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# Psychometric evaluation of the Ryff's Scale of psychological wellbeing in self-identified American entrepreneurs

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ABSTRACT

In recent years, psychological wellbeing is gaining importance in entrepreneurship research. And, one of the most critical measures of psychological wellbeing is Ryff's Scales of Psychological Wellbeing (SPWB). The SPWB consists of six dimensions: Autonomy, Environmental mastery, Personal growth, Positive relations with others, Purpose in life, and Self-acceptance. However, previous studies have noted that the psychometric properties of the SPWB in various contexts as problematic. Thus, the purpose of the present study was to investigate the psychometric properties of the SPWB – 42 Item version in a sample of self-identified American entrepreneurs. Data from the Midlife Development in the United States (MIDUS) were used to test the SPWB's psychometric properties. The data were subjected to various statistical analyses, which revealed that the proposed 6-factor structure of the SPWB was conditionally supported in the entrepreneurial context. Based on the psychometric evaluation, suggestions are made for future studies investigating psychological wellbeing in entrepreneurship settings. To date, the present study is the *first* to test the psychometric properties of the SPWB in the context of entrepreneurship research.

## 1. Introduction

The concept of psychological wellbeing (hereafter PWB) has been widely studied, which is an integral part of living a fulfilling and flourishing life (Wiklund et al., 2019). Several studies have noted the importance of PWB in various contexts, which include organization employees (Gardner, 2020), parole officers (Gayman et al., 2018), refugees (Newman et al., 2018), transgender women (Glynn et al., 2016), and global conflicts (Gray et al., 2017). For example, in the context of parole officers, it has been maintained that higher PWB of parole officers is associated with superior stress management at work (Gayman et al., 2018). Similarly, it has been maintained that a strong PWB helps refugees from the negative effects of perceived discrimination (Newman et al., 2018). Likewise, in the context of organizational studies, PWB has been associated with a better life outcomes such as more successful relationships (Diener and Seligman, 2002), superior mental and physical health (Vazquez et al., 2009) and increased performance at work (Avey et al., 2010; Wright and Cropanzano, 2000).

Therefore, given the importance of PWB in various domains, scholars have been increasingly calling for research on PWB in the context of entrepreneurship (e.g., Hisrich et al., 2007; Ryff, 2019; Wiklund et al., 2019). For instance, Wiklund et al. (2019) maintained that wellbeing among entrepreneurs should be researched and should complement traditional business-related outcomes such as business performance and failure. Consistently, there have been a few studies (e.g., Dewal & Kumar, 2017; Hahn, 2019; Kibler et al., 2019; Nikolaev et al., 2019; Shir, 2015; Shir et al., 2019; Uy et al., 2013; Uy et al., 2017), which have investigated the concept of PWB in the context of entrepreneurship.

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One crucial measure of PWB that has been employed in many studies (e.g., Dewal & Kumar, 2017) is the Ryff's Scales of Psychological Wellbeing (SPWB, Ryff, 1989), which is vital for entrepreneurial research as well (Ryff, 2019). SPWB has been translated into more than 35 languages, which has resulted in over 750 publications (Ryff, 2019). Carol Ryff (1989) introduced a model of PWB, which has its roots in Aristotelian philosophy (Aristotle, trans. 1985) that augmented concepts from existential and humanistic psychology (e.g., Allport, 1961; Maslow, 1968). Ryff (1989) conceptualization of PWB refers to a school of thought that aligns with *eudaimonic* wellbeing (Ryan and Deci, 2001). While hedonic wellbeing underscores happiness and positive affect, in contrast, eudaimonic wellbeing underscores the realization of an individual's unique potential (Espinoza et al., 2018). Furthermore, in general (as well as in entrepreneurship research), it has been maintained that hedonic wellbeing has been widely researched (Wiklund et al., 2019). Moreover, it has been posited that eudaimonic wellbeing is more critical than hedonic wellbeing in the context of entrepreneurial wellbeing and needs to be investigated (see Ryff, 2019).

Per Ryff's conceptualization, PWB is a multidimensional construct and developed a measurement instrument (i.e., SPWB) that has six subscales or dimensions: (1) *autonomy* (i.e., living consistent with one's convictions); (2) *environmental mastery* (i.e., effective management of one's life situations); (3) *personal growth* (i.e., making use of one's talents and potential); (4) *positive relations with others* (i.e., deep and meaningful connection with others); (5) *purpose in life* (i.e., feeling that one's life has purpose and meaning); and (6) *self-acceptance* (i.e., being aware of and accepting one's strengths and limitations) (Ryff, 1989, 2019; Ryff and Keyes, 1995).

As noted earlier, the SPWB is a widely used meaRyff, 1989, 2019sure. However, the SPWB has been problematic per some scholars (e.g., Abbott et al., 2010; Springer and Hauser, 2006; Springer et al., 2006; Triado et al., 2007), which primarily pertains to the SPWB's psychometric properties (e.g., internal consistency, Triado et al., 2007; structural validity, Kafka and Kozma, 2002; factorial validity, Springer and Hauser, 2006). For instance, Kafka and Kozma (2002) subjected a version of the SPWB data collected using a student sample to factor analysis with an unspecified number of underlying factors; they found that the SPWB consisted of 15 factors as opposed to the 6-factor structure maintained by Ryff and colleagues (e.g., Ryff and Keyes, 1995). Others reported similar results (e.g., Espinoza et al., 2018; Guindon et al., 2004; Triado et al., 2007) with data collected from different demographics (e.g., older adults). Additionally, it has been maintained that the SPWB has mixed results for demographics and professions (e.g., entrepreneurs) (Ryff, 2019). However, to date, the evaluation of the psychometric properties of the SPWB in the context of entrepreneurship or self-employment has not been conducted. Given the importance of PWB for researchers, practitioners, and policy-makers, appropriate instruments must be used to measure wellbeing (Abbott et al., 2010).

Therefore, the goal of the present study was to investigate the psychometric properties of the SPWB (42-Item, Ryff, 1989) in the context of entrepreneurship. To this end, the following three steps were undertaken to test the psychometric properties of the SPWB-42 item version on a sample of entrepreneurs, which included: (1) analysis of internal consistency of each dimension of the SPWB; (2) an exploratory factor analysis (EFA) was performed; and (3) the original and *alternative* factorial structures of the SPWB were tested via confirmatory factor analysis (CFA). The aforementioned analytical strategy was first performed on the SPWB (42-Item), followed by the same analysis to examine the SPWB-38 and the SPWB-Parceled (3 parcel model), whose items were derived from the SPWB (42-Item).

## 2. Method

### 2.1. Data

The MIDUS (acronym for Midlife Development in the United States) dataset was used for testing the psychometric properties of the SPWB. The MIDUS survey studies midlife from an unusually wide variety of perspectives.[1] Information is collected on various topics such as the physical health and psychological wellbeing of a representative sample of working-age men and women in the United States. To date, three waves of MIDUS datasets are available. For the present study, MIDUS 3 dataset was used, which was collected in 2013, consisting of 3294 participants (Male = 1484) between ages 25 and 74 from the United States. More importantly, the MIDUS 3 dataset includes information on whether individuals are self-employed, their psychological wellbeing (measured on the SPWB-42), and some necessary demographic variables (i.e., gender and education), which are focal constructs of the present study.

Thus, MIDUS 3 dataset was screened based on the [current] employment status of the participants.[2] In MIDUS 3, the total number of valid responses for employment status were 2,674, of which 373 (i.e., 13.95%) identified themselves as self-employed. The selected self-employed cases were subjected to missing data analysis; 51 cases were found that had almost complete data missing on key constructs related to the present study. Thus, these cases were deleted from further investigations in the study. The final sample size of valid cases for the study were 332 (Male = 194). Among the 332 cases, 0.53% of data were missing. Since the missing data percentage is low (i.e., below two percent), no additional analyses related to missing data or imputation were conducted.

### 2.2. Measures

Scales of Psychological Wellbeing (SPWB-42 Item). This scale is based on six dimensions that assess different aspects of positive functioning (Ryff, 1989). The original scale consisted of 120 items (20-item per dimension). However, Ryff and colleagues have developed shorter versions of the scale (e.g., 3, 7, 9, and 14 items per dimension; Sirigatti et al., 2009). For the MIDUS 3 study, seven items per dimension scales were employed. Each dimension (or subscale) consists of positive and negative statements. Participants rated

[1] For information related to MIDUS and related database, see https://midus.colectica.org/.
[2] The screening variable code in MIDUS database is C1PB3B.

42 items on a 7-point Likert scale anchored by one = "Strongly agree," and seven = "Strongly disagree." All the items were coded such that higher scores reflected higher PWB.

### 2.3. Statistical analyses

The statistical analyses were employed using IBM SPSS 25.0 and MPlus 6.0 statistics software. First, missing data analysis was performed. Second, descriptive statistics, reliabilities of the subscales, factor analyses, and correlations of the SPWB subscales were conducted. Third, data were subjected to exploratory factor analysis (EFA) to investigate the SPWB factor structure. And finally, based on the literature review on the psychometric properties of the SPWB and the EFA conducted, the original and alternate models of the SPWB factor structure were explored using confirmatory factor analysis (CFA).

### 2.4. Parceling technique

Given the problematic nature of the SPWB based on previous literature (e.g., Abbott et al., 2006, 2009; Sirigatti et al., 2009; Springer and Hauser, 2006; Triadó et al., 2007), in the present study, the SPWB's psychometric properties were also evaluated by parceling technique (Bandalos, 2002; Hair et al., 2002), which can be used as a potential solution for scales with poor psychometric properties (e.g., Matsunaga, 2008). Parceling refers to aggregating individual items into one or more "parcels" and using those parcel(s), instead of items, as the indicator(s) of the target latent construct (e.g., subscales of the SPWB; Kishton and Widaman, 1994). When a given scale consists of nine items, for instance, parcels can be formed by creating several aggregate scores by combining two or more items in a random or non-random manner, or aggregating all nine items into one composite score (Little et al., 2002; Matsunaga, 2008; Rogers and Schmitt, 2004). In the present study, three parcel models (Matsunaga, 2008; see also Rogers and Schmitt, 2004 for the rationale to use three parcels instead of say, four or five parcels) were tested, with parcels created randomly. In other words, instead of using 42 items to capture the SPWB, 18 parcels were created to capture the SPWB (i.e., with three parcels per subscale). The parcels were created for each subscale of the SPWB such that, for example, the autonomy subscale had three parcels instead of seven items. In general, it is maintained that the parceling technique is useful to enhance psychometric properties of measures and to improve model fit indices in structural equation modeling (e.g., CFA). An extant review on parceling technique and related methods is beyond the scope of the present study, which can be found elsewhere (e.g., Bandalos, 2002; Hair et al., 2002; Matsunaga, 2008).

### 2.5. Model fit indices

The goodness of fit for the CFA models was evaluated based on the overall $\chi^2$ statistics. However, $\chi^2$ statistics are heavily influenced by sample size, data non-normality, and model complexity (Byrne, 1998; Lei and Lomax, 2005). Furthermore, with large sample size, the $\chi^2$ test statistic will almost certainly be significant, even when they are good-fitting models for the data in question; therefore, the $\chi^2/df$ ratio is also reported. A $\chi^2/df$ ratio of 2:1 to 5:1 is required (Marsh and Hocevar, 1985) and indicates an acceptable fit, but values of less than three are considered favorable in large sample analyses (Kline, 1998).

Given the drawbacks involving overall $\chi^2$ statistics for CFA models, several fit indices have been developed. Therefore, other indices should also be taken into consideration, which includes the Tucker–Lewis index (TLI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR).[3] Rather than relying on a single measure, it is generally recommended that researchers examine several indices when evaluating model fit (e.g., Kline, 2005; Nye and Drasgow, 2011). For maximum-likelihood (ML) CFA, a cut-off value close to 0.95 for TLI and CFI; a cut-off value close to 0.08 for SRMR; and a cut-off value close to 0.06 for RMSEA are needed before we can conclude that there is a relatively good fit between the hypothesized model and the observed data (Hu and Bentler, 1999). For the present study, multiple indices are referred to, which include CFI, TLI, SRMR, and RMSEA, in addition to $\chi^2$ statistics. Also, the fitness of the data to models was evaluated based on Hu and Bentler's (1999) recommended cutoff values.

## 3. Results

### 3.1. Reliability analysis

Cronbach *alpha* was calculated for each subscale of the SPWB-42. As depicted in Table 1, the resulting coefficients ranged from 0.701 (Purpose in Life) to 0.853 (Self-Acceptance) for the SPWB-42—likewise, Table 1 also depicts correlations between various subscales of the SPWB-42. The strongest correlation was found between environmental mastery and self-acceptance ($r = 0.77$, $p < .01$).

### 3.2. Exploratory factor analysis

As noted, the factorial validity of SPWB has been debated (e.g., Abbott et al., 2010; Sirigatti et al., 2009; Springer and Hauser, 2006; Springer et al., 2006; Triado et al., 2007). Therefore, to examine the factor structure of the SPWB, factor analysis using a maximum-likelihood (ML) estimator was conducted. Also, as recommended by Ryff and Singer (2006), ML with oblimin rotation was

[3] Definitions of the model fit indices can be found elsewhere (e.g., Iacobucci, 2010).

**Table 1**
Correlations and reliability scores among the SPWB-42 subscales (N = 322).

| Subscale | *Autonomy* | *Environmental Mastery* | *Personal Growth* | *Positive Relations* | *Purpose in Life* | *Self-Acceptance* | *Cronbach's α* |
|---|---|---|---|---|---|---|---|
| *Autonomy* | 1.0 | | | | | | .72 |
| *Environmental Mastery* | .55** | 1.0 | | | | | .81 |
| *Personal Growth* | .41** | .50** | 1.0 | | | | .76 |
| *Positive Relations* | .35** | .57** | .59** | 1.0 | | | .79 |
| *Purpose in Life* | .47** | .67** | .65** | .60** | 1.0 | | .70 |
| *Self-Acceptance* | .54** | .77** | .59** | .65** | .70** | 1.0 | .85 |

**Correlation is significant at the 0.01 level.

employed. Eight factors were extracted by this analysis based on the Kaiser-Guttman criterion (eigenvalues greater than 1.0) when all the 42-item pools were subjected to EFA. This analysis revealed that the 8-factor structure accounted for 58.09% of the variance in PWB. Also, the 8-factor structure is different from the 6-factor structure of the SPWB, which was proposed by Ryff (1989). This finding is consistent with the previous SPWB factor structure explored by various studies in diverse contexts (e.g., Triado et al., 2007).

Alternatively, to test Ryff's proposition, extraction of factor structure was limited to six factors, which assumes that items that constitute each subscale will load on the same factor. Again, ML with oblimin rotation was employed in factor extraction. Like the analysis mentioned above, the 6-factor solution was not consistent with Ryff's proposition for the 42-item scale. Factor 1 accounted for 30.11% of the variance, which was from item loadings from all the subscales. Factors 2, 3, 4, 5, and 6 explained 5.90%, 5.20%, 4.68%, 3.45%, and 2.84% of variance respectively. Furthermore, there was evidence that several items cross-loaded across factors.

Consistently, based on the above-mentioned factor analysis results, a more granular analysis of the uni-dimensionality of the subscales of the SPWB was conducted. For this analysis, ML with oblimin rotation was employed using the Kaiser-Guttman criterion. All but two subscales demonstrated uni-dimensionality. The two subscales that were not uni-dimensional are Personal relations with others and Purpose in life. Thus, two items in each of the two subscales (i.e., Personal relations with others and Purpose in life) were deleted based on factor loadings and tested again for uni-dimensionality; upon deletion of the four items resulted in a single-factor structure for the Positive relations with others and Purpose of life subscales. Also, all factor loadings were higher than 0.30 for the rest of the 38 items.

For all the subsequent analyses performed in the present study, 38 items of SPWB (hereafter SPWB-38) were used in addition to the SPWB-42; seven items for autonomy, environmental mastery, personal growth, and self-acceptance subscales and five items for positive relations with others and purpose in life subscales.[4] The 6-factor solution for the SPWB-38 per the EFA demonstrated a better fit with the data ($\chi^2 = 915.45$, $df = 490$; CFI = .93, TLI = .90, RMSEA = .052, SRMR = .032) than SPWB-42 ($\chi^2 = 1134.03$, $df = 624$; CFI = .92, TLI = .89, RMSEA = .050, SRMR = .033)[5]. Also, 6-factor solution for the SPWB-38 parceled demonstrated excellent fit when compared to both the SPWB-42 and the SPWB-38 ($\chi^2 = 104.82$, $df = 60$; CFI = .99, TLI = .97, RMSEA = .048, SRMR = .016).

### 3.3. Confirmatory factor analysis

Researchers often regard CFA as the "gold standard" technique for evaluating internal structure (e.g., Anderson and Gerbing, 1988; Hopwood and Donnellan, 2010; Thompson, 2004). This preference likely stems from the apparent correspondence between CFA techniques and a hypothesis-driven, deductive approach to science (Hopwood and Donnellan, 2010). In CFA, "researchers specify the anticipated factor structure of a measure based on preexisting theory and then evaluate that structure using real data, just like researchers specify falsifiable hypotheses and then conduct systematic investigations to test those hypotheses in the context of general scientific inquiry" (Hopwood and Donnellan, 2010, pg. 333).

Therefore, the data were subjected to CFA. Based on existing literature related to psychometric properties of the SPWB (e.g., Abbott et al., 2006; 2010; Sirigatti et al., 2009; Springer and Hauser, 2006; Triado et al., 2007), four CFA models were tested on the SPWB-42, the SPWB-38, and the SPWB-38 parceled.[6] They were:

MODEL 1 – the original six-factor structure proposed by Ryff and colleagues (e.g., Ryff, 1989; Ryff and Keyes, 1995)

MODEL 2 – a single-factor model that assumes that all the 42 items loaded on a general wellbeing factor (e.g., Triado et al., 2007)

MODEL 3 – a six-factor model with a second-order latent wellbeing factor (Abbott et al., 2006)

MODEL 4 – a six-factor model with 2 s-order factors (e.g., Keyes et al., 2002), where the first second-order factor reflected hedonic wellbeing (loading all the items from 4 subscales: Environmental mastery, Self-acceptance, Positive relations with others, and Autonomy) and the second second-order factor reflected eudaimonic wellbeing that included items from Personal growth and Purpose in life subscales.

The fit indices of the various CFA models[7] related to the SPWB structure are noted in Table 2. Based on the cut-off criteria for fit indices (e.g., Hu and Bentler, 1999; i.e., CFI/TLI >/= .95, RMSEA < 0.06, SRMR < 0.08; Kline, 1998, i.e., $\chi^2/df$ </ = 3) it is clear that

[4] The updated Cronbach's *alpha* coefficients for positive relations with others and purpose in life 5-item subscales were 0.78 and 0.77 respectively.

[5] A $\chi^2$ difference test was conducted, which demonstrated a superior fit [of the SPWB-38 when compared to the SPWB-42) for $\Delta\ \chi 2 = 218.58$ and $df = 134$ at $p < .05$.

[6] The parceling technique was only applied to the SPWB-38 since uni-dimensionality of factors is a prerequisite for the technique's application (Matsunaga, 2008). This assumption was violated for the SPWB-42.

[7] All the CFA models were analyzed without employing modification indices (or LaGrange Multipliers).

**Table 2**
Fit indices of different CFA models for SPWB-42, SPWB-38, and SPWB-18 parcel (N = 322).

| SPWB-42 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $\chi^2$ | *df* | $\chi^2/df$ | CFI | TLI | RMSEA | SRMR |
| Model 1 | 2103.60 | 804 | 2.616 | .792 | .778 | .071 | .064 |
| Model 2 | 2486.20 | 819 | 3.036 | .734 | .720 | .080 | .069 |
| Model 3 | 2141.91 | 813 | 2.634 | .788 | .775 | .071 | .065 |
| Model 4 | 2140.69 | 812 | 2.636 | .788 | .775 | .071 | .065 |
| SPWB-38 | | | | | | | |
| | $\chi^2$ | *df* | $\chi^2/df$ | CFI | TLI | RMSEA | SRMR |
| Model 1 | 1667.68 | 650 | 2.566 | .825 | .810 | .070 | .058 |
| Model 2 | 2017.69 | 665 | 3.034 | .767 | .753 | .080 | .064 |
| Model 3 | 1696.01 | 659 | 2.574 | .821 | .809 | .070 | .059 |
| Model 4 | 1695.73 | 658 | 2.577 | .821 | .809 | .070 | .059 |
| SPWB-38 (Parceled) | | | | | | | |
| | $\chi^2$ | *df* | $\chi^2/df$ | CFI | TLI | RMSEA | SRMR |
| Model 1 | 311.14 | 120 | 2.593 | .943 | .928 | .070 | .044 |
| Model 2 | 560.68 | 135 | 4.153 | .874 | .857 | .099 | .056 |
| Model 3 | 339.75 | 129 | 2.634 | .938 | .926 | .071 | .046 |
| Model 4 | 338.29 | 128 | 2.643 | .938 | .926 | .071 | .046 |

**Table 3**
CFA model factor loadings of the SPWB—38 (parceled) for MODEL 1.

| *Construct* | *Parcels* | *MIDUS Variable* | *Factor Loadings (Std)* |
|---|---|---|---|
| Autonomy | P_A1 | =(C1SE1A + C1SE1G) | 0.65 |
| | P_A2 | =(C1SE1M + C1SE1S) | 0.69 |
| | P_A3 | =(C1SE1Y + C1SE1EE + C1SE1KK) | 0.79 |
| Environmental Mastery | P_EM1 | =(C1SE1B + C1SE1H) | 0.81 |
| | P_EM2 | =(C1SE1N + C1SE1T) | 0.68 |
| | P_EM3 | =(C1SE1Z + C1SE1FF + C1SE1LL) | 0.88 |
| Personal Growth | P_PG1 | =(C1SE1C + C1SE1I) | 0.57 |
| | P_PG2 | =(C1SE1O + C1SE1U) | 0.84 |
| | P_PG3 | =(C1SE1AA + C1SE1GG + C1SE1MM) | 0.69 |
| Positive Relations | P_PR1 | =(C1SE1J + C1SE1P) | 0.87 |
| | P_PR2 | =(C1SE1V + C1SE1HH) | 0.78 |
| | PR7 | =(C1SE1NN) | 0.54 |
| Purpose in Life | P_PL1 | =(C1SE1K + C1SE1Q) | 0.84 |
| | P_PL2 | =(C1SE1W + C1SE1CC) | 0.72 |
| | PL6 | =(C1SE1OO) | 0.56 |
| Self-Acceptance | P_SA1 | =(C1SE1F + C1SE1L) | 0.84 |
| | P_SA2 | =(C1SE1R + C1SE1X) | 0.81 |
| | P_SA3 | =(C1SE1DD + C1SE1JJ + C1SE1PP) | 0.87 |

the data does not fit most of the CFA models adequately for the SPWB-42 and the SPWB-38. However, the SPWB-38 parceled CFA models demonstrated a better fit with the data than the SPWB-42 and the SPWB-38. Among all the CFA models for the SPWB-38 parceled, Model 1 (i.e., the factor structure proposed by Ryff, 1989; Ryff and Singer, 2006) provided superior fit indices, with values closest to Hu and Bentler (1999) recommended cut-off criteria. Also, CFA Models 3 and 4 of the SPWB-38 parceled provided adequate fit indices proposed by several researchers (e.g., Bentler, 1990; Browne and Cudeck, 1993; Kline, 2005). All in all, the data favored the SPWB-38 parceled CFA Model 1 the best, which aligns with the original theoretical model proposed by Ryff and colleagues (Ryff, 1989; Ryff and Singer, 2006) (see Table 3).

## 4. Discussion

The factorial structure of the SPWB scales has been explored across different population samples (adolescents, Chan et al., 2017; Friedman et al., 2017), cultural contexts (e.g., Chinese, Cheng & Chan, 2005; Spanish, Van Dierendonck et al., 2008; Swedish, Lindfors et al., 2006) and versions (e.g., 3, 9, and 14 item versions, Shokri et al., 2008). The original English version has been translated into several other languages (Ryff, 2019). However, to date, the SPWB's psychometric properties have not been tested on a sample of entrepreneurs. Also, recent research calls (e.g., Ryff, 2019; Wiklund et al., 2019) have encouraged research in the context of the PWB and entrepreneurs. Thus, it becomes paramount to analyze the psychometric properties of the SPWB in an entrepreneurial setting as a first step.

To this end, the goal of the present study becomes more significant when we consider the following reasons: 1) the lack of studies that analyze the psychometric properties of the SPWB in an entrepreneurship context, 2) the recent research call to investigate the concept of PWB and entrepreneurship (e.g., Ryff, 2019), and 3) the investigation of the measurement properties of a widely used PWB scale—the SPWB, has been quite controversial (e.g., Springer and Hauser, 2006).

Sirigatti et al. (2009) maintained that a part of the SPWB psychometric properties could be ascribed to different methods of data analysis (e.g., factor rotation, statistical estimators, e.g., Ryff and Singer, 2006). Therefore, this study also proposes ways to deal with these issues related to the SPWB analysis. Consistently, the present study aimed to make available the first exploration of the proposed multidimensional model of PWB by Ryff and colleagues (1989, 1995, and 2006) in an entrepreneurial sample using the MIDUS dataset. The findings of the present study suggest that overall the SPWB-42 psychometric properties are less than satisfactory as far as the model fit indices are concerned, both per EFA and CFA analyses. Also, the various alternate CFA models proposed by some researchers (e.g., Abbott et al., 2006; Triado et al., 2007) demonstrated poor model fit indices when compared to the original SPWB factor structure proposed by Ryff and colleagues (1989, 1995, 2006, and 2019). As far as the SPWB-38 Parceled factor structure is concerned, the model fit indices from both EFA and CFA demonstrated that the data fits well with the original factor structure proposed by Ryff (1989).

The findings of the present study agree with some previous results that investigated the psychometric properties of the SPWB (e.g., Ryff and Keyes, 1995; Sirigatti et al., 2009), which found that the theory-driven 6-factor model of the SPWB has the best-fit indices. It is important to note that the psychometric properties of the SPWB were analyzed based on several guidelines provided by researchers elsewhere (e.g., Ryff and Singer, 2006). In the present study, maximum-likelihood (i.e., ML; full information ML—FIML) statistical estimator with oblimin rotation was employed.

Furthermore, the present study used the MIDUS database, which has been gaining popularity in terms of its usage for various research studies.[8] In a similar vein, several entrepreneurship studies (e.g., Hamilton et al., 2019; Nikolaev and Maldonado-Bautista, 2019) have used the MIDUS datasets. Thus, another significant contribution of this study was to suggest researchers who intend to use the MIDUS datasets to understand PWB and its associated outcomes in entrepreneurial context [and beyond], a potential solution to tackle the SPWB measure. For instance, based on the present study's findings, the parceling technique is recommended in analyzing SPWB and its associated outcomes when employing the MIDUS datasets.

## 5. Limitations and future directions

In the present study, self-employment was considered to be a proxy for entrepreneurship, which is consistent with entrepreneurship literature (e.g., Bjuggren et al., 2012; Nyströ m, 2008). However, the aforementioned statement is debatable. Also, using secondary data in a research study has its drawbacks (e.g., lack of researchers' control over data collection, type of data collected, survey design, etc.). Although the MIDUS dataset is based on a representative sample, it is restricted by geographic area (i.e., the USA). Also, some researchers consider the parceling technique to suffer from some drawbacks (e.g., see Matsunaga, 2008). However, measures were taken in the present study to overcome any shortcomings.

To date, the present study is the *first* to test the psychometric properties of the SPWB in the context of entrepreneurship research. It is encouraged that future studies should replicate the findings of the present study to generalize its conclusions beyond the self-employment context. Future studies should also investigate the different versions of the SPWB in an entrepreneurial context. Moreover, cross-cultural studies that focus on the psychometric properties of the SPWB and entrepreneurship is encouraged.

## CRediT authorship contribution statement

**Srikant Manchiraju:** Conceptualization, Methodology, Software, Writing - original draft.

## Declaration of competing interest

No conflict of interest.

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[8] Several scholars (e.g., Trzesniewski et al., 2011) are proposing that secondary datasets (e.g., MIDUS) be employed in research studies.

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