

Evaluating the psychometric properties of the Spanish version of the Family Sense of Coherence scale: How valuable is this measurement for health promotion?

Abstract

This study assessed the psychometric properties of the F-SOC-S scale in a sample of 320 Peruvian college students aged 16-29 years old. Cronbach's alpha for the full scale was .85. Multidimensional Scaling, Principal Components and Confirmatory Factor Analysis were used to evaluate factor structure. The former showed an acceptable model fit for one factor solution (SRMR = .052, RMSEA = 0.072, CFI = .92). F-SOC-S Correlations with Stress, Hope, General Health and Family Adaptation confirmed convergent and divergent validity. Also, the scale showed appropriate psychometric properties regarding internal consistency, criterion validity and factor structure when tested in this peruvian sample.

Keywords

Family Sense of Coherence, psychometric properties, Health promotion, Peruvian young adults

Resumen

El presente estudio evaluó las propiedades psicométricas de la prueba F-SOC-S en una muestra de 320 estudiantes universitarios peruanos con edades de 16 a 29 años de edad. El alfa de Cronbach para la escala completa fue de .85. Escalamiento multidimensional, componentes principales y análisis factorial confirmatorio fueron utilizados para evaluar la estructura de los factores. El primero mostró un ajuste aceptable del modelo para una solución de factor (SRMR = .052, RMSEA = 0.072, CFI = .92). Las correlaciones F-SOC-S con estrés, esperanza, salud general y adaptación familiar confirmaron la validez convergente y

divergente. Además, el F-SOC-S mostró propiedades psicométricas aceptables en la consistencia interna, validez del criterio y la estructura del factor en dicha muestra.

Palabras clave

Sentido de Coherencia Familia, propiedades psicométricas, promoción de la salud, jóvenes peruanos

Background

The salutogenic model is an approach that focuses on the origins of health and why people stay healthy in spite of different stressful situations (Antonovsky, 1979). It looks to promote health in institutions and the society itself. Therefore, to better understand human health, it is important to look beyond the individual and also focus on interpersonal interactions and structures that form societies, like human resources and living contexts (Lindstrom & Eriksson, 2005). This theory revolves around a construct called Sense of Coherence (Antonovsky, 1979).

Antonovksy (1988), defined Sense of coherence (SOC) as follows:

“a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that: (a) the stimuli deriving from one’s internal and external environments in the course of living are structured, predictable and explicable; (b) the resources are available to one to meet the demands posed by these stimuli; and (c) these demands are challenges, worthy of investment and engagement” (p. 19).

Antonovsky (1979) postulated that a stronger sense of coherence would promote better health in people. Moreover, when explaining sense of coherence, he made a reference to the family's construction of reality (Reiss, 1981) as a similar concept to SOC (Antonovsky, 1988). After that, the author retook the idea of sense of coherence in the family and proposed the concept of family sense of coherence (Antonovsky & Sourani, 1988).

Family sense of coherence is the cognitive map of the family considering the cognitive representations of a group expressed by an individual in a self-report (Sagy & Antonovsky, 1992). A further study developed this definition and stated that family SOC is the extent to which a person sees his family as overall coherent (Sagy, 1998).

Regardless of the attention that the SOC scales have gathered throughout the literature as useful psychometric tools (Antonovsky, 1993; Eriksson & Lindstrom, 2005) and the strong evidence of the effect that SOC has on better mental health (Eriksson & Lindstrom, 2006a; 2006b) the same interest has not been shown for the concept of Family sense of coherence.

Since Antonovsky & Sourani (1988), proposed the first Family sense of coherence scale (FSOC), not many studies have evaluated their psychometric properties. In fact, only two studies have been found (Rezan Çecen, 2008; Ngai & Ngu, 2011) and both of them have focused on the short version of the scale that was proposed afterwards (Sagy, 1998).

The Turkish version of the short family sense of coherence scale proved to have adequate psychometric properties. The reliability using Cronbach's alpha score showed good internal consistency ($\alpha = .80$). Principal component factor analysis showed that a one-factor solution explained 32% of the total variance of the scale (Rezan Çecen, 2008).

On the other hand, the Chinese version of the Family sense of coherence scale (C-FSOC-S) also showed good internal consistency with a Cronbach's alpha equal to .83. Furthermore, this study also used principal components analysis, which revealed a one factor

solution which explained 35% of the total variance of the scale. Correlations with Sense of Coherence ($r = .55, p < .01$), State-Trait anxiety ($r = -.50, p < .01$) and medical outcomes ($r = .71, p < .01$) indicated good construct validity (Ngai & Ngu, 2011).

The construct of family sense of coherence acquires particular importance within the field of adolescent and youth health. In terms of physical health, an individual sense of coherence has been strongly associated to perceived health, even in terms of predictability (Eriksson & Lindström, 2006a), and negatively associated to psychosomatic symptoms (Myrin & Lagerström, 2008). Similarly, the family level of sense of coherence has been positively associated to the physical component of quality of life (Ngai & Ngu, 2013).

On the other hand, in terms of mental health, both the individual and the family sense of coherence have been shown to be negatively associated to psychological symptomatology like state anxiety, state anger, emotional distress, life dissatisfaction, depression, and stress; and positively associated with better perceived mental health (Eriksson & Lindström, 2006; Myrin & Lagerström, 2008; Ngai & Ngu, 2013; Sagy, 1998), the mental component of quality of life, and life satisfaction in general (Ngai & Ngu, 2013; Rezan Çecen, 2008). In this same line, a study investigating the impact of family environment on adopted youth's psychosocial adjustment reported that there was a significant effect of family sense of coherence on the adoptees' psychosocial adjustment (Ji, Brooks, Barth, & Kim, 2010).

In addition, family sense of coherence has been associated to other family variables. For example, it has been shown to have an effect on family and marital functioning among couples (Ngai & Ngu, 2014). Also, other studies have found out in adults that Family conflict was negatively related with Family sense of coherence (Kulik, 2009).

It is important to mention that family context is considered not only a separate measure from shared sense of coherence, but also as a contextual variable that can shape and

influence individual sense of coherence. In this sense, it has been shown how children within rigid and non-cohesive families show lower levels of individual sense of coherence (Sharabi, Levi, & Margalit, 2011). A recent systematic review regarding developmental contexts and sense of coherence assessed a set of 68 research studies on adolescent SOC. One of their main findings was that there has been little research attention on developmental contexts as potential sources of relevant experiences for SOC development. Currently, only a few studies have considered family developmental context and its impact on SOC (Rivera, García-Moya, Moreno, & Ramos, 2013).

Considering these developmental aspects, it becomes evident that both adolescents and emerging youth are a target population for SOC studies. These populations are very important for several reasons. Particularly, all the challenges late adolescents and emerging adults have to face increase their probability of being at potential risk for both mental and physical negative outcomes. This population has to face difficult tasks as a result of maturation. Physical and emotional changes transform the way they have to relate with peers and family, which could in turn influence their health (Currie et al., 2010).

Even though there are some studies establishing the psychometric properties of the short version of the FSOC and showing in some cases how this construct is related with better health, we are not aware of any Spanish version of this questionnaire or any application on a Spanish speaking context. Moreover, there is not much evidence that Family sense of coherence can enhance health promotion, for example in young adults. Just one study that we know of has assessed the relationship of Family sense of coherence with positive psychological health outcomes in young people (Sagy, 1998).

The present study draws attention to the need for a reliable instrument in Spanish that measures family sense of coherence, in order to assess the relation of this concept with different health elements later on. Furthermore, it takes a special interest in young population,

as we consider it is a target population for health promotion and health interventions. Therefore, an important inclusion criterion for the sample of this study was age, within a range from 16 to 29 years old, covering both adolescents and young adults.

Due to all of the aforementioned, this study has four objectives. (a) Translate this scale in order to have a Spanish version available. (b) Evaluate the psychometric properties of the Spanish version of the Family sense of coherence in its short version.

Method

This study had two phases. The aim of the first phase was to translate the short version of the Family Sense of Coherence scale (F-SOC-S) from Hebrew to Spanish. The purpose of the second phase was to establish the psychometric properties of the Spanish version of the F-SOC-S.

Phase 1:

The F-SOC-S was provided by the author in its original language (Hebrew) (Sagy, 1998). Two Hebrew and Spanish native speakers translated the questionnaire to Spanish. Back translation was performed from Spanish to Hebrew and compared with the previous Hebrew translations in order to also gather literal meaning.

Afterwards, a focus group with three late adolescents was conducted in order to further check the clarity of items for this population.

Phase 2:

A cross-sectional study was conducted in a private university in Lima, Peru. The reliability was assessed by means of internal consistency. Construct validity was measured by convergent validity using the Family Adaptation Scale (FAS) (Antonovsky & Sourani, 1988), the Spanish version of the Reactivity towards stress index (IREA) (Valdez, 1999) and the Spanish Version of the Herth Hope Scale (HHP) (Martinez, Cassaretto & Herth, 2012). Factor structure was also assessed using confirmatory factor analysis and multidimensional scaling.

Participants

A sample of 320 undergraduate students participated for this study. 230 of the participants were women (72%) and 88 (28%) were men. Their age range was 16-29 years old. The mean age was 18.54 years old ($SD = 1.71$). All of the participants were between their first and third year of studies. The survey took place in a private university from Lima, Peru. Even though the sample size was big enough to be representative of the institution, the participants were not chosen randomly.

Measures

The F-SOC-S is a shorter version of the original 26 item-scale (Antonovsky & Sourani, 1988). This questionnaire aims to assess the degree to which the family views the environment as comprehensible, manageable and meaningful (Sagy, 1998). It comprises 12 items, which are rated in Likert scale from 1 to 7. Scores range between 12 and 84, the higher the scores the greater the perception of coherence in the family life.

The FAS is a questionnaire that measures family satisfaction, consisting of 11 items. Total scores are calculated using the first 10 items and the last one is a general view of an ideal family. This questionnaire is divided in three subscales: family fit, family community fit and the third area that measures both scales (Antonovsky & Sourani, 1988). Scoring is from 1 to 7 where a higher score means greater family satisfaction. A Cronbach's alpha of .87 was found in this study.

The HHS is a questionnaire that measures Hope. The Spanish Peruvian version consists of 28 items. This scale has four different areas: social support, optimism and spiritual support, agency and despair. The areas are measured separately with a likert scoring where a higher score means the greater the hope. Cronbach's alphas for two scales (social support and agency) was .83, the scale of despair had a Cronbach's alpha of .80 and the last scale (optimism and spiritual support) had a Cronbach's alpha of .84.

The Peruvian version of the IREA is a questionnaire of 33 items that measures stress reactions. These reactions can be neuro-vegetative, cognitive, emotional and behavioral. They are measured in a likert scale where a higher the score indicates greater the reactivity towards stress (Valdez, 1999). A Cronbach's alpha of .93 was present in this study.

Procedure

Ethical approval was obtained from the institutional ethics committee. Teachers were asked for their permission to apply the scales in their classes. Written informed consent was given to each participant and personal information was coded in order to protect confidentiality and anonymity. Participants were asked to complete the Spanish version of following questionnaires F-SOC-S, FAS, IREA and HHS.

Data Analysis

Cronbach's alpha coefficient was used to assess internal consistency of F-SOC-S. A Cronbach alpha greater than .70 was used as an acceptable threshold (Streiner & Norman, 2008). Pearson correlations analysis with FAS, HHS (Convergent Validity) and IREA (Divergent validity) were assessed in order to evaluate construct validity.

Later, to assess the internal structure of the instrument a one-factor confirmatory factor analysis (CFA) was performed with weighted least square mean and variance adjusted (WLSMV). Furthermore, an ordinal Multi-Dimensional Scaling (MDS) analysis of 2 dimensions was performed to further analyze item-behavior. F-SOC-S reversed items were recoded prior to analysis.

Results

Convergent and divergent validity

For convergent validity, according to Mann's²⁵ criterion to analyze strength of Pearson correlations F-SOC-S scores had a very strong positive and significant ($r = .82, p < .001$) correlation with overall family satisfaction and family fit ($r = .78, p < .001$). Moreover, the subscale family community fit and family fit combined also showed a strong correlation ($r = .68, p < .001$) with F-SOC-S. The same correlation coefficient was found with the perception of ideal family. Furthermore, family community was also strongly correlated with family sense of coherence ($r = .56, p < 0.001$).

F-SOC-S was also strongly and significantly correlated with social support ($r = .49, p < 0.001$), optimism and spiritual support ($r = .46, p < 0.001$) and lower despair ($r = .45, p <$

0.001). Likewise, a single item that measures general health also had a moderate correlation with family sense of coherence ($r = .35, p < 0.001$). Finally, agency also showed a moderate relationship with family sense of coherence ($r = .34, p < 0.001$).

For divergent validity, a negative and strong correlation was found between stress reactions and family sense of coherence ($r = -.40, p < 0.001$).

Factor structure

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was estimated to assess and confirm the one factor structure of the instrument. Therefore, one latent variable, namely family sense of coherence was estimated using the twelve items as indicators. Using a model generating approach (Byrne, 2012), a second model was estimated without item 1 because of poor functioning within the model. The standardized factor loading for this item was .12, being much lower than the cutoff point of .40 (Stevens, 1992).

According to the theoretical fit indices established to accomplish an acceptable fit, RMSEA should be $< .07$, SRMR $< .08$ and CFI and TLI $> .95$ (Hooper, Coughlan, & Mullen, 2008). Considering this, a model without item 1 has a smaller χ^2 an acceptable SRMR index (0.043), and acceptable RMSEA (0.043), CFI (0.965) and TLI (0.954).

Therefore, this model was chosen as the better fit, and the standardized factor loadings are shown in Table 1.

Table 1: items factor loadings

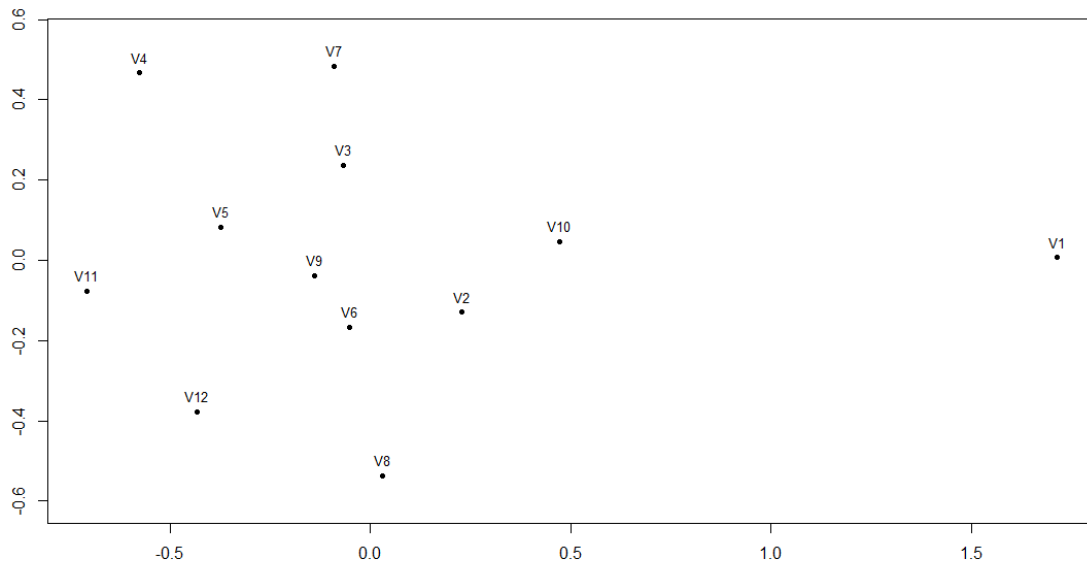
	B	Standard error	Z	P value	β
FSOC2	1				0.614
FSOC3	1.13	0.115	9.785	0	0.666

FSOC4	0.902	0.125	7.188	0	0.461
FSOC5	0.918	0.101	9.1	0	0.581
FSOC6	1.132	0.117	9.681	0	0.605
FSOC7	1.064	0.147	7.256	0	0.553
FSOC8	1.051	0.138	7.635	0	0.526
FSOC9	1.271	0.122	10.431	0	0.82
FSOC10	0.801	0.097	8.242	0	0.531
FSOC11	0.851	0.128	6.635	0	0.483
FSOC12	1.027	0.125	8.217	0	0.55

The eleven items of this model showed acceptable factor loadings higher than the cutoff point of .40 (Stevens, 1992). Item 4 had the smaller factor loading (.46) and item 9 had the highest factor loading (.81).

To further interpret the results, an additional ordinal Multi-Dimensional Scaling (MDS) analysis with 2 dimensions was carried out. A transformed matrix of item correlations (Pearson coefficients) into dissimilarities was used. The results of the MDS approach show the Euclidean distances between items, and the location of each item in the low-dimensional space (2D). This graphical representation of the underlying structure of the F-SOC-S is shown (Figure 1). The general non-metric stress for the MDS solution (2D) was 0.35. The graph clearly shows all items clustered in the left of the horizontal dimension (X axis) of the plot, which the exception of item 1 which appears to be an outlier in this configuration. These would imply additional and strong evidence for the low performance of this item, which respect to the others and to the one factor structure of the instrument.

Figure 1: Configuration Plot F-SOC-S



Finally, in order to check if the construct varied between men and women a multigroup analysis was made.

Table 2: Fit indices for multigroup test.

	Configural invariance	Metric invariance	Scalar invariance	Intercepts invariance	Full uniqueness
χ^2	98.601	110.424	128.078	115.398	142.565
df	70	79	88	79	98
p value	0.014	0.011	0.003	0.005	0.002
CFI	0.953	0.949	0.935	0.941	0.927
TLI	0.940	0.942	0.933	0.932	0.933
RMSEA	0.052	0.051	0.054	0.055	0.054
SRMR	0.056	0.066	0.071	0.061	0.077
Δ Chi square		11.936	25.135	14.975	38.299
Δ Df		9	18	9	28
P value		0.2169	0.1212	0.09163	0.093

Regarding FSOC, there was no construct invariance between men and women. Therefore, both groups understood the latent construct the same way (configural invariance), had very similar factor loadings (scalar invariance), means of items were very similar as well (intercepts invariance) and finally item error variance was also similar (full uniqueness).

Reliability

Reliability tests showed a Cronbach's alpha of .85 for the F-SOC-S overall scale, demonstrating a good internal consistency.

Conclusions

This is the first study assessing the performance of the F-SOC-S scale in Spanish among Peruvian young adults. F-SOC-S showed adequate properties in terms of internal consistency construct validity and factor structure. These findings refer to college students and should not be generalized to other specific populations.

Reliability results showed that the final one factor solution of the Spanish version had a higher internal consistency than the Chinese and Turkish versions (Rezan Çecen, 2008; Ngai & Ngu, 2011).

Factor structure showed that the Spanish version of the F-SOC-S is indeed a one factor solution, but with a very clear local misfit referred to item 1, confirmed in different analyses such as confirmatory factor analysis and multidimensional scaling. In this sense, results were different to what other authors (Rezan Çecen, 2008; Ngai & Ngu, 2011) found in their studies. Item 1 “¿En qué medida tienes la sensación que puedes afectar lo que pasa en tu familia?” in English (“To what extent do you think that you can influence what happens to your family?”), did not show an acceptable factor loading and also appeared to be unrelated to the rest of the scale in the MDS plot. As a results of all this, Item 1 was not an appropriate item to measure Family sense of coherence in the Spanish version and we recommend to drop this item in the Spanish scale. A qualitative analysis of item 1 shows that this question refers to the ability of

influencing what is happening in your family (Manageability). Regardless of that, this item seems to be broader than the other ones that are related to more specific situations such as having a clear understanding of rules and goals in the family (Comprehensibility), feeling that family life is worthwhile for a person (Meaningfulness) and that family is a source of disappointment and that family collaboration is possible and useful during difficult situations (Manageability). Therefore, it is possible that this item does not properly refer to the whole scale because item 1 is much more general than the other items and does not capture Manageability.

Overall, regardless of the fact that item one had to be dropped, the Spanish version with 11 items explained more variance than the Chinese C-FSOC-S version and the Turkish version (Rezan Çecen, 2008; Ngai & Ngu, 2011). Finally, a good model fit for this eleven item version (Hooper, Coughlan, & Mullen, 2008) on the CFA analysis, shows that the Spanish version of F-SOC-S should be measured using a one factor solution. Furthermore, multigroup analysis showed full uniqueness of construct between men and women which is similar to what Antonovsky & Sourani, (1988), suggested about Sense of Coherence and gender. In spite of this, it is necessary to analyse construct invariance with a bigger sample in order to reinforce this idea.

Convergent validity analyses showed the construct of family sense of coherence is positively associated to family satisfaction, family fit, social support, optimism and spiritual support, lower despair and general health. These associations provide more evidence of the importance of the concept of family sense of coherence within the field of health psychology, as it is clearly a complex concept related to a broad range of both intra and interpersonal elements of health. These findings were very similar to what Antonovsky found in his original study of the construction of the Family sense of coherence, where he found very strong

correlations between Family adaptation and Family sense of coherence (Antonovsky & Sourani, 1988).

These results are also related to other previous studies that have shown positive relationship with SOC and hope. Nevertheless, in this study Family sense of coherence showed lower correlations coefficients than other studies that used the individual Sense of Coherence scale (Martinez, et al., 2012). Finally, Family sense of coherence has a positive correlation with health, which is similar to what has been found in Meta-analysis of individual Sense of Coherence that also shows strong correlations with overall health (Eriksson & Lindstrom, 2006b). These similarities once again reinforce the idea that Family sense of coherence is a valuable tool for health promotion.

Similarly, divergent validity analyses showed that Family sense of coherence is negatively associated with stress reactions. This negative association to more pathologic dimensions would also imply the possibility of FSOC as being a potential protective factor for negative health outcomes. Furthermore, this evidence shows similarities with studies that show that distress and family sense of coherence are negatively related (Ngai & Ngu, 2013; Sagy & Antonovsky, 1992) and that family sense of coherence is also negatively related with state-trait anxiety (Ngai & Ngu, 2011).

Limitations for this study refer mainly to its cross-sectional nature and sample size. Future research could assess test-retest reliability with a longitudinal approach. Furthermore, these findings are specific for a group of late adolescents and young adults and cannot be generalized to either all Peruvian groups or all Spanish-speaking populations.

Future analysis should continue assessing the Spanish version of the F-SOC-S scale to other samples in Peru and also compare this with other Spanish speaking countries in order to further reinforce these findings. Research could focus on describing the value this

questionnaire has in evaluating better family functioning, and on validating its value as a tool to measure factors that enhance health in young adults.

The Spanish version of the F-SOC-S scale revealed to have adequate reliability, factor structure and criterion validity. Therefore, a one-factor solution with eleven items is recommended in order to measure Family sense of coherence. This conclusion was made as a result of the best model fit for this scale and also because this measurement had adequate criterion validity with many health measurements. As a result of our findings it is stated that F-SOC-S is a valuable measurement for health promotion and that is negatively related with measurements that describe negative aspects of health. Therefore, it would be very important to start using it more often in order to measure health promotion (Ngai & Ngu, 2011).

The concept of Family sense of coherence could be very helpful because it could add a different dimension to health promotion by including a measurement that also takes into account the group and the family, given its importance to late adolescents' health (Currie et al., 2010).

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