomes. Results pointed

to different distributions of the profiles across genders, with the *high mindfulness* profile showing a higher proportion of women when compared to the *low mindfulness* one. This somewhat contradicts previous intrapersonal mindfulness literature, as in most of the existing studies, gender differences in mindfulness are not found (Brown & Ryan, 2003; Catak, 2012; De Petrillo et al., 2009; MacKillop & Anderson, 2007). Some other studies, however, have found some gender differences, albeit with disparities. For example, in a variable-centered context, Chinese females have shown higher scores in Describing and Observing than males, while the latter had higher scores in Nonreactivity to inner experience (Gan et al., 2023). In a Bosnian sample, Alispahic and Hasanbegovic-Anic (2017) found gender differences in Observing, again favoring women, and Acting with awareness, in which men obtained higher scores. If our interpretation of the mindfulness profiles stands, that is, if the *reactingly present* group can be somehow assimilated to the intrapersonal *judgmentally observing* profile, as this is formed by a high “what” skill + a low “how” skill, and according to results found by Gan et al. (2023) and Alispahic and Hasanbegovic-Anic (2017), we could expect a higher proportion of women, which has not been found. In the same vein, for the *nonreactingly – not present* profile, as it represents a low “what” skill + a high “how” skill combination, and again according to results found by Gan et al. (2023) and Alispahic and Hasanbegovic-Anic (2017), we could expect a higher proportion of men in this profile, which was neither found. What we found in our results was, however, different distributions of the profiles across genders, with the *high mindfulness* profile showing a higher proportion of women when compared to the *low mindfulness* one. An explanation for such results may be that our focus has been interpersonal mindfulness, and that this relates our internal process of mindful awareness to interpersonal relations. In this context, literature has pointed out several gender differences in interpersonal

mindfulness-related variables. For example, regarding compassion and compassionate care, literature has suggested different compassionate paths for the different genders (Yarnell et al., 2015). Yet in 1995, Beutel and Mooney found gender differences in compassion: they found that women were more likely than men to express concern and responsibility for the well-being of others (Beutel & Mooney, 1995). Women have also been found to be more empathic in conflict-resolution situations, whereas men manifest a lower activation of brain areas related to empathy when they observe a painful stimulus received by a person known to be unfair (de Wied et al., 2007). Indeed, there have also been found differences in women's and men's brain activation during compassion (Mercadillo et al., 2011). Thus, as interpersonal mindfulness involves the figure of the other, these differential gender behaviors in empathy and compassion could also affect the capacity of awareness of others (Luders et al., 2015). This is, however, a simple theorization. It should be kept in mind that these are the first results in this matter, so we will have to wait for further work focusing on this relation.

As for the other demographic variables, age and previous experience as a healthcare professional, results showed no differences across interpersonal mindfulness profiles. However, it must be taken into account the sample's homogeneity in both these two variables: most of the students were young, and most of them had no experience as healthcare professionals. Thus, future studies in more diverse samples should provide more accurate insight into this regard.

Regarding intrapersonal mindfulness, results pointed to lower levels of mindfulness for the *low mindfulness* group, followed by the *reactingly present* profile, with the *nonreactingly not present* and the *high mindfulness* groups showing the higher means. The only study that has previously delved, albeit in a limited way, into this relationship is that of Leucona et al. (2022), which compared the level of mindfulness,

as measured with the Self-Compassion Scale, across the profiles. These authors found higher scores of mindfulness for the *judgmentally observing* profile, followed by the *non-judgmentally aware* profile, whereas the lowest ones were for the *general mindfulness* group, which was characterized by medium or average levels in the different facets of mindfulness. Despite the differences between the profiles found in the two studies, our results are contradictory to those found by Lecuona et al. (2022), as the most similar profile to the *judgmentally aware* would be the *reactingly present* group, which has shown lower levels of intrapersonal mindfulness, when compared to the *nonreactingly – not present* profile. In this sense, the authors themselves pointed out that their results in the *judgmentally observing* group were surprising and showed a pattern of relationships different from that reported in previous literature (Lecuona et al., 2022). Be that as it may, what our results show is that, in the case of interpersonal mindfulness, it appears that the *low mindfulness* profile would be that of lower interpersonal mindfulness, the *reactingly present* group would be the one with average levels, and the *nonreactingly – not present* and the *high mindfulness* groups would be those with higher levels of intrapersonal mindfulness.

Finally, when it comes to the mindfulness-related psychological outcomes, results show that, in general, the *high mindfulness* profile was characterized by the best psychological outcomes, followed by the *nonreactingly – not present* group, and then the *reactingly present* group, whereas the *low mindfulness* profile presented the worst mindfulness-related outcomes. These results confirm the interpretations that have been made of the different profiles found in response to our second aim: whereas the *low mindfulness* and the *reactingly present* groups are somehow related to less adaptive profile on mindfulness-related constructs (Bravo et al., 2016, 2018; Ford et al., 2020; Pearson et al., 2015), the *high mindfulness* and the *nonreactingly – not present* profiles

are associated with the most adaptive psychological outcomes (Bravo et al., 2016, 2018; Pearson et al., 2015). However, the differences between the *reactingly present* and the *nonreactingly – not present* groups are not always clear: particular results that contradict this pattern have been evidenced, as is the case of the lower level of negative affect for the *reactingly present* profile. When levels of affect have been studied across mindfulness profiles in the intrapersonal mindfulness literature, these differences in negative affect have not been found, although higher levels of positive affect have been found for the *judgmentally observing* when compared to the *nonjudgmentally aware* group (Fort de al., 2020). In this sense, we take up the idea of the authors themselves who indicate that the differences between these two profiles are not at all clear and could be due to random chance (Ford et al., 2020), thus indicating a lack of criterion-related validity of these two profiles.

Conclusions

In conclusion, this study validates the IMS scale in Spanish and offers a reliable tool with which to measure interpersonal mindfulness using a four-dimensional perspective, as well as allowing us to explore how student nurses manage interpersonal mindfulness during their placements. The first contribution of this study to the field of nursing is that it will facilitate the use of a robust, psychometric measurement of interpersonal mindfulness amongst nursing students, which may be a prerequisite for compassionate action to take place (Neff, 2003; Pommier et al., 2020). The second contribution is related to the study of interpersonal mindfulness profiles. Four profiles have been found, which present a number of similarities with those previously found in the intrapersonal mindfulness literature. Taking into account evidence on criterion-related validity of the profiles, we could refer to positive (*high mindfulness* and *nonreactingly – not present*) and negative (*low mindfulness* and *reactingly present*) profiles of

interpersonal mindfulness, and even perform some type of sorting in their degree of relation to adaptive psychological outcomes. In this way, the present work enables researchers to perform future interpersonal mindfulness interventions from a person-centered approach, by focusing on those interpersonal mindfulness skills that show lower performance in each of the profiles. However, the results on interpersonal mindfulness profiles are still tentative, and we are uncertain the extent to which this approach is more enriching than the traditional variable-centered perspectives.

Finally, considering current results, it will now be possible to explore how nursing students manage interpersonal mindfulness in a more robust and reliable way, using the IMS. One area that would benefit from deeper research is the study of the four dimensions of interpersonal mindfulness in different cultural contexts. As this is the first study to focus on interpersonal mindfulness profiles, their research in other populations could help us to better understand the results presented in this research.

Limitations and Future Research

This research has several limitations. Among them, the use of the FMI as a measure of intrapersonal mindfulness in a mindfulness-naïve sample. Taking into account the results provided by Belzer et al. (2013), participants could have had comprehension problems with some items, which could consequently affect the results regarding these scores. Thus, additional insights on the relationships between interpersonal and intrapersonal mindfulness, both in terms of evidence of convergent validity of the Spanish version of the IMS, and also in terms of criterion-related validity evidence of the interpersonal mindfulness profiles, would be welcomed. A second limitation would be the cross-sectional nature of the study, which limits our capacity to establish causal interpretations, stands out. In this sense, future studies could explore how these interpersonal mindfulness profiles perform over time. Along the same line, it would be

interesting to see how different profiles respond to the different interventions on interpersonal mindfulness that are currently being developed, such as the IMP or the IMT. Another shortcoming of the present study is the fact that we gathered data from nursing university students. Whereas this is not a limitation in terms of profiles interpretability, as scientific evidence used to interpret our results had been collected in similar samples of college students (i.e., Bravo et al., 2016, 2018; Pearson et al., 2015), it could have an impact on the generalizability of our results to other populations. In this line, future studies should assess the Interpersonal Mindfulness Scale's psychometric properties in the general population, and what extent these interpersonal mindfulness profiles may be specific to healthcare students. Also, evidence on criterion-related validity is limited, and important interpersonal constructs, such as empathy or communication are missing. Future research would benefit from including such variables and studying how they affect or are affected by the different interpersonal mindfulness profiles. Another key limitation to take into account when using the Spanish version of the IMS is the poor performance reported for Item 10. Researchers and clinicians must be aware of the evidence gathered on this item and are welcomed to provide new insights on this line. Finally, we have used the original 27-item version of the scale. To this date, there are two shortened versions: the 17-item and 13-item versions (Pratscher et al., 2022). Future studies should test these versions in the Spanish population.

Declarations

Conflict of Interest

The authors declare no conflict of interests.

Ethics Approval

The study was approved by the Ethics Committee in Experimental Research of the University of Valencia (code 2581819) and the Ethics Research Committee of the University of the Balearic Islands (code 263CER22). Students participated voluntarily and anonymously. The study complied with the ethical principles for research in health sciences established in the Declaration of Helsinki (World Medical Association, 2013).

Informed Consent

The participants signed an informed consent document to authorize the collection and processing of their personal information, and they were able to withdraw their consent at any time and without any consequences.

Author Contributions

Laura Galiana: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing.

Javier Sánchez-Ruiz: Data curation, Formal analysis, Writing - original draft, and Writing - review & editing.

Gabriel Vidal-Blanco: Investigation, Writing - review & editing.

Mireia Guillén-Solà: Investigation, Writing - review & editing.

Noemí Sansó: Conceptualization, Funding acquisition, Investigation, Project administration, Resources, Supervision, Validation, Visualization, Writing - review & editing.

Data availability

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

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Use of Artificial Intelligence

No generative AI tools were used in the writing of this manuscript.

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Figure 1.

Depiction of the four latent profiles defined by pattern of standardized means on the four facets of interpersonal mindfulness.

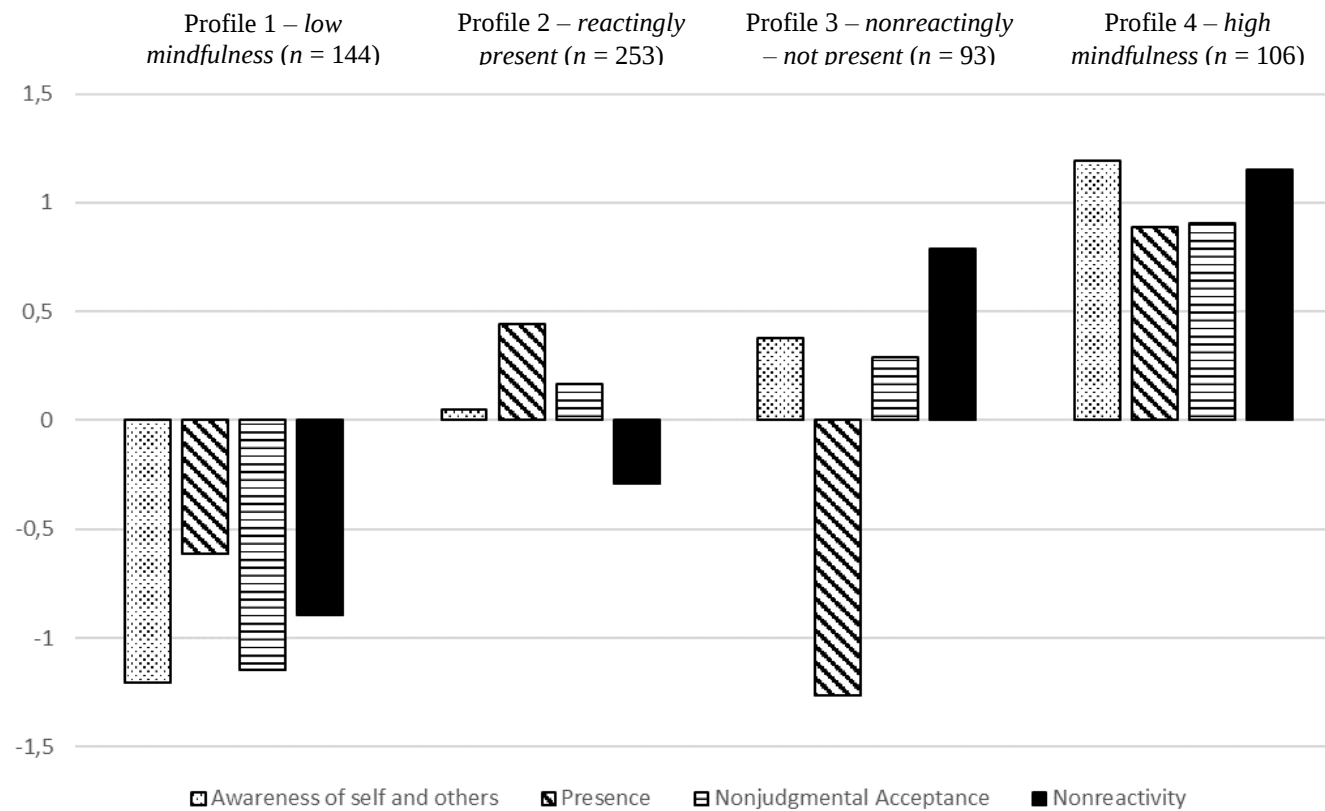


Table 1.*Sample description.*

Variable/groups		<i>M</i>	<i>SD</i>
Age		22.74	7.65
		<i>n</i>	%
Sex			
	Women	570	83.5
	Men	108	15.8
	Missing	5	0.7
University			
	University of ###	374	54.8
	University of ###	309	45.2
	Missing	0	0.0
Job			
	Not job	481	70.4
	Part-time job	94	13.8
	Full-time job	104	15.2
	Missing	4	0.6
Healthcare professional			
	No	591	86.6
	Yes	92	13.5
	Missing	0	0.0

Notes: *M* = mean; *SD* = standard deviation.

Table 2.

Statistics for the items and the dimensions of the Spanish version of the Interpersonal Mindfulness Scale.

Dimension	Item num.	<i>M</i>	<i>SD</i>	Min	Max	<i>Sk</i>	<i>K</i>	λ
ASO	1	3.87	0.84	1.00	5.00	-0.54	0.34	0.62
P	2	3.84	0.90	1.00	5.00	-0.48	-0.07	0.65
NA	3	4.25	0.77	1.00	5.00	-0.78	0.18	0.60
NR	4	3.36	0.97	1.00	5.00	-0.12	-0.36	0.55
P	5*	3.46	1.06	1.00	5.00	-0.26	-0.55	0.70
NR	6	3.61	0.94	1.00	5.00	-0.44	0.02	0.59
ASO	7	3.96	0.87	1.00	5.00	-0.65	0.30	0.67
NR	8	3.39	0.96	1.00	5.00	-0.26	-0.21	0.60
NA	9	3.98	0.83	1.00	5.00	-0.43	-0.36	0.73
P	10*	2.93	0.98	1.00	5.00	0.04	-0.18	0.21
NR	11	3.28	1.04	1.00	5.00	-0.22	-0.40	0.60
NR	12	3.74	0.96	1.00	5.00	-0.44	-0.30	0.79
P	13*	3.69	1.07	1.00	5.00	-0.54	-0.37	0.67
NA	14	3.75	0.87	1.00	5.00	-0.39	-0.11	0.59
ASO	15	4.07	0.83	1.00	5.00	-0.66	0.18	0.79
ASO	16	3.39	0.98	1.00	5.00	-0.28	-0.24	0.58
P	17*	3.45	1.06	1.00	5.00	-0.41	-0.33	0.75
ASO	18	3.98	0.86	1.00	5.00	-0.60	0.16	0.77
ASO	19	3.98	0.79	1.00	5.00	-0.57	0.37	0.72
NA	20	3.97	0.85	1.00	5.00	-0.63	0.34	0.59
P	21*	3.59	1.17	1.00	5.00	-0.54	-0.47	0.70
NR	22	3.73	0.84	1.00	5.00	-0.23	-0.35	0.75

Dimension	Item	<i>M</i>	<i>SD</i>	Min	Max	<i>Sk</i>	<i>K</i>	λ
	num.							
ASO	23	3.92	0.84	1.00	5.00	-0.55	0.11	0.79
ASO	24	4.08	0.82	1.00	5.00	-0.69	0.30	0.75
P	25	3.44	0.98	1.00	5.00	-0.42	0.01	0.53
ASO	26	3.73	0.89	1.00	5.00	-0.32	-0.18	0.67
ASO	27	3.98	0.90	1.00	5.00	-0.59	-0.07	0.74
ASO	--	3.90	0.60	1.00	5.00	-0.47	0.55	--
P	--	3.49	0.66	1.43	5.00	-0.12	-0.18	--
NA	--	3.99	0.59	1.50	5.00	-0.47	0.32	--
NR	--	3.52	0.65	1.50	5.00	-0.09	-0.12	--

Notes: ASO=Awareness of Self and Others; P=Presence; NA=Nonjudgmental

Acceptance; NR=Nonreactivity; M=Mean; SD=Standard deviation; Min=Minimum score; Max=Maximum score; Sk=Skewness; K=Kurtosis. * For reversed items, reversed scores are presented. All factor loadings and correlations among factors were statistically significant ($p < 0.01$).

Table 3.

Results of the confirmatory factor analyses for the Spanish version of the Interpersonal Mindfulness Scale.

	χ^2	df	<i>p</i>	CFI	RMSEA [90% CI]	SRMR	$\Delta\chi^2$	Δ df	<i>p</i>	Δ CFI	Δ RMSEA
One-factor structure	3546.36	324	<0.01	0.74	0.13[0.13,0.13]	0.10	--	--	--	--	--
Second order structure	1649.32	320	<0.01	0.89	0.08[0.08,0.08]	0.07	--	--	--	0.15	0.05
Four-factor with correlated factors structure	1536.99	318	<0.01	0.90	0.08[0.08,0.08]	0.07	--	--	--	0.01	0.00

Table 4.

Correlations among dimensions and values of Cronbach's alpha and Omega for the Spanish version of the Interpersonal Mindfulness Scale.

	Correlations				α	ω
	ASO	P	NA	NR		
Awareness of Self and Others (ASO)	--				0.88	0.91
Presence (P)	0.42**	--			0.76	0.81
Nonjudgmental Acceptance (NA)	0.71**	0.50**	--		0.66	0.72
Nonreactivity (NR)	0.68**	0.17**	0.68**	--	0.78	0.82
Intrapersonal mindfulness (FMI)	0.38**	0.10*	0.29**	0.43**	0.84	0.88
Positive affect (PANAS)	0.15**	0.14**	0.10*	0.17**	0.88	0.91
Negative affect (PANAS)	-0.09*	-.23**	-0.08	-0.07	0.84	0.86
Dispositional hope (DHS)	0.31**	0.14**	0.22**	0.27**	0.75	0.81
General self-efficacy (5GSES)	0.29**	0.11*	0.23**	0.29**	0.73	0.80
Resilient coping (BRCS)	0.29**	0.08	0.28**	0.35**	0.57	0.65

Notes: * $p < 0.05$; ** $p < 0.01$.

Table 5.

Model fit for one to six profiles of interpersonal mindfulness.

	AIC	BIC	aBIC	Entropy	LMR <i>p</i> value	Min_N	Max_N	Min prob	Max prob
1 profile	4525.94	4561.06	4535.66	NA	NA	596	596	1	1
2 profiles	4130.89	4187.96	4146.69	0.710	<0.01	215	381	0.90	0.92
3 profiles	4011.95	4090.97	4033.83	0.724	<0.01	120	338	0.85	0.90
4 profiles	3959.40	4060.38	3987.36	0.722	<0.01	93	253	0.82	0.89
5 profiles	3928.14	4051.06	3962.17	0.769	<0.01	2	253	0.82	1
6 profiles	3903.92	4048.80	3944.04	0.799	0.31	2	254	0.81	1

Notes: AIC= Akaike Information Criterion; BIC = Bayesian Information Criteria; aBIC= sample size—adjusted BIC; LMR= Lo-Mendell-Rubin adjusted LRT test; BLRT= Parametric Bootstrapped Likelihood Ratio Test for $k - 1(H_0)$ versus k classes; Min_N= minimum class size; Max_N=maximum class size; Min prob=minimum average latent class probability for most likely latent class membership; Max prob= maximum average latent class probability for most likely latent class membership.

Table 6.

Means in the dimensions of interpersonal mindfulness profiles and intrapersonal mindfulness for the four identified latent classes.

	Profile 1 – low		Profile 2 – reactingly		Profile 3 – nonreactingly –		Profile 4 – high	
	<i>mindfulness (n = 144)</i>		<i>present (n = 253)</i>		<i>not present (n = 93)</i>		<i>mindfulness (n = 106)</i>	
<i>Raw scores</i>	M	SD	M	SD	M	SD	M	SD
Awareness of Self and Others	3.08	0.40	3.78	0.44	2.65	0.41	4.08	0.50
Presence	3.18	0.43	3.93	0.35	4.13	0.38	4.61	0.27
Nonjudgmental Acceptance	3.32	0.46	4.09	0.39	4.16	0.47	4.52	0.39
Nonreactivity	2.96	0.47	3.33	0.46	4.04	0.38	4.27	0.42
Intrapersonal mindfulness (FMI)	2.38	0.43	2.58	0.43	2.77	0.50	2.92	0.51
Positive affect (PANAS)	3.01	0.70	3.18	0.67	3.27	0.79	3.36	0.82
Negative affect (PANAS)	2.58	0.64	2.29	0.72	2.44	0.74	2.31	0.81
Dispositional hope (DHS)	2.88	0.42	3.03	0.37	3.12	0.46	3.24	0.40
General self-efficacy (5GSES)	2.67	0.47	2.83	0.41	2.96	0.46	3.07	0.53
Resilient coping (BRCS)	2.67	0.48	2.76	0.43	2.96	0.48	3.12	0.48
<i>Standardized scores (z scores)</i>	M	SD	M	SD	M	SD	M	SD
Awareness of Self and Others	-1.208	0.718	0.049	0.593	0.378	0.632	1.191	0.449

Presence	-0.611	0.607	0.441	0.663	-1.266	0.619	0.888	0.760
Nonjudgmental Acceptance	-1.148	0.787	0.167	0.660	0.291	0.798	0.906	0.665
Nonreactivity	-0.849	0.721	-0.289	0.699	0.787	0.574	1.153	0.647

Table 7.

Follow-up ANOVAs for interpersonal mindfulness dimensions and positive and negative affect.

Factor: profile	df_{effect}	df_{error}	<i>F</i>	<i>p</i>	η^2
Awareness of Self and Others	3	592	255.227	<0.001	0.564
Presence	3	592	335.369	<0.001	0.630
Nonjudgmental Acceptance	3	592	189.806	<0.001	0.490
Nonreactivity	3	592	234.794	<0.001	0.543
Positive affect	3	592	5.343	0.001	0.026
Negative affect	3	592	5.278	0.001	0.026