

Frequency of Suicidal Ideation Inventory: Psychometric Properties of the Spanish Version

Nicolás Sánchez-Álvarez¹, Natalio Extremera Pacheco¹, Lourdes Rey¹, Edward C. Chang², and Olivia D. Chang²
¹ University of Málaga (Spain) and ² University of Michigan, USA

Abstract

Background: The Frequency of Suicidal Ideation Inventory (FSII) is a new and brief measure designed to assess for suicide ideation frequency in the previous year. To provide evidence of the reliability and validity for the FSII in a Spanish-speaking community, the present study examined the psychometric properties of the Spanish version of the FSII (FSII-S) in a sample of 1,013 adults from southern Spain (51.4% women), ranging from 18 to 82 years old. **Method:** In addition to the FSII-S, the participants completed the following measures: Suicidal Behaviors Questionnaire-Revised, Beck Depression Inventory, Positive and Negative Affectivity Scale, Flourishing Scale, and Satisfaction with Life Scale. **Results:** The results of Confirmatory Factor Analysis indicated a good fit for a one-dimensional model of the FSII-S, and high reliability ($\alpha = .89$). FSII-S scores correlated negatively with suicide protective factors, and positively with suicide risk factors. Multi-group analyses showed the invariance of the factor structure of FSII-S across gender and age. **Conclusions:** In line with studies in other countries, these findings provide evidence of the validity, reliability, and invariance of the FSII-S as a brief measure of suicidal ideation frequency in Spanish adults.

Keywords: Suicidal ideation, Spanish validation, measurement, factorial validity, adult population.

Resumen

Inventario de Frecuencia de Ideación Suicida: Propiedades Psicométricas de la Versión Española. Antecedentes: el Inventario de Frecuencia de Ideación Suicida (FSII) es una medida nueva y breve que evalúa la frecuencia de ideaciones suicidas en el último año. Para proporcionar evidencias de fiabilidad y validez del FSII en la comunidad hispanohablante, el presente estudio examinó las propiedades psicométricas de la versión española del FSII (FSII-S) en una muestra de 1.013 adultos del sur de España (51,4% mujeres), con un rango de edad de 18 a 82 años. **Método:** además del FSII-S, los participantes completaron las siguientes medidas: Cuestionario Revisado de Comportamientos Suicidas, Inventario de Depresión de Beck, Escala de Afectividad Positiva y Negativa, Escala de Plenitud y Escala de Satisfacción Vital. **Resultados:** los resultados de la estructura interna indicaron un buen ajuste del modelo unidimensional del FSII-S y una alta fiabilidad ($\alpha = .89$). Las puntuaciones del FSII-S correlacionaron negativamente con factores protectores del suicidio y positivamente con factores del riesgo suicida. Los análisis multigrupos mostraron invarianza de estructura factorial del FSII-S por género y edad. **Conclusiones:** consistente con estudios en otros países, estos hallazgos proporcionan evidencia de la validez, fiabilidad e invarianza del FSII-S como medida breve de frecuencia de ideación suicida en adultos españoles.

Palabras clave: ideación suicida, validación española, medición, validez factorial, población adulta.

According to official figures reported by the World Health Organization, in 2017, nearly 800,000 people died by suicide worldwide. Suicide accounted for 1.4% of all deaths globally, making it one of the leading causes of death among individuals (World Health Organization, 2018). This figure is even greater if one includes the number of suicide attempts made. Notably, after the 2008 economic crisis, rates of suicide increased in the US and European countries (Chang, Stuckler, Yip, & Gunnell, 2013), and there were increases in negative mental health consequences in Spain (Gili, Roca, Basu, McKee, & Stuckler, 2013). Indeed,

recent studies have found that the prevalence of deaths by suicide in Spain in 2017 was 87 per 100,000 individuals (World Health Organization, 2018), with some research reporting a relative increase in suicides, especially in the working-age adult population (López-Bernal, Gasparrini, Artundo, & McKee, 2013). In Spain, remarkable suicide rate trends from 1974/1976 to 1999/2000 have been reported, in which rates increased considerably (Hansen & Pritchard, 2008). In short, several studies have shown that adults aged 35 to 54 years are the most affected in both sexes, especially in Andalusia, the most populated region of Spain (Córdoba-Doña, Sebastián, Escolar-Pujolar, Martínez-Faure, & Gustafsson, 2014). It is important to identify people who are at risk of dying by suicide by developing useful tools that can better identify risk of suicide to prevent suicide among vulnerable Spanish adult non-clinical populations (García-Nieto et al., 2012).

The number of previous suicide attempts is considered one of the most important predictors of a subsequent suicide attempt

(Fernández-Artamendi et al., 2019; Goñi-Sarriés, Blanco, Azcárate, Peinado, & López-Goñi, 2018). Negative life events, low self-esteem and stressful circumstances are known to trigger suicide risk, with suicide ideation being an important risk predictor for suicidal behaviors and suicide attempts (Franklin et al., 2017; Soto-Sanz et al., 2019), including among young Spanish adults (Blasco et al., 2019). Suicidal ideation refers to thoughts of tiredness with one's life, desires to take one's own life as a solution to problems, and feelings that you have a life that is not worthwhile (Beck, Kovacs, & Weissman, 1979). These thoughts are often accompanied by an active desire to die and planning how to die, and these thoughts can be recurring (Joiner, Rudd, & Rajab, 1997). Several instruments have been developed to assess and identify early signs of suicidal ideation in young adult populations (Batterham et al., 2015; Blasco et al., 2019; García-Nieto, Blasco-Fontecilla, Paz-Yepes, & Baca-García, 2013); many of these instruments share problems related to length and heterogeneity (Beck et al., 1979). Current instruments which assess suicidal ideation have several methodological problems. For instance, some of the items on these scales evaluate other variables which are related to suicidal ideation, such as capability of attempt, courage, or competence (Beck et al., 1979), and even variables related to the method and ability to carry out suicidal behavior are evaluated (Beck, Brown, & Steer, 1997). Therefore, some instruments assess latent factors other than suicidal ideation, which in turn influence a large number of items (Batterham et al., 2015). In Spain, there exists validated, brief suicide scales, which have typically been used in Spanish populations, such the Paykel scale (Fonseca-Pedrero et al., 2018; Rubio, Montero, Salvador, & Marín, 1998). This scale is comprised of five items that assess jointly the presence of thoughts of death, suicide ideation, suicide plans, and suicide attempt in the last year. Respondents answer each item "yes" or "no" which does not allow to quantify the frequency of suicidal ideation.

Recently, Chang and Chang (2016) developed the Frequency of Suicidal Ideation Inventory (FSII), which has been validated in non-clinical populations of several countries (American, Turkish, Hungarian, and Chinese samples) (Chang & Chang, 2016). The goal of this scale is to assess the frequency of thoughts about suicide as an indicator of suicide risk in the general non-clinical adult population. This measure is a five-item self-report questionnaire focused on one specific suicidal ideation dimension to evaluate the frequency of suicidal ideation over the last 12 months. Previous studies of the psychometric properties of the FSII in different samples have confirmed a one-dimensional factor structure (Chang & Chang, 2016; Chang et al., 2017). The English version of the FSII has been well-validated, with good six-week test-retest reliability. Different translations from China, Hungary, and Turkey have shown adequate internal reliability in several international samples (Chang & Chang, 2016).

The FSII has been demonstrated to be positively correlated with other measures of suicidal behaviors and risk factors, and negatively correlated with suicide protective factors, which provides empirical evidence that supports factorial validity and construct validity (Chang & Chang, 2016). According to previous studies, both distal factors (e.g., depressive symptoms, negative affectivity, hopelessness) (Beck, Steer, Beck, & Newman, 1993) and proximal factors (e.g., suicidal ideation) are factors that may increase the risk of dying from suicide. Distal factors (e.g., depressive symptoms) affect the threshold for suicide and indirectly increase an individual's risk when they experience a proximal risk

factor. Proximal risk factors are more closely linked to suicidal behavior and often act as precipitants (e.g., suicide ideation). However, there are also some other positive aspects related to well-being and personal traits which are seen as protective factors, reducing the risk of suicide attempts (e.g., flourishing, life satisfaction, optimism, positive affect) (Hirsch, Duberstein, Chapman, & Lyness, 2007). Regarding sociodemographic dimensions associated with suicide ideation measured by the FSII, as far as we know, no prior research has analysed the invariance by sex and gender groups. It is speculative to assume that differences in prevalence of stressful events and specific life stressors across gender and age stages might lead to differences between males and females across the adult life span in psychiatric and mental health outcomes (Hatch & Dohrenwend, 2007). Likewise, determining the invariance of factor structure across sex and gender is necessary to justify consistency of interpretation in suicide ideation for males and females in different age groups. Self-report instruments such as the FSII are assumed to measure a latent factor, which is used to compare groups or to follow individuals' suicide ideation over time. Therefore, the FSII should measure the identical construct with the same structure across different groups. One main aim of this study was to analyze the measurement invariance of the FSII to demonstrate that individuals across gender and age interpret the items and the underlying latent factors in the same way and, therefore, factor means can be compared across different groups.

In summary, although there are well-validated Spanish scales to assess suicidal thoughts and attempts (Fonseca-Pedrero et al., 2018; Rubio et al., 1998), there is a lack of brief and useful measures that specifically assess the frequency of suicide ideation in Spanish samples. It is important to validate new suicidal ideation measures in Spanish-speaking samples to identify early signs of suicide risk in adult populations. Likewise, providing measurement invariance across gender and age for the FSII has practical significance for the use of this scale across different age and gender groups and for the longitudinal tracking of participants. Thus, these instruments would help to examine the specific factors associated with suicidality (e.g., suicidal ideation) in Spain, in order to create tailored suicide prevention programs among vulnerable Spanish adult non-clinical populations and to potentially provide information on developmental periods during which females and males are particularly vulnerable to suicide-related experiences (Hawton & van Heeringen, 2009).

To our knowledge, a validated version of the FSII does not yet exist for use with Spanish adults. To fill this gap, the main aim of this study was to validate the Spanish version of the FSII scale in a non-clinical sample of adults. Our main objectives were to: (a) to examine the current frequency suicide ideation in a Spanish-speaking adult sample. On the basis of prior findings in the original English version and in other international non-clinical samples, we expected a low average frequency of suicide ideation in our Spanish sample; b) to analyse the factor structure and reliabilities of the FSII-S. In line with prior studies, we expected that the factor structure analysis should confirm the one-dimensional structure, and an adequate internal reliability; (c) to examine the associations of the FSII-S with other factors related to suicidal ideation. We expected positive and significant associations between FSII-S scores and suicidal behaviors, depressive symptoms, negative affectivity, and negative and significant associations with flourishing, life satisfaction, and positive affect; and (d) to examine factor structure and measurement invariance across gender and age. We expected

that latent mean differences on the FSII-S are comparable across gender and age groups.

Method

Participants

In this study, the sample was composed of 1,013 adults (521 females) from southern Spain (Andalusia) with ages ranging from 18 to 82 years (M= 39.64, SD= 16.17). The sample was selected from the University of Jaén (26.9% students) and the community, using non-probability and convenience sampling. The total sample reported marital status: single (42.3%), married (49.0%), divorced (4.9%), and widowed (3.8%). Regarding the academic level, 34.3% reported primary studies, 29.9% secondary studies, 29.1% university studies, and 6.7% non-studies. Finally, the employment status: employed (56.3%), unemployed (32.4%), and retired (11.4%). The sample was split into three age groups: the first group consisted of 329 young adults aged between 18 and 29 (M= 21.12, SD= 3.16, 60% female). The second group consisted of 361 middle-aged adults aged between 30 and 49 (M= 39.33, SD= 6.23, 48% female). The third group consisted of 323 older adults aged between 50 and 82 (M= 58.84, SD= 6.97, 46% female).

Instruments

Sociodemographic data. All participants provided basic sociodemographic data about their age, sex, academic level, employment status, and marital status.

Frequency of Suicidal Ideation Inventory (FSII; Chang & Chang, 2016). The FSII is a 5-point scale that assesses the frequency of suicidal thoughts over the past 12 months, from 1 (*never*) to 5 (*almost every day*). The total score ranges from 5 to 25, with higher scores indicating greater suicidal ideation frequency (see Table 1).

Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001). The SBQ-R is a brief self-report instrument that evaluates four symptoms related to suicide. Adequate estimates of internal consistency and reliability have been reported in prior work (Osman et al., 2001). The Spanish version has good levels of reliability and validity in Spanish samples (Extremera, Quintana-Orts, Mérida-López, & Rey, 2018).

Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988). Used for the assessment of the intensity of depressive symptoms, this scale consists of 21 items that assess negative mood, pessimism, weight loss, fatigue, suicidal thoughts, guilt, and sense of failure. The total score ranges from 0 to 63. We used a well-validated Spanish version that has shown good internal consistency and reliability (Sanz & Vázquez, 1998).

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This scale, developed by Watson et al. (1988) was adapted for Spanish children and adolescents by Sandín (2003). It is a self-report measure that includes 20 items of which ten items refer to positive affect (PA; e.g., “I am inspired”) and ten items that refer to negative affect (NA; e.g., “I feel tense”). Participants indicate how they feel and/or behave most of the time, using a scale ranging from 1 (*never*) to 3 (*many times*).

Flourishing Scale (FS; Diener et al., 2010). This scale is an eight-item measure that assesses several aspects of positive relationships, feelings of competence, and purpose in life. Participants indicate their agreement with each item on a seven-point Likert scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate a positive self-view in important areas of functioning. We used the Spanish version, which has shown satisfactory psychometric properties (Ramírez-Maestre et al., 2017).

Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). This scale is comprised of five self-referencing statements about perceived global life satisfaction across a seven-point Likert scale. Participants indicate their extent of agreement/disagreement with each item on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). We used the well-validated Spanish version which has shown evidence of discriminant validity and adequate internal consistency (Atienza, Pons, Balaguer, & Merita, 2000).

Procedure

Translation of the instrument was conducted according to recommended guidelines by Zenisky and Hambleton (2015): two authors of this study independently translated the original English FSII into Spanish. Then, a bilingual independent translator performed the back translation. The discrepancies between the original version and the Spanish version were discussed and adjusted by a panel of experts from the university.

Data collection took place at a university. Undergraduate students enrolled in a class of methodology at the Faculty of Psychology. The principal researcher trained the students in the fundamentals and instructions of collecting data using a snowball sampling strategy (Hendriks, Blanken, Adriaans, & Hartnoll, 1992). This strategy was adopted to distribute the battery of questionnaires to other samples from the community, fostering the heterogeneity of the sample in relation to gender, age, and educational levels (Demerouti & Rispens, 2014). Participants were informed of the confidentiality and anonymity of the survey, as well as the voluntary nature of participation. None of participants received any reward for taking part in the study.

Aware that a student-recruited sampling technique has several limitations, we applied an administrative procedure to reduce the associated errors. First, inclusion and exclusion criteria

Table 1
Frequency of Suicide Ideation Inventory Spanish version (FSII-S)

<p>Instructions: Please read carefully each statement about you and indicate the extent to which you agree or disagree [Instrucciones: Por favor lee los siguientes enunciados respecto a ti mismo e indica tu grado de acuerdo o desacuerdo].</p> <ol style="list-style-type: none"> 1. Over the past 12 months, how often have you thought about hurting yourself? [Durante los últimos 12 meses ¿con qué frecuencia has pensado en hacerte daño?] 2. Over the past 12 months, how often have you believed that your life was not worth living? [Durante los últimos 12 meses ¿con qué frecuencia has creído que no merecías vivir?] 3. Over the past 12 months, how often have you wondered what would happen if you ended your own life? [Durante los últimos 12 meses ¿con qué frecuencia te has preguntado qué pasaría si pusieses fin a tu vida?] 4. Over the past 12 months, how often have you thought about committing suicide? [Durante los últimos 12 meses ¿con qué frecuencia has pensado en suicidarte?] 5. Over the past 12 months, how often have you wished you did not exist? [Durante los últimos 12 meses ¿con qué frecuencia has deseado no existir?]
--

were applied: (1) participants over 18 years old, (2) not obtain informed written consent, and (3) Spanish people. Second, sociodemographic data were collected to get a stratification of sex, age, and educational level. Secondly, the questionnaires included explicit instructions to avoid the inconveniences of the application of the snowball sampling technique.

Data analysis

Statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS; IBM, 2015) and Rstudio (Rosseel, 2012). For Confirmatory Factor Analysis (CFA) and Multiple Group Confirmatory Factor Analysis (MG-CFA) we used the Laavaan, semPlot, polycor, and semTools packages, using the Weighted Least Squares Mean and Variance Adjusted method. Model fit was tested using χ^2 , the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation index (RMSEA), with values of CFI and TLI > .90, SRMR and RMSEA < .08, indicating a good fit (Kline, 2015). The percentage of missing data was acceptable (3.6%). Thus, the missing values were imputed using the imputation algorithm of expectation-maximization (EM) (Liang & Bentler, 2004). To determine the internal consistency of the instruments, we estimated Cronbach’s alpha coefficient (α), McDonald’s omega coefficient (ω), Guttman’s lambda (λ), and the function of information from the Item Response Theory (Muñiz & Fonseca-Pedrero, 2019).

To examine the factorial invariance across gender and age groups, a MG-CFA was conducted through four levels of factorial invariance: configural invariance, metric factorial invariance, scalar factorial invariance, and strict factorial invariance (Timmons, 2010). The invariance constraint test is based on the same parameters which exist for all groups (configural invariance). If the invariance with no constraints model is confirmed, that means that equivalence exists across groups. Afterwards, the factor loadings are required to be equivalent across groups (metric invariance). In the case where metric invariance is met, the different groups respond to items in the same way. Then, in the next step, the equivalence of means for items across groups (scalar invariance) is included. Finally, the factor loadings, means of the indicators, residual variances, and residual covariances are constrained to be equal across groups (strict invariance). The invariance of residual variances and residual covariances showed equal latent scores across groups. This step invariance process compares each model

with the previous one. For this, the chi-square difference test χ^2 , RMSEA, SRMR, and CFI are used. The variations in the fit of the models are compared and are quantified through Δ CFI, Δ SRMR and Δ RMSEA. When sample size is high than 300, increases greater than Δ CFI < .010, Δ SRMR < .030 and Δ RMSEA < .015 suggest the existence of invariance (Chen, 2007).

Results

Means, Standard Deviations, and Internal Consistencies

Means, standard deviations, and reliability of the FSII scores from the present Spanish sample are shown in Table 2, together with the scores obtained in US, Turkish, Hungarian, and Chinese samples of other studies (Chang & Chang, 2016). Spanish participants reported low frequency of suicidal ideation ($M= 7.87$; $SD= 3.88$). These findings are consistent with findings obtained in prior research in non-clinical adult populations (e.g., American adults, Turkish adults, etc.). Internal consistency coefficients were similar to those indicated in the original scale ($\alpha= .89$).

Confirmatory Factor Analysis

Given that prior research has found that the FSII taps into a single latent factor, we conducted a confirmatory factor analysis on the FSII-S. The index of fit of the factor structure model indicated a good fit, with the following indices: $X^2 (5, N= 1,013)= 1.102$, $p= .954$, $TLI= .999$, $CFI= .999$, $SRMR= .017$, and $RMSEA= .001$ ($CI\ 95\%= .010-.050$). Factor loadings (standardized) and item information for the FSII-S are presented in Table 3.

Table 2
Means, Standard Deviations, and Internal Consistencies of the Frequency of Suicidal Ideation Inventory in Samples from Spain, US, Turkey, Hungary, and China

	N	M	SD	α
Spanish sample	1013	7.87	3.88	.89
US sample	399	6.35	3.26	.96
Turkish sample	153	7.87	3.65	.85
Hungarian sample	146	7.31	3.72	.93
Chinese sample	102	7.53	3.12	.85

Note: Means and Standard Deviations for US, Turkish, Hungarian, and Chinese samples as reported in Chang and Chang (2016)

Table 3
Polychoric correlation, Factor loadings, Mean, SD, Skewness, Kurtosis, corrected Item-Total correlation for the FSII-S

Item	1	2	3	4	Factor loadings			Mean(SD)	Skewness	Kurtosis	r			
					Total sample	Female	Male					Young adults	Middle adults	Older adults
1	–				.827	.816	.839	.815	.877	.760	1.46(.83)	1.92	3.42	.83
2	.75	–			.797	.843	.746	.779	.800	.799	1.60(.94)	1.58	1.98	.82
3	.71	.70	–		.770	.771	.769	.761	.754	.825	1.80(1.05)	1.16	0.53	.83
4	.84	.76	.80	–	.761	.767	.753	.737	.777	.752	1.39(.80)	2.36	5.52	.86
5	.75	.77	.74	.83	.856	.837	.877	.878	.825	.863	1.63(.96)	1.51	1.73	.86

N= 1013

From the perspective of the Theory of Response to the Item, the complementary psychometric indicators were estimated using the WINMIRA program. The distribution and information function parameters of the FSII-S scale are presented in Figure 1. As can be seen in the figure, the FSII-S test provides maximum information for high values.

Convergent Validity

Pearson correlations for all variables are presented in Table 4. In support of convergent validity, the FSII-S scores correlated positively and significantly ($p < .001$) with measures of suicide risk - specifically the SBQ-R, BDI, and NA. Conversely, FSII-S scores correlated negatively and significantly ($p < .001$) with measures of suicide protection – specifically the FS, SWLS, and PA. The internal consistency coefficients are presented in Table 4; all values were satisfactory.

Multi-Group Confirmatory Factor Analysis

A MG-CFA was used to determine whether there were gender or age group differences in the modelling of the FSII-S. The test

results' invariance (Timmons, 2010) showed that differences between gender or age in the model were non-significant (see Table 5). The invariance tests by sex and age groups of the model begins with the establishment of the baseline model (model 1); the model showed an adequate adjustment which supports the configurational validity through sex and age groups. For metric invariance, the results showed an appropriate adjustment of model 2, and the differences between models 2 and 1 did not exceed the established threshold ($\Delta CFI < .010$, $\Delta SRMR < .030$, and $\Delta RMSEA < .015$), contributing to the metric invariance support of equivalence of the factor loadings across the sex and age groups. For the next step (scalar invariance), model 3 included equivalence of means for items across groups and showed a good fit, and variations fit index between models 3 and 2 did not exceed the cut-point. Following the invariance test, model 4 (strict invariance) showed a reasonable fit, and the comparison between models 4 and 3 was less than the critical values across groups. Therefore, the model was consistent in providing a robust test regardless of sex and age in the adult population, which supported the initial hypothesis of the FSII-S's structural invariance across sex and age groups.

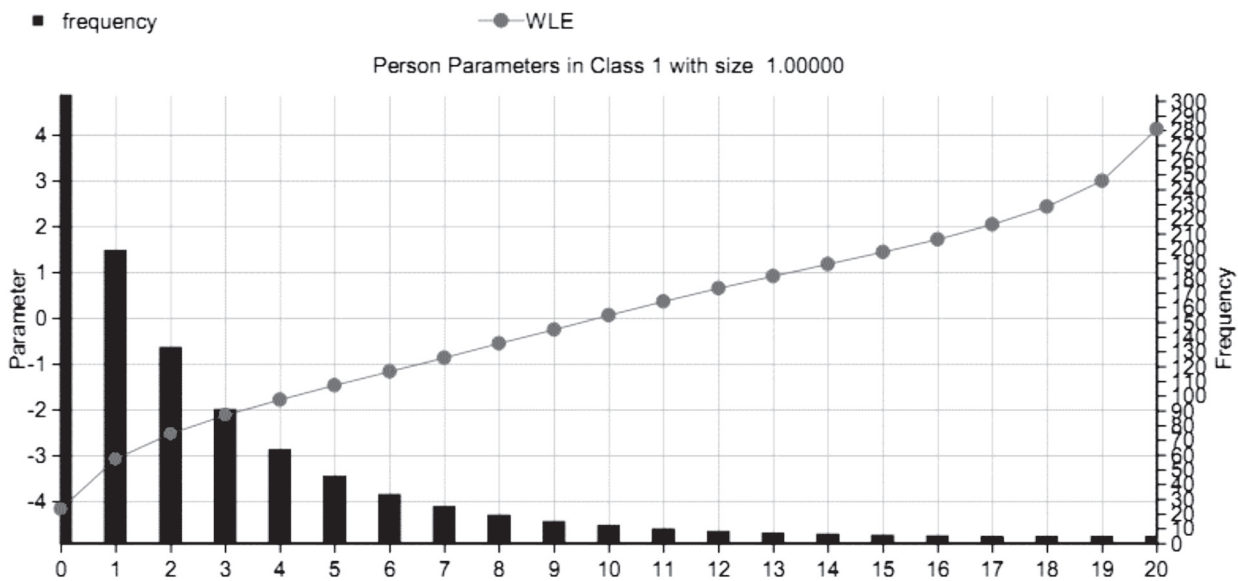


Figure 1. Frequency distribution and information function of FSII-S

Table 4
Pearson Correlation Coefficients, Means (Standard Deviations), and internal consistency coefficients

	1	2	3	4	5	6	7	Alpha	Omega	Guttman	M(SD)
1.FSII-S	–							.89	.90	.88	7.87(3.88)
2.SBQ	.60	–						.72	.75	.71	5.95(2.77)
3.BDI	.47	.51	–					.90	.89	.89	28.98(8.07)
4.NA	.41	.21	.42	–				.84	.84	.83	22.57(7.60)
5.FS	-.42	-.41	-.51	-.29	–			.88	.88	.87	45.82(7.56)
6.SWLS	-.35	-.38	-.47	-.26	.69	–		.85	.86	.84	25.24(6.00)
7.PA	-.23	-.21	-.41	-.14	.56	.50	–	.84	.84	.85	34.28(6.99)

Note: N= 1013. FSII-S= Spanish Frequency of Suicidal Ideation Inventory; SBQ-R= Suicidal Behaviors Questionnaire Revised; BDI= Beck Depression Inventory; NA= Negative Affect Scale; FS= Flourishing Scale; SWLS= Satisfaction with Life Scale; PA= Positive Affect Scale.
All correlations indexes were significant $p < .001$

Table 5
Tests for invariance of FSII-S

Model	X ²	df	CFI	RMSEA	SRMR	Comparison	ΔCFI	ΔRMSEA	ΔSRMR
<i>Males vs Females</i>									
Model 1.Configural	1.368	10	.999	.001	.018	–	–	–	–
Model 2.Metric	4.424	15	.999	.001	.032	2 vs 1	.000	.000	.014
Model 3.Scalar	5.321	19	.999	.001	.029	3 vs 2	.000	.000	.003
Model 4.Strict	6.385	24	.999	.001	.032	4 vs 3	.000	.000	.003
<i>Young adults vs Middle adults vs Older adults</i>									
Model 1.Configural	2.266	15	.999	.001	.054	–	–	–	–
Model 2.Metric	22.932	25	.999	.001	.075	2 vs 1	.000	.000	.021
Model 3.Scalar	34.336	33	.999	.011	.070	3 vs 2	.000	.010	.005
Model 4.Strict	52.167	43	.993	.025	.097	4 vs 3	.006	.014	.027

Discussion

The validation of measures to evaluate suicidal thoughts is a priority in the research and prevention of suicidal behaviors (Chang et al., 2017), especially in countries such as Spain, where the prevalence of suicide has increased during the last decades. In this study, we sought to investigate the psychometric properties of the FSII-S across a relatively large sample of Spanish adults. Furthermore, the confirmatory factor analysis demonstrated a one-dimensional structure for the FSII-S, with excellent internal consistency and reliability, in line with the original version and other adaptation studies (Chang et al., 2017; Chang & Chang, 2016). Moreover, regarding construct validity, the FSII-S showed significant and positive correlations with depressive symptomatology and negative affect (Beck et al., 1993), consistent with the general notion that negative mood might be related to suicidal ideation. Additionally, regarding convergent validity, a high correlation was found between FSII-S scores and SBQ-R scores. Finally, in line with the expectation that positive psychological factors may protect against suicidal ideation, FSII-S scores were found to be significantly and negatively linked to life satisfaction, positive affect, and flourishing (Hirsch et al., 2007). Overall, these results are consistent with past findings (Chang et al., 2017; Chang & Chang, 2016), suggesting that future interventions focused on reducing negative conditions and increasing positive conditions might benefit from efforts to reduce suicidal ideation in Spanish adults. Additionally, the analysis of multi-group invariance revealed that configural, metric, and scalar invariance existed across gender and age, suggesting that the Spanish FSII items, as well as the underlying latent factor, are interpreted similarly by females and males. That is, the same structure of the FSII-S causes equal associations of items with the same factor and an equality of strength in the relationship of the construct with each item was corroborated for both genders. These findings are in line with previous literature that found no differences in suicidal ideation between sexes (Fonseca-Pedrero et al., 2018) and suggest that the FSII can be reliably applied to Spanish female and male adults. Similarly, the results did not show significant differences between the three age groups, maintaining a factorial and metric factor invariance. Accordingly, these findings show the consistency of the FSII-S in different adult stages and are of great relevance for the evaluation of suicidal ideation in young adults, middle-aged, and older adults, specifically for the longitudinal tracking of participants. Therefore, consistent with our findings, Spanish FSII scores might thus be meaningfully

compared, not only across gender, but also across this large age range within adulthood.

Despite these promising findings, some limitations of the present study are worth noting. First, our findings should be considered as preliminary, because of the use of student-recruited sampling. Although this sampling technique is a valuable tool increasingly used in research (Wheeler, Shanine, Leon, & Whitman, 2014), further research using traditional sampling procedures should be carried out to support the findings of the present study. Second, for a more complete validation process, it would be interesting in future work to provide data about the FSII-S's test-retest reliability. Third, the cross-sectional nature of our research implies that it is impossible to draw conclusions regarding cause and effect with respect to the relationship between the FSII-S and measured well-being outcomes. Also, our findings suggest certain age stability, but cross-sectional designs are less suited to infer developmental trends. Furthermore, prospective research is needed to examine the age invariance across different time points, and the predictive validity of the FSII-S in accounting for risky behaviors and factors associated with suicide attempts over time in Spanish adults. Finally, we did not control for other personal dimensions that may be associated with suicidal ideation (e.g., cognitive intelligence, personality traits). Future studies would benefit from the inclusion of personality traits, cognitive intelligence, social desirability measures, as well as questions about socio-economic status (Hegerl et al., 2019). At the same time, future studies should extend our findings with the inclusion of clinical samples to provide clinical cut-off points of this instrument.

Notwithstanding these limitations, our study was designed to provide support for the validation of the Spanish version of the FSII in Spanish adults. Our findings suggest that the FSII-S might be a useful tool for researchers when studying risk factors of suicide in Spanish adults, especially when a short and reliable measure of suicidal ideation frequency is desired. In sum, these results are an important contribution to the literature on psychometric characteristics of brief suicide ideation measures, suggesting invariance across male and female groups as well as three adult age groups. Thus, the Spanish FSII may prove useful in the detection and prevention of warning signs and early symptoms of those at high risk of suicide among Spanish-speaking populations.

Acknowledgements

This work was supported by Junta de Andalucía/FEDER funds (UMA18-FEDERJA-147).

References

- Atienza, F., Pons, D., Balaguer, I., & Merita, M. (2000). Propiedades psicométricas de la Escala de Satisfacción con la Vida en adolescentes [Psychometric properties of the Satisfaction with Life Scale in adolescents]. *Psicothema*, *12*(2), 314-319. Retrieved from <https://www.redalyc.org/articulo.oa?id=72712226>
- Batterham, P., Ftanou, M., Pirkis, J., Brewer, J., Mackinnon, A., & Christensen, H. (2015). A systematic review and evaluation of measures for suicidal ideation and behaviors in population-based research. *Psychological Assessment*, *27*(2), 501-512. <https://doi.org/10.1037/pas0000053>
- Beck, A., Steer, G., & Steer, R. (1997). Psychometric characteristics of the Scale for Suicide with psychiatric outpatients. *Behaviour Research and Therapy*, *35*(11), 1039-1046. [https://doi.org/10.1016/S0005-7967\(97\)00073-9](https://doi.org/10.1016/S0005-7967(97)00073-9)
- Beck, A., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: The Scale for Suicide Ideation. *Journal of Consulting and Clinical Psychology*, *47*(2), 343-352. <https://doi.org/10.1037/0022-006X.47.2.343>
- Beck, A., Steer, R., Beck, J., & Newman, C. (1993). Hopelessness, depression, suicidal ideation, and clinical diagnosis of depression. *Suicide and Life-Threatening Behavior*, *23*(2), 139. <https://doi.org/10.1111/j.1943-278X.1993.tb00378.x>
- Beck, A., Steer, R., & Garbin, M. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychological Review*, *8*, 77-100. [https://doi.org/10.1016/0272-7358\(88\)90050-5](https://doi.org/10.1016/0272-7358(88)90050-5)
- Blasco, M., Vilagut, G., Almenara, J., Roca, M., Piqueras, J., Gabilondo, A.,... Vives, M. (2019). Suicidal thoughts and behaviors: Prevalence and association with distal and proximal factors in Spanish university students. *Suicide and Life-Threatening Behavior*, *49*(3), 881-898. <https://doi.org/10.1111/sltb.12491>
- Chang, E. C., & Chang, O. D. (2016). Development of the Frequency of Suicidal Ideation Inventory: Evidence for the validity and reliability of a brief measure of suicidal ideation frequency in a college student population. *Cognitive Therapy and Research*, *40*(4), 549-556. <https://doi.org/10.1007/s10608-016-9758-0>
- Chang, E. C., Chang, O. D., Martos, T., Sallay, V., Najarian, A., & Lee, J. (2017). Validity of the Frequency of Suicidal Ideation Inventory in Hungarian adults. *Death Studies*, *41*(4), 236-240. <https://doi.org/10.1080/07481187.2016.1244226>
- Chang, S., Stuckler, D., Yip, P., & Gunnell, D. (2013). Impact of 2008 global economic crisis on suicide: Time trend study in 54 countries. *BMJ*, *347*(7925), 1-15. <https://doi.org/10.1136/bmj.f5239>
- Chen, F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, *14*(3), 464-504. <https://doi.org/10.1080/10705510701301834>
- Córdoba-Doña, J., San-Sebastián, M., Escobar-Pujolar, A., Martínez-Faure, J., & Gustafsson, P. (2014). Economic crisis and suicidal behaviour: The role of unemployment, sex and age in Spain. *International Journal Form Equity in Health*, *13*(55). <https://doi.org/10.1186/1475-9276-13-55>
- Demerouti, E., & Rispens, S. (2014). Improving the image of student-recruited samples: A commentary. *Journal of Occupational and Organizational Psychology*, *87*(1), 34-41. <https://doi.org/10.1111/joop.12048>
- Diener, E., Emmons, R., Larsen, J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, *49*(1), 71-75. https://doi.org/10.1207/s15327752jpa4901_13
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, *97*(2), 143-156. <https://doi.org/10.1007/s11205-009-9493-y>
- Extremera, N., Quintana-Orts, C., Mérida-López, S., & Rey, L. (2018). Cyberbullying victimization, self-esteem and suicidal ideation in adolescence: Does emotional intelligence play a buffering role? *Frontiers in Psychology*, *9*, 367. <https://doi.org/10.3389/fpsyg.2018.00367>
- Fernández-Artamendi, S., Al-Halabi, S., Burón, P., Rodríguez-Revuelta, J., Garrido, M., González-Blanco, L.,... Bobes, J. (2019). Prevention of recurrent suicidal behavior: Case management and psychoeducation. *Psicothema*, *31*(2), 107-113. <https://doi.org/10.7334/psicothema2018.247>
- Fonseca-Pedrero, E., Inchausti, F., Pérez-Gutiérrez, L., Aritio-Solana, R., Ortuño-Sierra, J., Sánchez-García, M.,... Pérez-Albéniz, A. (2018). Suicidal ideation in a community-derived sample of Spanish adolescents. *Revista de Psiquiatría y Salud Mental (English edition)*, *11*(2), 76-85. <https://doi.org/10.1016/j.rpsmen.2018.02.008>
- Franklin, J., Ribeiro, J., Fox, K., Bentley, K., Kleiman, E., Huang, X.,... Franklin, C. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological Bulletin*, 1-47. <https://doi.org/10.1037/bul0000084>
- García-Nieto, R., Blasco-Fontecilla, H., Paz-Yepes, M., & Baca-García, E. (2013). Traducción y validación de la Self-Injurious Thoughts and Behaviors Interview en población española con conducta suicida [Translation and validation of the Self-Injurious Thoughts and Behaviors Interview in Spanish population with suicidal behavior]. *Revista de Psiquiatría y Salud Mental*, *6*(3), 101-108. <https://doi.org/10.1016/j.rpsm.2012.07.001>
- García-Nieto, R., Parra-Urbe, I., Palao, D., López-Castroman, J., Sáiz, P., García-Portilla, M.,... Baca-García, E. (2012). Protocolo breve de evaluación del suicidio: fiabilidad interexaminadores [Brief suicide evaluation protocol: Inter-examiner reliability]. *Revista de Psiquiatría y Salud Mental*, *5*(1), 24-36. <https://doi.org/10.1016/j.rpsm.2011.10.001>
- Gili, M., Roca, M., Basu, S., McKee, M., & Stuckler, D. (2013). The mental health risks of economic crisis in Spain: Evidence from primary care centres, 2006 and 2010. *European Journal of Public Health*, *23*(1), 103-108. <https://doi.org/10.1093/eurpub/cks035>
- Goñi-Sarriés, A., Blanco, M., Azcárate, L., Peinado, R., & López-Goñi, J. (2018). Are previous suicide attempts a risk factor for completed suicide? *Psicothema*, *30*(1), 33-38. <https://doi.org/10.7334/psicothema2016.318>
- Hansen, L., & Pritchard, C. (2008). Consistency in suicide rates in twenty-two developed countries by gender over time 1874-78, 1974-76, and 1998-2000. *Archives of Suicide Research*, *12*(3), 251-262. <https://doi.org/10.1080/1381110802101153>
- Hatch, S., & Dohrenwend, B. (2007). Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES and age: A review of the research. *American Journal of Community Psychology*, *40*, 313-332. <https://doi.org/10.1007/s10464-007-9134-z>
- Hawton, K., & van-Heeringen, K. (2009). Suicide. *The Lancet*, *373*(9672), 1372-1381. [https://doi.org/10.1016/S0140-6736\(09\)60372-X](https://doi.org/10.1016/S0140-6736(09)60372-X)
- Hegerl, U., Maxwell, M., Harris, F., Koburger, N., Mergl, R., Székely, A.,... Gusmão, R. (2019). Prevention of suicidal behaviour: Results of a controlled community-based intervention study in four European countries. *PLoS ONE*, *14*(11), 1-26. <https://doi.org/10.1371/journal.pone.0224602>
- Hendriks, V., & Blanken, P. (1992). Snowball sampling: Theoretical and practical considerations. In Hendriks, V., Blanken, P., & Adriaans, N. (Eds.), *Snowball sampling: A pilot study on cocaine use* (pp. 17-35). Rotterdam, the Netherlands: IVO.
- Hirsch, J., Duberstein, P., Chapman, B., & Lyness, J. (2007). Positive affect and suicide ideation in older adult primary care patients. *Psychology and Aging*, *22*(2), 380-385. <https://doi.org/10.1080/10937404.2015.1051611>
- IBM, S.P.S.S. (2015). *IBM SPSS Statistics Version 23*. International Business Machines Corp., Boston.
- Joiner, T., Rudd, M., & Rajab, M. (1997). The modified scale for suicidal ideation: Factors of suicidality and their relation to clinical and diagnostic variables. *Journal of Abnormal Psychology*, *106*(2), 260-265. <https://doi.org/10.1037/0021-843X.106.2.260>
- Kline, R. (2015). *Principles and practice of structural equation modeling*. Guilford publications.
- Liang, J., & Bentler, P. (2004). An EM algorithm for fitting two-level structural equation models. *Psychometrika*, *69*(1), 101-122. <https://doi.org/10.1007/BF02295842>
- López-Bernal, J., Gasparrini, A., Artundo, C., & McKee, M. (2013). The effect of the late 2000s financial crisis on suicides in Spain: An interrupted time-series analysis. *European Journal of Public Health*, *23*(5), 732-736. <https://doi.org/10.1093/eurpub/ckt083>

- Muñiz, J., & Fonseca-Pedrero, E. (2019). Ten steps for test development. *Psicothema*, *31*(1), 7-16. <https://doi.org/10.7334/psicothema2018.291>
- Osman, A., Bagge, C., Gutiérrez, P., Konick, L., Kopper, B., & Barrios, F. (2001). The Suicidal Behaviors Questionnaire-Revised (SBQ-R): Validation with clinical and nonclinical samples. *Assessment*, *8*(4), 443-454. <https://doi.org/10.1177/107319110100800409>
- Ramírez-Maestre, C., Correa, M., Rivas, T., López-Martínez, A., Serrano-Ibáñez, E., & Esteve, R. (2017). Psychometric characteristics of the Flourishing Scale-Spanish Version (FS-SV). The factorial structure in two samples: Students and patients with chronic pain. *Personality and Individual Differences*, *117*, 30-36. <https://doi.org/10.1016/j.paid.2017.05.035>
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1-36. Retrieved from https://econpapers.repec.org/article/jssjstsof/v_3a048_3ai02.htm%0Ahttp://www.jstatsoft.org/v48/i02/
- Rubio, G., Montero, I., Jáuregui, J., Salvador, M., Marín, J., & Carrasco, J. (1998). Validación de la Escala de Riesgo de Violencia de Plutchik en población española [Validation of the Plutchik Violence Risk Scale in the Spanish population]. *Archivos de Neurobiología: Revista de Psiquiatría y Disciplinas Afines*, *61*(4), 307-316.
- Sandín, B. (2003). Escalas Panas de afecto positivo y negativo para niños y adolescentes (PANASN) [Panas scales of positive and negative affect for children and adolescents (PANASN)]. *Revista de Psicopatología y Psicología Clínica*, *8*(2), 173-182. <https://doi.org/10.5944/rppc.vol.8.num.2.2003.3953>
- Sanz, J., & Vázquez, C. (1998). Fiabilidad, validez y datos normativos del Inventario para la Depresión de Beck [Reliability, validity and regulatory inventory data for the Beck Depression Inventory]. *Psicothema*, *10*(2), 303-318. <https://doi.org/7467-13170-1>
- Soto-Sanz, V., Piqueras, J., Rodríguez-Marín, J., Pérez-Vázquez, M., Rodríguez-Jiménez, T., Castellví, P.,... Alonso, J. (2019). Self-esteem and suicidal behaviour in youth: A meta-analysis of longitudinal studies. *Psicothema*, *31*(3), 246-254. <https://doi.org/10.7334/psicothema2018.339>
- Timmons, A. (2010). *Establishing factorial invariance for multiple-group confirmatory factor analysis*. KUant Guide, 22. Retrieved from http://crmda.dept.ku.edu/resources/kuantguides/22.Factorial_Invariance_Guide.pdf
- Watson, D., Clark, L., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Wheeler, A., Shanine, K., Leon, M., & Whitman, M. (2014). Student-recruited samples in organizational research: A review, analysis, and guidelines for future research. *Journal of Occupational and Organizational Psychology*, *87*(1), 1-26. <https://doi.org/10.1111/joop.12042>
- World Health Organization (2018). Suicide. Retrieved from <http://www.who.int/mediacentre/factsheets/fs398/en/>
- Zenisky, A., & Hambleton, R. (2015). A model and good practices for score reporting. In *Handbook of test development* (pp. 601-618). Routledge.