



# A latent profile analysis of the five facets of mindfulness in a U.S. adult sample: Spiritual and psychological differences among four profiles

Fabio Cezar De Souza Marcovski<sup>1</sup> · Lisa J. Miller<sup>1</sup>

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## Abstract

Person-centered studies have grown in the mindfulness literature recently. Previous research has suggested four profiles of mindfulness, each with differential mental health and emotional outcomes. The present study supports the existence of these four profiles of mindfulness based on the five facets of mindfulness (*observing, nonjudging, acting with awareness, nonreactivity, and describing*). We provide further insight into differences in levels of psychopathology, positive psychology indicators, and spirituality among these profiles. Using model-selection criteria (e.g., BIC, AIC, entropy) in a latent profile analysis (LPA), we identified four clusters of individuals based on their scores on the Five-Facet Mindfulness Questionnaire (FFMQ) among 1499 US participants. We then compared profiles across measures of positive psychology, psychopathology, and spirituality. Overall, we found support for the four profiles of mindfulness in the U.S. sample, replicating and extending findings from prior studies. In addition, the four profiles showed differential levels of previous experience with mindfulness, mind–body and meditative practice, and in positive psychology and spirituality measures. Specifically, the *high-mindfulness* profile appeared as the healthiest and most adjusted of the four profiles; the *judgmental observing* and *nonjudgmental aware* profile showed higher levels of anxiety, depression, and the lowest levels of well-being. By contrast, the *average mindfulness* displayed intermediate levels of adjustment, spirituality, and well-being. Spiritual and positive psychology outcomes among the *nonjudgmentally aware* and *judgmental observing* appeared mixed. In sum, mindfulness profiles are differentially associated with psychopathology, positive psychology, and spirituality.

**Keywords** Mindfulness · Latent Profile Analysis · Positive Psychology · Psychological Health · Five-Facet Mindfulness Questionnaire · Spirituality

Mindfulness, defined as “the awareness that arises by paying attention, on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 2013, p. xxxv), has become a mainstream and popular construct both in the academic literature and in popular culture. Although mindfulness has its conceptual roots embedded in Eastern spiritual, religious, and philosophical traditions, Western scientists, psychotherapists, and health practitioners have made a great effort to translate and to teach mindfulness in both spiritual and secular settings. Despite this widespread use and growing importance, the operationalization and measurement of mindfulness has continued to evolve, generating multiple scales with

distinct sub-scales across the empirical literature to date. Few scales now measure mindfulness as a unidimensional, trait-like construct, but rather as a multi-faceted and multi-dimensional experience. Still, the construct of mindfulness remains to be distilled.

Among the several instruments that purport to measure mindfulness (CAMS; Feldman et al., 2007, KMS; Baer et al., 2004; MAAS; Brown & Ryan, 2003; etc.), the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008) has become one of the most widely used instruments. In part, this is due to its multidimensionality and high reliability. In developing the FFMQ, Baer and colleagues (2008) built on the psychometric and validity foundations of pre-existing instruments in the extant literature, and devised a new questionnaire that drew upon five *facets* or inter-related *dimensions* of mindfulness. Specifically, the five dimensions were a) *observing* one’s own environment, emotions, and present-moment experience, b) *describing*, or putting

✉ Fabio Cezar De Souza Marcovski  
fdm2123@tc.columbia.edu

<sup>1</sup> Department of Counseling and Clinical Psychology,  
Spirituality Mind-Body Institute, Teachers College,  
Columbia University, 525 W 120th St, New York, NY, USA

one's experience into words; c) *acting with awareness*, consciously and by choice, rather than in the “automatic pilot”, d) *not judging* or not criticize one's own thoughts, emotions, sensations or overall experience; and e) *not reacting*, or not to getting carried away by thoughts and feelings, but simply letting them come and go. Since their development, the FFMQ has received robust empirical support in both its construct validity and reliability across a large number of studies and samples (e.g., Carpenter et al., 2019; de Bruin et al., 2012; Lilja et al., 2013; Tran et al., 2013). Yet, despite its widespread use in the psychological, educational, clinical, and social-sciences literatures, most studies to date on mindfulness have been *variable-centered*. That is, statistical analyses typically generate a sum score of all five dimensions of mindfulness, treating them uniformly and as an aggregate, and then comparing them with other indicators and psychological variables through regression analyses and correlation coefficients, mostly (Carpenter et al., 2019). Few studies, in turn, have explored *person-centered* approaches to mindfulness to identify potential population-wide variations in mindfulness style (e.g., Pearson et al., 2015). That is, relatively little has been studied regarding the existence of different and unique *profiles* of mindfulness style across the five purported dimensions of the FFMQ.

## Person-Centered Approaches to the Study of Mindfulness

Recent empirical evidence suggests that mindfulness may not look the same in every person (e.g., Bravo et al., 2016; Lilja et al., 2013; Pearson et al., 2015). That is, several studies now provide evidence for the existence of different profiles of individuals according to varying levels of mindfulness across the five facets of mindfulness. Person-centered approaches (e.g., hierarchical cluster analysis, latent profile analysis) provide researchers with the statistical framework to examine for varying distributions of trait mindfulness scores within a larger population, and thus to examine for the occurrence of unique groups or profiles of individuals within this larger group. In brief, these approaches allow researchers to investigate whether there may be a handful of mindfulness profiles, or whether mindfulness may have a single and uniform distribution in the general population.

Among the earliest researchers to explore mindfulness using a person-centered approach, Lilja and colleagues (2013) performed a hierarchical cluster analysis using the FFMQ. The authors arrived at several important insights that have been carried through the literature to date since. Having found 13 unique clusters of individuals based on their scores of mindfulness across the five dimensions, the authors discovered that the *observing* scale is an important differentiator between *experienced meditators* (defined as participants

mentioning having a “fair amount,” or “extensive” amount of practice, or a minimum of one year of a mindfulness practice) from *non-meditators* (who were defined as having had no prior experience of meditation). Their results were helpful in shedding light on how the five dimensions might differ across people, and on the role of *observing* in helping distinguish experienced meditators from non-experienced ones. Of note, this study was conducted exclusively with a Swedish sample.

Subsequently, Pearson et al., (2015) approached the five dimensions of mindfulness by conducting a Latent Profile Analysis (LPA). Their objective was to verify the existence of unique and distinguishable profiles of mindfulness dimensions in a college sample. The authors found support for a four-class model. The profiles featured the majority of the sample as a *low-mindfulness* class (59% of the sample), followed by a *high-mindfulness* class (26%), and two noticeable but minority groups which, when combined added to roughly 13% of the sample (Pearson et al., 2015). These two minority groups were named *judgmental observing* (6%), and *non-judgmental aware* (7%). Among these profiles, the *judgmental observing* showed the highest degree of emotional distress and maladaptive coping styles, while the *high-mindfulness* and *non-judgmental aware* reported the highest degree in adaptive responses to various emotional profiles and states. Importantly, only college students, with a mean age of 20, participated in this study. The generalizability of these groups remained unaddressed.

In sequence, Bravo and colleagues (2016) replicated the findings from Pearson and colleagues (2015), and also explored the relationship between these four classes and additional distal outcomes of well-being and psychopathology. The researchers found the *high-mindfulness* group to present the highest levels of well-being, emotion self-regulation, psychological flexibility; the *judgmental observing* group to show the lowest rates of psychological well-being, and the highest levels of anxiety and depressive symptoms. Of note and like Pearson and colleagues (2015), only college students participated in this study. Building upon these findings, Sahdra and colleagues (2017) conducted both an LPA and a series of exploratory equation modelling approaches to assess the generalizability of the previously established four-profile solution devised by earlier researchers (Bravo et al., 2016; Pearson et al., 2015). Using data from a large adult sample including 7884 U.S. participants, the authors found both support for previous models derived from college-samples, and a unique cluster to the diverse adult sample. The authors also found two additional distinct and novel profiles: that of *average-mindfulness* and that of *moderately non-judgmental*. However, Sahdra and colleagues (2017) used an abbreviated, 20-item version of the FFMQ, instead of the full, 39-item version that previous researchers had used, and did not include measures of spirituality. More recently,

several newer studies have continued to provide evidence for these distinct profiles of mindfulness across countries, age groups, and clinical conditions.

Studying mindfulness and attributions in the context of romantic relationships, Kimmes and colleagues (2017) also found evidence for the same four profiles of mindfulness (e.g., high mindfulness, nonjudgmentally aware, low mindfulness, and non-judgmental observing) described earlier by Pearson and colleagues (2015). Also using LPA and follow-up structural equation modeling analyses on a sample of 542 young adults in romantic relationships, the authors detected significant differences among profiles in how individuals from each profile may make causal attributions about the other person's motives and behaviors, and in general attachment styles. Furthermore, the authors also found that individuals from the high mindfulness and the nonjudgmentally aware profiles displayed more benign attributions about their partners, while individuals from nonjudgmental aware profile displayed less heightened attachment anxiety. Subsequently, Bravo and colleagues (2018) also replicated findings of the same four-profile solution among another sample of college students. However, they found evidence for a three-class solution among the U.S. military personnel. That is, among veterans, reservists, and active duty personnel, a combined low-mindfulness and judgmental aware group emerged for 56.7% of the military sample; a nonjudgmentally aware (30.7%) and a high mindfulness (12.5%) also emerged among veterans and military personnel. As found in earlier studies, the high mindfulness profile both among civilians and members of the military was associated with the most adaptive mental health indicators, while the judgmental observing and low mindfulness profiles were found to be the least adaptive of profiles.

Expanding the scope of this person-centered work, and exploring dispositional mindfulness in a group of adolescents (ages 12–17) from Spain, Calvete and colleagues (2020) also found evidence for a three-profile solution. Specifically, the authors found a moderate mindfulness class, as well as the judgmental observing, and the nonjudgmentally aware groups that also emerged in earlier studies and among other samples. With the important addition of cross-referencing data among self-report and parent-report approaches, the authors also found that the judgmental observing group was associated with worse overall adjustment, while the nonjudgmental aware profile was associated with better adjustment among a variety mental health indicators in adolescents. Other studies exploring additional populations have followed suit. Lam and colleagues (2018), for instance, analyzed data from a sample of 212 cancer patients and their findings replicated a four-profile solution. As found in earlier studies, the authors also found evidence for the low mindfulness (51%), judgmental observing (24%), non-judgmental aware (7%), and high mindfulness (18%) profiles

well. Furthermore, the authors found that the judgmental observing and the low mindfulness profiles were associated with the highest levels of depression and anxiety. Despite the growing consensus of these studies on the structure of profiles, questions about the generalizability of these findings remained unexplored.

To that end, Ford and colleagues (2020), using data from a sample of 715 U.S. adults with ages between 20 and 88, also demonstrated the same four profiles of mindfulness (e.g., high mindfulness, low mindfulness, judgmentally observing, and nonjudgmental aware profiles.) Ford and colleagues (2020) highlighted that differences in shapes and characteristics of the distributions of profiles may exist according to technique used. In particular, they found differential results when conducting a cluster analysis versus when conducting an LPA as several other recent investigations have done. All in all, these findings maintain that the high mindfulness profile was associated with the highest psychological well-being, while the low mindfulness profile was associated with the levels of well-being.

Combined, this growing number of studies continues to reinforce the heterogeneity of profiles of mindfulness in the general and in specific populations. Importantly, variations in number of classes exist depending on the specific population studied (with three profiles among adolescents and three among military personnel, for instance) as well as in the analytical technique used for the investigation (e.g., latent profile analysis versus cluster analysis). However, the high mindfulness, the low-to-moderate mindfulness, the non-judgmental aware, and the judgmental observing profiles have continued to emerge as common profiles across most samples, and each with differential levels of psychopathology, well-being, and overall adjustment. Still, questions pertaining to the individual differences in personality characteristics, and in spirituality or religiousness among profiles have been left mostly unexplored. Nonetheless, a growing number of studies point to significant associations between mindfulness and spirituality (Carmody et al., 2008; Greeson et al., 2011). In fact, some studies have also suggested that gains in spirituality may in fact mediate the positive effects of mindfulness training in predicting symptom reduction and well-being (Greeson et al., 2011). Furthermore, earlier person-centered studies have not yet assessed the extent to which experiences with lived spirituality, potentially to include prayer, meditative, transcendent or mind–body practices may differentially be associated with these different profiles of mindfulness. Thus, the present study aims to extend findings from earlier person-centered studies by focusing on individual differences among profiles pertaining to personal *spirituality* and in *contemplative practice*.

Specifically, we aimed to replicate the latent profiles for the five facets of mindfulness in the U.S. in a large demographically and age diverse sample. Then, having identified

mindfulness profiles in the current large and diverse sample, we then aimed to compare the profiles across a wider range of individual difference variables, including depression and anxiety, self-compassion, life satisfaction, gratitude, as well as religiosity and spirituality.

## Method

### Participants and Procedure

A total of 1499 U.S. adults aged 18 through 75 ( $M = 34.94$ ;  $SD = 10.94$ ), 51.4% of whom self-identified as female, took part in the present study. All participants provided informed consent prior to joining the study, and all were compensated for their time. To recruit potential participants, we first developed an online survey using Qualtrics, and invited eligible participants through Amazon's Mturk.com website. Several recent studies have commented on reliability and validity of findings derived from MTurk as the recruitment platform (Buhrmester et al., 2011; Landers & Behrend, 2015; Mason & Suri, 2012). We delivered an extensive research questionnaire with a number of widely used measures of spirituality, psychological well-being, mental health, and mindfulness. We abided by the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The Institutional Review Board (IRB) of Teachers College, Columbia University, approved the present study. Participants received \$10 as an honorarium for their participation in this study.

### Measures

**Mindfulness** We used the full-version, 39-item Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008) in this study. Previous studies have demonstrated reliability and construct validity of the FFMQ among for a variety of samples, both U.S.-based and international (e.g., Deng et al., 2011; Mandal et al., 2016). The five facets of mindfulness included in the instrument are *observing* (e.g., “when I take a shower or bath, I stay alert to the sensations of water on my body”), *describing* (e.g., “my natural tendency is to put my experiences into words”), *acting with awareness* (e.g., “when I do things, my mind is easily distracted”; reverse-coded), *non-judgment* (e.g., “I criticize myself for having irrational or inappropriate emotions”; reverse-coded) and *non-reactivity* (e.g., “when I have distressing thoughts or images, I just notice them and let them go”). We found excellent indices of the internal reliability of FFMQ-39. Full scale Cronbach's  $\alpha = 0.87$  (*observing*  $\alpha = 0.82$ ; *describing*  $\alpha = 0.87$ ; *acting with awareness*  $\alpha = 0.92$ ; *nonjudging*  $\alpha = 0.92$ ; *non-reactivity*  $\alpha = 0.80$ ).

### Negative Affect and Psychopathology Measures

**Anxiety Symptoms** We included the widely used seven-item instrument of anxiety symptoms: Generalized Anxiety Disorder -7 (GAD-7; Spitzer et al., 2006). The GAD-7 is a brief but robust instrument that has shown excellent internal consistency and substantial evidence of diagnostic and criterion validity. The instrument is sensitive in measuring various levels of anxiety, and has been used and validated with various samples and populations around the world (Spitzer et al., 2006). Cronbach's  $\alpha = .93$ .

**Depression Symptoms** For depression symptoms, we used the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). We chose this short scale because it has shown excellent internal consistency and good evidence of diagnostic and criterion validity among populations of various countries (e.g., Arroll et al., 2010; Becker et al., 2002; Lotrakul et al., 2008). In brief, the PHQ-9 offers a parsimonious and effective measurement of depression. Cronbach's  $\alpha = .91$ .

**Negative Affect** To measure participants' present levels of negative affect, we used the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Participants were asked to rate, using a five-point scale, in which 1 is *very slightly or not at all* and 5, *extremely*, the degree which they were feeling a particular distressing emotion (e.g., fearful, upset, irritable, distressed, etc.). The higher the score, the more negative affect a participant may be experiencing. Cronbach's  $\alpha = .92$ .

### Measures of Positive Psychology

**Gratitude** To measure gratitude, we used the Gratitude Questionnaire (McCullough et al., 2002). The Gratitude Questionnaire is a brief, unidimensional, seven-point Likert scale, dispositional measure of gratitude. Sample items include: “I have so much in life to be thankful for” and “I am grateful to a wide variety of people.” Gratitude is a central concept in positive psychology, and has received a great deal of scholarly attention and empirical research. Higher ratings of gratitude are associated with more frequent positive emotions, with higher optimism, life satisfaction, and lower levels of stress and anxiety (McCullough et al., 2002). Cronbach's  $\alpha = .82$ .

**Self-Compassion** To assess self-compassion, we used the Self-Compassion Scale (SCS; Raes et al., 2011). The Self-Compassion Scale (SCS) assesses individual levels of self-compassion. Self-compassion is defined as “the ability to hold one's feelings of suffering with a sense of warmth, connection, and concern (Raes et al., 2011).” The 12-item instrument is comprised of three key dimensions:

self-kindness, common-humanity, and mindfulness. A growing body of research links self-compassion with emotional resilience, greater psychological health, optimism, and lower indices of depression and anxiety (Neff, 2003). Cronbach's  $\alpha = .86$ .

**Satisfaction with Life** To measure participants' levels of life satisfaction, we used the Satisfaction With Life Scale (SWLS; Diener et al., 1985). The SWLS scale is a widely used, well-validated and concise, five-item instrument measuring one's overall sense of life satisfaction. Participants rate items (e.g., "I am satisfied with my life") on a seven-point Likert scale, indicating the degree to which they *disagree* or *agree* with each statement. Higher scores suggest greater levels of satisfaction in life. The Cronbach's  $\alpha = .94$ .

**Subjective Vitality** To measure subjective vitality, we used the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997), a brief, seven-item instrument that measures participants' "conscious experience of possessing energy and aliveness" (e.g., "I feel alive and vital," "I have energy and spirit," "I look forward to each day," "I feel energized.") Participants are asked to rate items, on a seven-point scale, the extent to which each statement is *true* or *not true* as it applied to them and their lives at the present. This measure is associated with one's sense of autonomy and self-actualization, and it addresses both somatic and psychological concomitants of "the energy felt to be available to the self." Cronbach's  $\alpha = .92$ .

**Perceived Social Support** We used the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) to measure social support. In brief, this instrument scale consists of 12 items, and it assesses, in a Likert-scale fashion, perceived support from three distinct social groups: a) family; b) friends; and c) significant other. (Zimet et al., 1988). The scale has shown robust evidence as a buffer against stress (Zimet et al., 1990). It also has been associated with many other indicators of well-being and health. Cronbach's  $\alpha = .95$ .

**Positive Affect** To measure participants' present levels of positive affect, we used the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Participants were asked to rate, using a five-point scale, in which 1 is *very slightly or not at all* and 5, *extremely*, the degree which they were feeling a particular positive emotion (e.g., joyful, cheerful, content, etc.). The higher the score, the more positive affect a participant may be experiencing. Cronbach's  $\alpha = .91$ .

## Spirituality and Religiosity Measures

**Personal Spirituality** The Delaney Spirituality Scale (DSL; Delaney, 2005), is a 23-item, widely used instrument of spirituality that measures four interrelated dimensions of spirituality: a) ecological awareness (e.g., "I believe that nature should be respected"), b) self-discovery (e.g., "My life is a process of becoming"), c) relational spirituality (e.g., "I respect the diversity of people"), and d) attunement with the sacred or one's higher power (e.g., "my faith in a higher power/universal intelligence helps me cope with the challenges of my life"). Participants rated, on a six-point Likert-scale, the degree to which they *agree* or *disagree* with a statement. Sum scores are computed for an overall sense of spirituality. Cronbach's  $\alpha = .94$ .

**Religious/Spiritual Importance** A single item, four-point Likert scale, is the most widely used measure over the past thirty years of research on spirituality and religion (Koenig, 2009, 2010). As in previous research studies, we asked participants: "how personally important is religion or spirituality to you?" Participants' responses ranged from 1: *not important at all*, to 4: *highly important*, where higher scores indicate greater levels of religious and spiritual importance. A growing body of evidence suggests that a strong sense of spirituality is associated with a number of positive mental health outcomes, as well as decreased risk for major depression (Miller et al., 2014).

**Spiritual and Religious Meaning** Religious meaning was assessed through brief instrument developed by Krause (2003). This brief, six-item instrument purports to measure the degree to which participants' meaning is derived from their faith and one's spiritual beliefs (e.g., "my faith gives me a sense of direction in my life.") Prior research has shown religious meaning to be associated with life satisfaction, self-esteem, and an optimistic orientation to life (Krause, 2003) Yet, differently from these measures, religious meaning assesses meaning-meaning from a specifically spiritual perspective. This is four-point Likert scale that assesses the extent to which they *agree* with each statement, and sum scores capture overall spiritual-religious meaning. Cronbach's  $\alpha = .97$ .

**Spiritual and Religious Struggle** Spiritual and religious struggle were measure through a seven-item instrument within the College Students' Values and Beliefs Survey (Bryant et al., 2003). The Spiritual and Religious Struggle instrument assesses one's subjective experience of being unsettled, disillusioned, in disagreement with, or questioning of one's spiritual beliefs (Bryant et al., 2003). A growing

body of studies define religious struggle as “tensions, strains, and conflicts in relation to what people hold sacred” (Exline et al., 2014, 2020). Religious struggle, thus, is commonly reported in the general population and has been associated with a lack of a sense of purpose and of perceived significance in one’s life, as well as with indicators of anxiety, depression, somatization, and obsessive-compulsiveness, including suicidality, social isolation, among other (Wilt et al., 2016). Higher scores indicate higher levels of religious struggle. Cronbach’s  $\alpha = .74$ .

## Demographics

Participants reported their age, gender, religious background, race and ethnicity, marital status, educational achievement, employment status, and previous experiences with mindfulness meditation or mind–body (e.g., yoga, tai-chi) practices. The large majority of our sample self-identified as *white* (83.6%), while 8.3% self-identified as African American and 7.2% self-identified as Hispanic; 2% identified as Chinese-Asian, 1.4% as Native American, and 0.7% as South Asian. We also collected information regarding participants’ present and past experience with meditative, spiritual, and mind–body practices. In terms of distribution of religious affiliation, our sample was comprised of self-identified Christian participants (48.5%), followed by non-religious (39.2%), then by Buddhists (2.4%), Jewish (1.3%), Muslim (0.9%) and Hindu (0.5%). With respect to educational achievement, 33.4% of our sample had attained a college degree, 9.7% had attained a graduate degree, and 14% had attained a high school degree. For mindfulness and mind–body practice 6.1% of our sample ( $n = 90$ ) reported having both a regular mind–body (e.g., yoga, chi-gong, tai chi), 8% of our sample ( $n = 119$ ) reported having a regular meditation practice (e.g., vipassana, mindfulness, Zen, Tibetan, Christian prayer, Transcendental Meditation, etc.), and 9.1% of our sample ( $n = 135$ ) reported having both a regular mind–body practice and a regular mindfulness meditation practice.

## Data Analyses

### Descriptive Statistics

First, we tabulated and processed the data using SPSS version 27. We verified the demographic profile of our participants and checked for the presence of any missing values. Overall, less than 1% (i.e., 0.8%, or 14 participants or less) of cases showed missing values for any of the items in the FFMQ. We used a simple imputation procedure to still include them in our LPA analyses and preserved missing cases across all the distal outcome comparisons, except for those in which they had missing values. We then computed correlation indices to understand the relationship among the various indicators of mindfulness. Table 1 summarizes these correlations.

### Latent Profile Analysis

We performed a latent profile analysis (LPA) in order to identify unique clusters, or classes, or participants, using the five facets of mindfulness as our indicators (Pastor et al., 2007). In the extant literature, LPA is known by a variety of names (e.g., latent class cluster analysis, mixture modeling profile analyses), and, broadly, as mixture modeling, latent variable approaches, and of person-centered analytical techniques. For the present analyses, we used the R package *tidyLPA* (v. 1.0.8 Rosenberg et al., 2018). The *tidyLPA* package expands and simplifies the *mclust* (Scrucca et al., 2016) package for R used for mixture modeling and cluster analyses. In brief, *tidyLPA* was developed to allow researchers to derive mixture models and to conduct cluster analysis through a free and open-source software. Moreover, this package also allows investigators to control for variances and covariances among indicators in the generated profiles, or, instead to let these parameters vary freely across models and profile-solutions, which allows researchers to compare models and to search for more parsimonious solutions. A thorough overview and summary of the various parameterization models in LPA

**Table 1** Pearson Correlations among participant scores in the five facets of mindfulness

|                       | Observe | Nonreactivity | Nonjudgment | Describing | Acting with Awareness |
|-----------------------|---------|---------------|-------------|------------|-----------------------|
| Observe               | -       |               |             |            |                       |
| Nonreactivity         | .364**  | -             |             |            |                       |
| Nonjudgment           | -.125** | .172**        | -           |            |                       |
| Describing            | .254**  | .335**        | .340**      | -          |                       |
| Acting with Awareness | .007    | .201**        | .546**      | .453**     | -                     |

\*\*  $p < 0.001$ .

may be read in the review by Pastor and colleagues (2007). Following the comprehensive LPA analytic approach recommended by Pastor and colleagues (2007), we assessed the fit indices and model solutions from the various parameterizations, allowing variances to vary or to remain equal, and covariances to vary, to remain equal, or to be kept at zero across several models. Table 2 summarizes the various model indices and fit across several parameterizations.

As mentioned, *TidyLPA* allows for four specific types of parameterization, all of which we ran in the present study. Model A is the most constrained and restrictive model: variances are held *equal* across different profiles, and covariances between indicators are constrained to be *zero* (equal variances, covariances fixed to 0). Model B offers some additional flexibility, as variances are allowed to freely vary across individual profiles, yet covariances across indicators remains fixed to 0 (varying variances, covariance fixed to 0). Model C maintains indicator variances equal across profiles, but lets the covariances among the various indicators to be estimated and kept *equal* across various profiles (equal variances and equal covariances). Finally, Model D, the most complex model, allows both variances and covariances across profiles to be freely estimated without constraints (varying variances, varying covariances).

In assessing model fit solutions, we specifically considered the Akaike Information Criterion (AIC; Akaike, 1987), the Bayesian Information Criterion (BIC; Schwarz, 1978), the bootstrapped likelihood ratio test (BLRT), and entropy as the main indices in our analysis. We also ran each model using a single imputation for missing values and standardized our indicator variables of mindfulness. We used the alpha level of  $p = .05$  for decision-making on better model when bootstrapped likelihood ratio test results applied. Finally, we prioritized more parsimonious solutions and performed visual inspections of various profiles solutions in order to choose a final class model and solution, considering confidence interval, distinguishability, and meaningful differences among profiles.

### ANOVAs, Cross-Tabulations, Chi-Square Tests of Proportions

To assess whether and to what extent different profiles of mindfulness differed on the various measures of psychopathology, spirituality, positive psychology, and well-being, we then performed a series of analyses of variances (ANOVAs). Like earlier studies in the literature (e.g., Bravo et al., 2016; Pearson et al., 2015) we used participants’ most likely profile of membership to predict each of the individual difference

**Table 2** Fit indices and LPA results with Models A, B, C, and D, and from one- through five-class solutions, indicating AIC, BIC, entropy, and the bootstrapped likelihood ratio test

| Model   | Classes  | AIC           | BIC           | Entropy     | Min. Probability | Smallest <i>n</i> (%) | BLRT (p)    |
|---|----------|---------------|---------------|-------------|------------------|-----------------------|-------------|
| Model A:<br>(equal variances,<br>covariances: zero)     | 1        | 21,284        | 21,338        | 1           | -                | -                     | -           |
|   | 2        | 20,307        | 20,392        | 0.77        | 0.88             | 31%                   | 0.01        |
|   | 3        | 19,868        | 19,985        | 0.83        | 0.86             | 7%                    | 0.01        |
|   | 4        | 19,653        | 19,802        | 0.85        | 0.71             | 5%                    | 0.01        |
|   | 5        | 19,631        | 19,812        | 0.73        | 0.69             | 5%                    | 0.01        |
| Model B:<br>(varying variances;<br>covariances: zero)   | 1        | 21,284        | 21,338        | 1           | -                | -                     | -           |
|   | 2        | 20,187        | 20,298        | 0.72        | 0.89             | 44%                   | 0.01        |
|   | 3        | 19,454        | 19,624        | 0.73        | 0.74             | 15%                   | 0.01        |
|   | <b>4</b> | <b>19,201</b> | <b>19,429</b> | <b>0.74</b> | <b>0.74</b>      | <b>14%</b>            | <b>0.01</b> |
| (An LPA was unable to fitted for a five-class solution) |          |               |               |             |                  |                       |             |
| Model C:<br>(equal variances; equal<br>covariances)     | 1        | 19,869        | 19,975        | 1           | -                | -                     | -           |
|   | 2        | 19,658        | 19,796        | 0.78        | 0.88             | 28%                   | 0.01        |
|   | 3        | 19,432        | 19,602        | 0.84        | 0.83             | 5%                    | 0.01        |
|   | 4        | 19,363        | 19,565        | 0.8         | 0.76             | 4%                    | 0.01        |
|   | 5        | 19,367        | 19,601        | 0.6         | 0.71             | 4%                    | 0.01        |
| Model D:<br>(varying variances;<br>varying covariances) | 1        | 19,852        | 19,958        | 1           | -                | -                     | -           |
|   | 2        | 19,293        | 19,511        | 0.62        | 0.72             | 47%                   | 0.01        |
|   | 3        | 18,963        | 19,292        | 0.6         | 0.76             | 27%                   | 0.01        |
|   | 4        | 18,887        | 19,327        | 0.61        | 0.75             | 16%                   | 0.01        |
|   | 5        | 18,760        | 19,313        | 0.67        | 0.71             | 11%                   | 0.01        |

AIC = Akaike Information Criterion; BIC = Bayesian information Criterion; BLRT = Bootstrapped likelihood ratio test. Min. Probability: the minimal probability value for assignment to one of the classes within this specific profile solution. Boldened row indicates the selected solution

variables across pathology, positive psychology, and spirituality. We also conducted cross-tabulation and subsequent Chi-Square Tests of Proportions, to identify the demographic characteristics of each of the emerging mindfulness profiles. When multiple comparisons were run among each the various profiles, we used Tukey's HSD procedure for all pair-wise multiple comparisons to control for Type I errors.

## Results

Our first aim was to assess the relationships between the five facets of mindfulness in our sample. Table 1 shows two-tailed Pearson correlations among the five facets of mindfulness. Consistent with studies in the extant literature, we found positive correlations among most of the various facets of mindfulness, but an inverse association between *observe* and *nonjudgment* ( $r = -.125, p < .001$ ) and no significant association between *observe* and *acting with awareness* ( $r = .007, p = .801$ ). As noted in earlier validity studies (Baer et al., 2006; Rudkin et al., 2018), the *observing* scale has shown an inconsistent patterns of correlations with other facets of mindfulness.

Our second aim was to identify profiles of mindfulness indicators in our large, diverse sample, and to determine whether this might replicate previous findings. Table 2 displays results from latent profile analyses (LPA), including AIC, BIC, entropy levels and bootstrapped likelihood ratio test  $p$ -values for across Models A through D, and across profiles 1 through 5. We chose to include a limit of five profiles per group, for a number of reasons: first, because earlier studies reported no more than four mindfulness classes; second, because a higher number of profiles shrinks groups to smaller sizes and thus poses threat to the validity of generalizability of such groups. Lower values for AIC, BIC are indicative of better-fitting models, and higher levels of entropy suggest increased classification utility and precision of the model.

As our results indicate, among the various possible profile solutions, Model D (which allows for both variances and covariances to be freely estimated and to vary across profiles), featured the lowest—and therefore the best-fitting—BIC and AIC values. However, this more complex parameterization of Model D came at the expense of precision in classifying of participants unequivocally into a particular group (i.e., entropy values ranging from 0.62 and 0.67). These results suggest that although goodness-of-fit indices favored the most complex Model D, such added complexity came with the important trade-off of poor classification utility and, in turn, low precision in determining with individuals belonged to which class. In turn, the next-best group was the four-profile solution based on Model B, with equal variances of indicators among profiles, and fixed covariances to zero. This

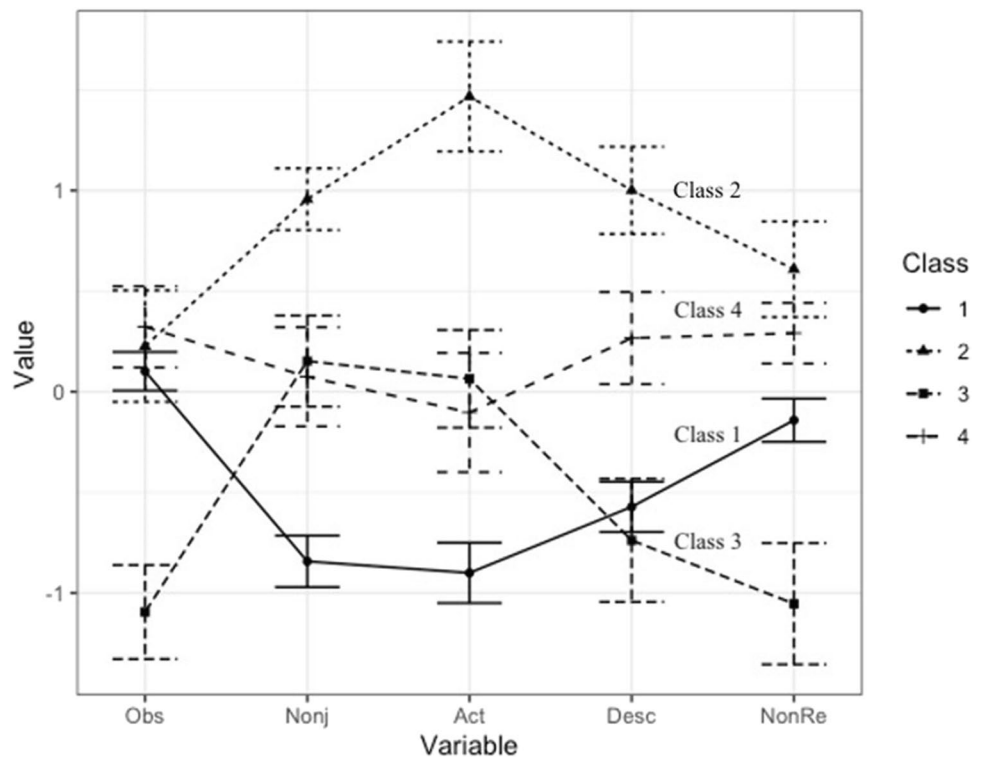
four-profile solution of Model B appeared best three key reasons: first, it featured lowest AIC and BIC (compared to all other models and solutions, except those of Model D); second, it displayed higher entropy ( $entropy = 0.74$ ); third, despite entropy on its own having been found as a poor criteria for model selection on its own (Tein et al., 2013), upon visual inspection of profiles, the model's four-profile solution bore great resemblance with prior solutions in the extant person-centered literature of mindfulness (Bravo et al., 2016; Kimmes et al., 2017; Pearson et al., 2015). Figure 1 illustrates the four-profile solution, with standardized means across the five facets of mindfulness. Specifically, this four-profile, empirically derived model featured clusters of included classes very similar to those found in earlier studies (e.g., *judgmentally observing*, a *nonjudgmentally aware*, as well as a *moderate mindfulness* and a *high-mindfulness* profiles). In light of these findings, we favored and selected this four-profile solution of Model B across the subsequent analyses.

Table 3 summarizes the mean scores and standard deviations of each of the mindfulness facets among the four profiles. Higher scores indicated higher levels across the indicators. As these results suggest, 29% of the sample ( $n = 435$ ) showed by average scores of observing and of non-reacting ( $z$  scores ranged from  $= 0.08$  to  $-0.16$ ), but lower levels of nonjudgment, acting with awareness, and describing ( $z$  scores ranged from  $-0.93$  to  $-0.61$ ). Similar to results found in earlier studies, we labeled this class as “*judgmental observing*.” Secondly, 19% of our sample ( $n = 289$ ) showed the highest indices of nonjudging, acting with awareness, describing, and non-reacting ( $z$  scores ranged from  $0.60$  to  $1.47$ ), yet average levels of observing ( $z = 0.022$ ); we labeled this group “*high mindfulness*.” Thirdly 14% of our sample ( $n = 216$ ) demonstrated average levels of nonjudging and acting with awareness ( $z$  scores ranged from  $0.015$  and  $0.013$ ), but low levels of observing, describing, and non-reacting ( $z$  scores ranged from  $-0.131$  to  $-0.088$ ). Similar earlier researchers (e.g., Bravo et al., 2016), we labeled this profile “*nonjudgmentally aware*.” Finally, the largest cluster comprised 37% of our sample ( $n = 559$ ) and showed an average score across all five indicators ( $z$  scores ranges from  $0.32$  to  $-0.009$ ). We deemed this class *average mindfulness* group.

The third aim of our study was to determine whether mindfulness profiles differed in measures of psychopathology, positive psychology, and spirituality. In turn, to compare the various groups across these indicators, we performed one-way ANOVAs adding the categorical variable of profile membership (1, 2, 3, or 4) as our independent variable. We then added each distal outcome as dependent variable. Results from omnibus tests suggested there were significant differences among profiles on all measures of both psychopathology and of well-being. We also found significant omnibus difference in overall spirituality measure (i.e.,



**Fig. 1** Line graph indicating the four-class solution featuring standardized mean values on the y-axis and each of the five facets of mindfulness as the LPA indicators in the x-axis. Note. Obs: Observing; Nonj: Nonjudging; Act: Acting with Awareness; Desc: Describing; NonRe: Non-Reacting. Bars represent 95% Confidence Intervals around the standardized mean value for a given indicator. Class 1: Judgmental Observing (29%); Class 2: High Mindfulness (19.3%); Class 3: Nonjudgmental Aware (14.4%); Class 4: Average Mindfulness (37.3%)



**Table 3** Table displaying standardized mean scores and standard deviations on FFMQ subscales for each profile in the LPA

|                       | Profile 1 (29%)           | Profile 2 (19.3%)         | Profile 3 (14.4%)         | Profile 4 (37.3%)         |
|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                       | Judgmental Observing      | High mindfulness          | Nonjudgmentally Aware     | Average mindfulness       |
|                       | <i>M (SD)</i>             | <i>M (SD)</i>             | <i>M (SD)</i>             | <i>M (SD)</i>             |
| Observing             | 0.08 <sub>a</sub> (0.67)  | 0.22 <sub>ab</sub> (0.98) | -1.31 <sub>c</sub> (1.28) | 0.32 <sub>b</sub> (0.63)  |
| Nonjudging            | -0.86 <sub>a</sub> (0.46) | 0.97 <sub>b</sub> (0.83)  | 0.15 <sub>c</sub> (1.07)  | 0.11 <sub>c</sub> (0.79)  |
| Acting with Awareness | -0.93 <sub>a</sub> (0.42) | 1.47 <sub>b</sub> (0.44)  | 0.13 <sub>c</sub> (1.03)  | -0.09 <sub>d</sub> (0.48) |
| Describing            | -0.61 <sub>a</sub> (0.66) | 1.01 <sub>b</sub> (0.58)  | -0.88 <sub>c</sub> (1.18) | 0.29 <sub>d</sub> (0.66)  |
| Nonreacting           | -0.16 <sub>a</sub> (0.75) | 0.60 <sub>b</sub> (0.78)  | -1.24 <sub>c</sub> (1.24) | 0.30 <sub>d</sub> (0.66)  |

Means sharing a subscript in a row indicate they were not significantly different from each other (i.e.,  $p > .05$ ) using Tukey’s HSD correction for multiple comparisons.

Delaney spirituality scale) across the four profiles. Table 4 summarizes the means, the standard deviations, and the *F* statistic comparing means across profiles of mindfulness.

The *high mindfulness* profile was associated with the healthiest and highest levels of positive psychology indicators (i.e., subjective vitality, life satisfaction, positive emotion, self-compassion, and gratitude; *z* scores ranging from 0.51 to 0.87), spirituality (i.e., religious/spiritual importance, and personal spirituality scores ranging from 0.35 to 0.47), and the lowest levels of depression, anxiety, and negative emotions (*z* scores ranging from -0.53 to -0.63). Secondly, the *average mindfulness* group correlated with the second highest levels of positive psychology (*z* scores ranging from 0.08 to 0.19), the second lowest levels of anxiety

and depression (*z* scores ranging from -0.20 to -0.25), and average levels of spirituality (*z* scores from -0.04 to 0.05). Third, the *nonjudgmentally aware* profile was associated with average levels of negative affect and psychopathology (*z* scores ranging from 0.05 to 0.20), but, for the most part, levels of positive psychology and spirituality that not statistically different from those of the most anxious and depressed group (with *z* scores ranging from 0.57 to 0.62): the *judgmental observing* profile. In sum, the *judgmental observing group* demonstrated the highest levels of depression, anxiety, negative affect, and religious struggle. Specific *z*-scores per variable and group, as well as comparisons of significance, can be viewed on Table 4. Finally, to assess for the potential positive association between age and

**Table 4** Means and Standard Deviations for Standardized Outcome Measure by Profile and F-Statistic of ANOVA tests

|                            | Judgmental Observing      | High Mindfulness           | Nonjudgmental Aware        | Average Mindfulness        | F       |
|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------|
| <i>Psychopathology</i>     | -                         | -                          | -                          | -                          | -       |
| Anxiety Symptoms           | 0.62 <sub>a</sub> (1.08)  | -0.57 <sub>b</sub> (0.56)  | 0.12 <sub>c</sub> (1.12)   | -0.24 <sub>d</sub> (0.76)  | 123.67* |
| Depression Symptoms        | 0.64 <sub>a</sub> (1.07)  | -0.63 <sub>b</sub> (0.56)  | 0.20 <sub>c</sub> (1.12)   | -0.25 <sub>d</sub> (0.72)  | 143.54* |
| Negative Emotion           | 0.57 <sub>a</sub> (1.20)  | -0.53 <sub>b</sub> (0.53)  | 0.05 <sub>c</sub> (1.04)   | -0.20 <sub>d</sub> (0.74)  | 93.44*  |
| <i>Positive Psychology</i> | -                         | -                          | -                          | -                          | -       |
| Gratitude                  | -0.38 <sub>a</sub> (0.93) | 0.51 <sub>b</sub> (0.88)   | -0.35 <sub>a</sub> (1.14)  | 0.16 <sub>d</sub> (0.88)   | 66.47*  |
| Self-Compassion            | -0.58 <sub>a</sub> (0.74) | 0.87 <sub>b</sub> (0.90)   | -0.46 <sub>a</sub> (1.09)  | 0.19 <sub>d</sub> (0.78)   | 196.51* |
| Life Satisfaction          | -0.28 <sub>a</sub> (1.00) | 0.44 <sub>b</sub> (0.90)   | -0.26 <sub>a</sub> (1.03)  | 0.08 <sub>d</sub> (0.92)   | 38.14*  |
| Subjective Vitality        | -0.36 <sub>a</sub> (0.93) | 0.67 <sub>b</sub> (0.80)   | -0.52 <sub>a</sub> (1.16)  | 0.14 <sub>d</sub> (0.83)   | 99.40*  |
| Perc Social Support        | -0.30 <sub>a</sub> (0.95) | 0.52 <sub>b</sub> (0.84)   | -0.35 <sub>a</sub> (1.13)  | 0.10 <sub>d</sub> (0.92)   | 55.46*  |
| Positive Emotion           | -0.27 <sub>a</sub> (0.93) | 0.55 <sub>b</sub> (0.93)   | -0.48 <sub>a</sub> (1.01)  | 0.11 <sub>d</sub> (0.91)   | 63.19*  |
| <i>Spirituality</i>        | -                         | -                          | -                          | -                          | -       |
| R/S Importance             | 2.13 <sub>a</sub> (1.12)  | 2.60 <sub>b</sub> (1.26)   | 2.06 <sub>a</sub> (1.13)   | 2.21 <sub>a</sub> (1.20)   | 11.99** |
| Religious-Meaning          | -0.07 <sub>a</sub> (0.94) | 0.35 <sub>b</sub> (1.07)   | -0.20 <sub>a</sub> (0.93)  | -0.04 <sub>a</sub> (0.99)  | 16.23*  |
| Personal Spirituality      | -0.14 <sub>a</sub> (0.91) | 0.47 <sub>b</sub> (0.98)   | -0.47 <sub>c</sub> (0.99)  | 0.05 <sub>d</sub> (0.96)   | 43.81*  |
| Religious-Struggle         | 0.33 <sub>a</sub> (1.05)  | -0.40 <sub>b</sub> (0.87)  | -0.01 <sub>c</sub> (1.05)  | -0.04 <sub>c</sub> (0.90)  | 33.83** |
| Age                        | 31.54 <sub>a</sub> (8.99) | 38.66 <sub>b</sub> (12.21) | 34.63 <sub>c</sub> (10.99) | 35.79 <sub>c</sub> (10.87) | 27.70** |

\* $p < .01$ ; Anxiety Symptoms: GAD-7: Generalized Anxiety Disorder-7 Questionnaire; Depression Symptoms: PHQ-9: Patient Health Questionnaire-9; Negative Emotion: PANAS-NA: Negative Affect; Gratitude: Gratitude Scale;; Self-Compassion: Self-Compassion Scale; Life Satisfaction: Satisfaction with Life Scale; Subjective Vitality: Subjective Vitality Scale; Perc Social Support: Perceived Social Support; Positive Emotion: PANAS-PA: Positive Affect; R/S Importance: Religious / Spiritual Importance; Rel-Meaning: Religious Meaning Scale; Spirituality: Delaney Spirituality Scale. Means sharing a subscript in a row indicate they were not significantly different from each other (i.e.,  $p > .05$ ).

mindfulness highlighted in previous studies (e.g., Mahlo & Windsor, 2021), we also performed a series of ANCOVAs, where we entered age as the covariate. Even after controlling for age, we found that differences that had been found to be significant in the series ANOVA remained significant within the ANCOVA framework when age was controlled for. As a result and for simplicity, we maintained our report of the ANOVA results instead.

Cross-tabulation and ANOVA analyses of demographic characteristics of each sample revealed some salient demographic differences among our classes. For instance, the *high mindfulness* class tended to be the oldest group among all other profiles ( $M = 38.66$ ,  $SD = 12.21$ ), while the *judgmental observing* tended to be the youngest among profiles ( $M = 31.54$ ,  $SD = 8.99$ ;  $F = 27.70$ ,  $p < .001$ ). Post-hoc comparisons indicated no significant age differences between the *nonjudgmental aware* and the *average mindfulness* groups ( $t = 1.36$ ,  $p = .525$ ). Regarding how important participants across profiles regarding religion or spirituality in their lives, the *high mindfulness* profile expressed the highest degree of importance ( $M = 2.60$ ,  $SD = 1.26$ ), compared to all other three groups ( $F = 11.99$ ,  $p < .001$ ). Post-hoc analyses suggested no statistical differences among other groups. We have also assessed gender differences and differences in meditation and mind–body practice experience among the different profiles. Chi-square tests of independence were conducted for each of

the two aforementioned variables, with all expected cell values frequencies greater than five. There was a marginally significant association between gender and profile membership  $\chi^2(3) = 7.946$ ,  $p = .047$ . The association was small (Cohen, 1988), Cramer's  $V = .073$ . Further investigation of the plot of adjusted standardized residuals in the chi-square procedure revealed that the *judgmental observing* class present with more males (54%, adjusted standardized residual = 2.7) than females (46%, adjusted standardized residual = -2.7) than expected. For meditation practice, we also found a significant association between profile membership and mindfulness meditation practice  $\chi^2(3) = 23.918$ ,  $p < .001$ , although the association was small, Cramer's  $V = .127$ . Overall, participants in the *high mindfulness* profile were significantly more likely to endorse *having* a meditation practice (adjusted standardized residual = 3.3) than not; individuals in the *nonjudgmental aware* were significantly less likely to endorse having a meditation practice (adjusted standardized residual = -3.7). Finally, we also found a significant association between mindfulness profile membership and mind–body practices  $\chi^2(3) = 15.565$ ,  $p = .001$ , of a small magnitude (Cramer's  $V = .102$ ). Taken together, these results suggest that, as expected, participants in the *high mindfulness profile* are more likely to report having a contemplative meditation practice.

## Discussion

The present study replicated and extended findings from earlier person-centered, latent profile analytic studies of the five-facet mindfulness questionnaire (FFMQ) among participants from a large and diverse U.S. sample. We used data from 1,499 participants to assess unique profiles of individuals based on individuals' self-report scores of each of the five dimensions of mindfulness (i.e., observing, nonjudging, acting with awareness, describing, and non-reacting). Like previous studies, ours was guided by the model-based framework of latent profile analysis to identify and plot the resulting groups of participants.

Overall, our findings replicated those of previous studies, showing four distinct profiles of mindfulness: 1) a *judgmental observing*, 2) a *high mindfulness*, 3) a *nonjudgmental aware*, and finally, and 4) *average mindfulness* (Bravo et al., 2016; Ford et al., 2020; Kimmes et al., 2017; Pearson et al., 2015) profiles, corroborating the possibility of distinct *styles of trait mindfulness*. In sequence, we replicated earlier findings that suggested that a *high-mindfulness* profile would correlate with the lowest anxiety, depression, and negative affect; that an *average mindfulness* group would display average scores of depression and anxiety, followed by the *nonjudgmentally aware*, and that the *judgmental observing* group would display the highest indices of psychopathology. Such results are consistent with the large extant literature linking high judgment and self-criticism with depressive and anxiety symptoms. In turn, outcomes among positive psychology and spirituality indicators were less clear and straightforward. While the *high mindfulness* profile correlated with the highest level of report on positive psychology and spirituality, and the *average mindfulness* group correlated with the second-best levels of positive psychology and spirituality, across some outcomes, the *nonjudgmental aware* and the *judgmental observing* displayed a set of mixed findings. For example, these two groups showed no significant differences in positive psychology indicators, such as gratitude and self-compassion, life satisfaction, subjective vitality, perceived social support, and positive emotion. Regarding spirituality, these two groups showed no significant differences in religious meaning and religious-spiritual importance, while the *judgmental observing* had significantly higher religious struggle, but also a relatively higher overall measure of overall spirituality. In addition, because earlier empirical studies have found mindfulness to increase with age (Greeson et al., 2011), it is also interesting to note that these significant differences in psychopathology continued to hold even after we controlled for age. That is, merely being older (and thus more mindful), did not in itself explain the differences in psychopathology, positive psychology, and spirituality among the four profiles.

Taken together, our findings point to a relatively clear inter-profile distinction in psychopathology scores, where a *high-mindfulness* group performs best, and a *judgmental observing* group performs the worst, and to more nuanced inter-profile distinctions in positive psychology and spirituality. Overall, the highest level of spirituality was found among the high mindfulness group, suggesting that spiritual awareness may carry with it a capacity for being present and accepting of others. High mindfulness profile participants were high in transcendent awareness of the self, nature and a higher power, low in spiritual or religious struggle, and high in the single item of personal importance of personal spirituality or religion shown to be predictive of physical and mental health (Koenig et al., 2021). The opposite was found as well, in that the two uneven profiles of mindfulness showed lower levels of personal spirituality or religion, less transcendent awareness of self, nature and a higher power, and more spiritual struggle. Of the two profiles of uneven mindfulness, the *judgmental observing* group appeared to have more religious struggle, but to also endorse higher overall spirituality than the *non-judgmental aware*. One possible explanation for this finding is that people from the *judgmental observing* group may turn more to spirituality to invoke balance or coping.

When it comes to forms of contemplative practice, the high mindfulness group was also more likely to engage in a form of contemplative practice or pathway to transcendent awareness, to include, Vipassana or Zen meditation or centering prayer. To date, these findings both corroborate earlier studies (Carmody et al., 2008; Greeson et al., 2011) that link mindfulness with spirituality, and add nuance to the presentation among other profiles. Furthermore, the mindfulness profiles also appeared particularly robust in the current sample. In the current study, each mindfulness profile included at least 14% of the participants in our overall sample. By contrast to earlier studies that found some groups to fit, of concern, only 6% of participants into *judgmental observing* and *nonjudgmental aware* profiles. Such higher membership strengthens the empirical support for the prevalence of these profiles, and may reflect our use of a broader range of adult age groups, in contrast to earlier studies (e.g., Bravo et al., 2016; Pearson et al., 2015) that focused exclusively on college students.

All in all, the present study builds on earlier person-centered mindfulness studies and adds further evidence to the validity of unique *profiles*, or *styles* mindfulness in the adult population. As expected, mindfulness does not present equally among all people: some people are better able to observe their experience, yet display heavy judgment; others are less judgmental, but also less attentive; while others show a fine synergy among all five dimensions of mindfulness and, as a result, display the highest levels of mental health, spirituality, and positive psychology. Interventions

and mindfulness programs may benefit from capitalize on these unique presentation and individual profiles, and make choice-based adjustments to their curriculum. That is, participants who tend towards the judgmental profile may receive instructions that emphasize acceptance, while participants with lesser tendency to *observe* may benefit from mindfulness activities that emphasize somatic awareness and awareness of one's environment. With the surge in personalized mindfulness training over apps and online, these adjustments may lead to both enhancements in the overall effectiveness of programs, and conform to an increasing person-centered and customized learning experience.

## Limitations and Recommendations for Future Research

Our study limitations include the use of cross-sectional and self-report data. As such, our study cannot speak for causal relations or for precedence among overall well-being, psychological adjustment and spirituality as these relate with the profiles of mindfulness. Future research might include investigation of the longevity and the stability of these profiles over time, potentially conducted through a longitudinal design using latent transition analysis. Apparent cohort differences in mindfulness profile by age suggest that a longitudinal study disentangle cohort effects from those of adult development. Considering that the *high mindfulness* profile is the oldest, valuable research questions on the developmental trajectories or cohort-differences remain open and unanswered. Future research further might explore cross-cultural comparisons and profile analyses among non-Western participants and samples, as this would help us understand whether these profiles are universal or constrained to the cultural context of Western cultures. That is especially important given that earlier studies have focused exclusively on North American or European samples.

Moreover, several statistical approaches have been developed to derive profiles. These approaches include hierarchical cluster analysis, bi-factor models and exploratory SEMs as well as mixture-modeling derives techniques, such as latent profile analyses. Several statistical techniques have also emerged in recent years aimed at performing group-wise comparisons among profiles (e.g., ANOVAs, and bias-corrected three-step methods via maximum likelihood and BMC). Building on the methodology used by several of the previous person-centered studies, our study also relied on latent profile analysis. We then followed our analysis using a series of ANOVAs, with added corrections for the multiple comparisons performed. This ANOVA approach is part of the standard classify-analyze framework to LPA (Clogg, 1995). In our study, we used the maximum probability assignment framework to obtain profile classification

(Nagin, 2005) and this method categorically assigns participants to the profile for which they have the highest posterior probability of membership (Goodman, 1974, 2007). Other approaches reported in some of the earlier studies (e.g., Bravo et al., 2016; Pearson et al., 2015,) have relied instead on pseudo-class multiple imputations and on subsequent Wald tests. While adding in probabilistic information to their models, the pseudo-class model that relies on bootstrapped multiple-drawing framework has been shown to be more biased than maximum-probability assignment approach (Bray et al., 2015). Given our profiles' entropy of levels and reasonable mean probability of class membership also above .70, we still proceeded the use classify-and-analyze ANOVA framework. However, we recognize that alternative statistical approaches to compare distal outcomes exist (e.g., three-step approaches, including Maximum Likelihood and BMC) have been growing in popularity and in statistical robustness. While our analytic software (i.e., tidyLPA) did not yet contain the integrated framework for three-step procedures, given the number of other recently published studies using the classify-and-compare approach, we maintained more traditional ANOVA techniques. That said, we believe our findings remain consistent and serve as an important initial investigation for spirituality across profiles of mindfulness. We recommend that future studies continue to document differences that emerge across statistical procedures, and continue to standardize and converge on analytic frameworks and methods, considering that some subtle but important differences emerged when some authors (e.g., Ford et al., 2020). Greater consensus on the techniques used and to be used will benefit readers and enhance the replicability of findings.

## Conclusions

Our findings replicate the four clusters, profiles, or groups of mindfulness based on the FFMQ found in earlier studies. We also show how they differ and how they are alike across a number of individual difference variables, including positive psychology, positive psychology, and personal spirituality. Overall, these findings provide further evidence suggesting that having higher mindfulness, across the five dimensions of the FFMQ, goes hand in hand with spiritual awareness, positive character strengths and better mental health. Although having moderate levels or even being lower in judgment can be protective, our data suggest that it is the synergy and the integration of all five dimensions that has consistently appears to be part and parcel with the healthiest and most positive outcomes. Treatment studies, mindfulness programs and curricula might, therefore, consider helping balance across the dimensions of mindfulness. Interventions might include

adaptations and adjustments to individuals of the *judgmental observing* profile, reinforcing among them patterns of radical acceptance and compassion; to *non-judgmental aware*, interventionists and researchers might add a larger scope of exercises meant to cultivate awareness and mindfulness of one's environment.

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**Data Availability** The dataset generated and analyzed during the current study is not publicly available due to the multiple demands on the collaborative data, but it is available from the corresponding author on reasonable request.

**Code Availability** Not Applicable.

## Declarations

**Consent for Publication** All authors read the final version of this paper, and they provide full consent for it to be published.

**Conflicts of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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