

Argentinian Version of the Fear of COVID-19 Scale (FCV-19S): A Review of Possible Structural Models and its Relationship with Fear of Death

Versión argentina de la Escala de Miedo al COVID-19 (FCV-19S): Una revisión de posibles modelos estructurales y su relación con el miedo a la muerte

Hernán Furman *¹, Mark D. Griffiths², Amir H. Pakpour³, Hugo Simkin^{4, 5}

1 - Carrera de Psicología, Universidad de Flores, CABA, Argentina.

2 - International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK.

3 - Department of Nursing, School of Health and Welfare, Jönköping University, Jönköping, Sweden.

4 - Carrera de Sociología, Universidad de Buenos Aires, CABA, Argentina.

5 - Consejo Nacional de Investigaciones Científicas y Técnicas, CABA, Argentina.

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Abstract

During the pandemic caused by SARS-CoV-2, the Fear of COVID-19 Scale (FCV-19S) has become one of the main psychometric instruments used in research globally. The present study examined the psychometric properties of the Argentinian version of the FCV-19S. More specifically, the study analyzed and compared different possible models in order to determine which internal structure fits better for the Argentinian FCV-19S. The sample comprised 505 adults from Argentina between 18 and 85 years ($M = 45.44$ years; $SD = 17.08$), of both genders (males = 33.5%; females = 66.5%). The results provided empirical support for a bi-factor structure with a general factor ($\alpha = .89$) and two specific factors, that is, emotional response ($\alpha = .87$) and physiological response ($\alpha = .83$). Additionally, the associations between the FCV-19S and the Brief Fear of Death Scale (BFODS) provide evidence of validity related to other variables.

Keywords: fear of COVID-19, fear of death, FCV-19S, psychometric validation, Argentina

Resumen

Durante la pandemia provocada por el SARS-CoV-2, la Escala de Miedo al COVID-19 (FCV-19S) se ha convertido en uno de los principales instrumentos psicométricos utilizados en investigación a nivel mundial. El presente estudio examinó las propiedades psicométricas de la versión argentina de la FCV-19S. Más específicamente, el estudio analizó y comparó diferentes modelos posibles con el fin de determinar qué estructura interna encaja mejor para la versión argentina de la FCV-19S. La muestra estuvo compuesta por 505 adultos argentinos de entre 18 y 85 años ($M = 45.44$ años; $DE = 17.08$), de ambos sexos (hombres = 33.5%; mujeres = 66.5%). Los resultados proporcionaron soporte empírico de la existencia de una estructura bifactorial con un factor general ($\alpha = .89$) y dos factores específicos, es decir, respuesta emocional ($\alpha = .87$) y respuesta fisiológica ($\alpha = .83$). Además, las asociaciones entre la FCV-19S y la Escala Abreviada de Miedo a la Muerte (BFODS) proporcionan evidencia de validez relacionada con otras variables.

Palabras clave: miedo al COVID-19, miedo a la muerte, FCV-19S, validación psicométrica, Argentina

Author's note: Hernán Furman <https://orcid.org/0000-0001-5597-3174>, Mark D. Griffiths <https://orcid.org/0000-0001-8880-6524>, Amir H. Pakpour <https://orcid.org/0000-0002-8798-5345>, Hugo Simkin <https://orcid.org/0000-0001-7162-146X>. The authors declare no conflict of interest. *Acknowledgment.* The authors wish to thank the participants who voluntarily collaborated in this study. *Funding.* This study was conducted within UBACyT 20020190200244BA, PICT-2019-2019-00408 and UFLO 02OR20, founded by Universidad de Buenos Aires (UBA), Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT) and Universidad de Flores (UFLO).

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*Correspondence to: Hernán Furman, Universidad de Flores, 5741 Av. Rivadavia, Ciudad Autónoma de Buenos Aires, C1406GLA, Argentina. E-mail: hernan.furman@uflo.edu.ar

Participaron en la edición de este artículo: Abigail Pérez, Gloria Nieve, Juan Cruz Balverdi, Florencia Ruiz, Mónica Serppe, Alicia Molinari, Ricardo Hernández, Jorge Bruera.

Introduction

The pandemic caused by SARS-CoV-2 has generated unprecedented negative consequences and global losses, from the number of deaths to countless psychological, economic and social repercussions (Borio, 2020; Caycho-Rodríguez et al., 2021; Furman et al., 2020). With regard to the psychological repercussions, researchers from all over the world have set themselves the task of studying them and/or developing appropriate approaches for their treatment (Ahorsu et al., 2020; Mamun et al., 2021; Piltch-Loeb et al., 2021). In this area, one of the most studied psychological factors has been the fear of COVID-19 including the fear of contagion, infecting others, or suffering the socioeconomic consequences associated with the pandemic (Caycho-Rodríguez, Tomás et al., 2022; Tzur Bitan et al., 2020). Likewise, as a consequence of the high contagion potential and the high mortality rate of the virus, individuals also experience a greater fear of death (Indacochea-Cáceda et al., 2021; Kumar & Nayar, 2021; Menzies & Menzies, 2020).

The aforementioned fear experiences can cause an increase of mental health problems, either by promoting an increment of risky behaviors (e.g., alcohol and tobacco consumption) or by affecting the prevalence of mental disorders (e.g., post-traumatic stress, and anxiety and depressive disorders, Fitzpatrick et al., 2020; Huarcaya-Victoria et al., 2022; Indacochea-Cáceda et al., 2021). Moreover, due to fear, individuals can think irrationally and react inappropriately, stigmatizing and discriminating against infected individuals (Ahorsu et al., 2020). However, the absence of fear can be equally problematic, fostering the lack of necessary care and hygiene habits during a pandemic (Caycho-Rodríguez, Tomás et al., 2022).

For all these aforementioned reasons, it is

necessary to have valid and reliable instruments to interpret the fear of COVID-19 (Ahorsu et al., 2020; Pakpour & Griffiths, 2020). Such an evaluation makes it possible to analyze its consequences on mental health and explore significant differences among countries (Caycho-Rodríguez et al., 2021; Piqueras et al., 2021). Although a number of psychometric instruments which assess fear and anxiety in relation to COVID-19 are available, the Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) has been the most widely used scale in the extant literature (Ahorsu et al., 2020; Furman et al., 2020; Tzur Bitan et al., 2020).

The Fear COVID-19 Scale (FCV-19S)

The FCV-19S was originally developed for the Iranian population. According to the developers (Ahorsu et al., 2020), its items emerged from a bibliographic review in which thirty different measures of fear were identified in different populations and circumstances. The authors grouped the most relevant items and discarded those with similar content. The first version consisting of 28 items was analyzed by a panel of experts that included psychologists, virologists, psychiatrists, general physicians and nurses, who suggested discarding another 11 items. The second version comprising 17 items was evaluated by a new panel that included health education specialists, pulmonologists, social psychologists and sociologists, who suggested discarding an additional seven items. Finally, the third version comprising 10 items was administered in a pilot study ($N = 46$; $M = 39.63$; 43% women) and in the general Iranian population ($N = 717$; $M = 31.25$; 42% women). The results suggested discarding another three items, resulting in a final version comprising seven items (Ahorsu et al., 2020).

Since its initial publication in March 2020,

the FCV-19S has been translated, adapted and administrated in over 30 different languages and contexts, including Africa (Elemo et al., 2020; Fawzy El-Bardan, & Lathabhavan, 2021; Giordani et al., 2021), Asia (Al-Shannaq et al., 2021; Alyami et al., 2021; Chang et al., 2022; Chi et al., 2022; Doshi et al., 2021; Dadfar et al., 2021; Masuyama et al., 2020; Nazari et al., 2021; Pang et al., 2022; Reznik et al., 2021; Sakib et al., 2020; Tzur Bitan et al., 2020; Wakashima et al., 2020), Europe (Haktanir et al., 2022; Iversen et al., 2021; Magano et al., 2021; Martínez-Lorca et al., 2020; Nikopoulou et al., 2022; Piqueras et al., 2021; Reznik et al., 2021; Sánchez-Teruel & Robles-Bello, 2021; Satici et al., 2021; Soraci et al., 2020; Stănculescu, 2022; Tsipropoulou et al., 2021), Latin America (Broche-Pérez et al., 2020; Cassiani-Miranda et al., 2022; Cavalheiro & Sticca, 2020; Caycho-Rodríguez, Tomás et al., 2022; Caycho-Rodríguez et al., 2020; de Medeiros et al., 2021; Furman et al., 2020; García-Reyna et al., 2022; Giordani et al., 2020; Huarcaya-Victoria et al., 2022; Mercado-Lara et al., 2022; Moreta-Herrera et al., 2021; Piqueras et al., 2021), North America (Attieh et al., 2022; Perz et al., 2022), and Oceania (Rahman et al., 2021; Winter et al., 2020).

Most of the aforementioned validation studies reported a one-factor structure for FCV-19S (Ahorsu et al., 2020; Al-Shannaq et al., 2021; Alyami et al., 2021; Broche-Pérez et al., 2020; Cassini-Miranda et al., 2022; Cavalheiro & Sticca, 2020; Chang et al., 2022; de Medeiros et al., 2021; Doshi et al., 2021; Elemo et al., 2020; Fawzy El-Bardan & Lathabhavan, 2021; Furman et al., 2020; García-Reyna et al., 2022; Giordani et al., 2020; Giordani et al., 2021; Haktanir et al., 2022; Martínez-Lorca et al., 2020; Mercado-Lara et al., 2022; Nazari et al., 2021; Nikopoulou et al., 2022; Pang et al., 2022; Perz et al., 2022; Piqueras et al., 2021; Sakib et al., 2020; Sánchez-Teruel &

Robles-Bello, 2021; Satici et al., 2021; Soraci et al., 2020; Stănculescu, 2022; Tsipropoulou et al., 2021; Wakashima et al., 2020; Winter et al., 2020). However, there are a few validation studies that reported either a two-factor structure (Caycho-Rodríguez et al., 2021; Caycho-Rodríguez et al., 2020; Magano et al., 2021; Reznik et al., 2021; Tzur Bitan et al., 2020), a higher-order structure (Iversen et al., 2021) or a bi-factor model (Caycho-Rodríguez, Tomás et al., 2022; Chi et al., 2022; Dadfar et al., 2021; Huarcaya-Victoria et al., 2022; Masuyama et al., 2020; Moreta-Herrera et al., 2021). Those who regarded the scale as having more than one factor agreed on the way to group the items, but there were differences regarding the name they assigned to each factor. While some studies have referred to factors in a two-factor structure as *physiological responses* and *emotional responses* to fear of COVID-19 (Caycho-Rodríguez et al., 2021; Masuyama et al., 2020; Reznik et al., 2021), others have named them *physical response* and *fear thoughts* (Chi et al., 2022), *somatic expressions of fear* and *emotional fear reactions* (Huarcaya-Victoria et al., 2022; Tzur Bitan et al., 2020), and *somatic fear* and *cognitive fear* (Iversen et al., 2021). More recently, an alternative bi-factor model that included one general factor and a specific factor called *emotional responses* was proposed (Caycho-Rodríguez, Tomás et al., 2022).

In the Argentinian context, two studies have recently been published reporting the psychometric properties of the FCV-19S. In the first study, the version translated in Spain was used and a solution of two correlated factors was reported (Caycho-Rodríguez et al., 2020). In the other one, a new translation which incorporated Argentinian idiomatic uses and the single-factor model originally proposed was carried out (Furman et al., 2020). Both studies constitute favorable antecedents for the investigation of the fear of COVID-19

in Argentina. However, the psychometric testing was relatively basic. Therefore, the present study analyzed the psychometric properties of the scale in the general Argentinian population in depth. Moreover, it compared the different factorial models proposed in the literature and evaluated both its reliability and the validity criteria according to its internal structure and in relation to other relevant variables.

Method

Participants

The sampling was non-probabilistic and cross-sectional. A total of 505 adults from Argentina between 18 and 85 years ($M = 45.44$ years; $SD = 17.08$; 33.5% males and 66.5% females) voluntarily participated in the study. To determine the sample size, at least 10 to 20 participants were needed per scale item, as suggested in the literature (Kline, 2016; Kyriazos, 2018). With 20 participants per scale item, the minimum number of participants needed would be 140 participants in total. Therefore, the present study's sample size was sufficiently adequate.

Measures

The data were collected through a self-administered survey which included the following measures:

Fear of COVID-19 Scale (FCV-19S). The seven-item FCV-19S (Ahorsu et al., 2020) was used to assess the fear of COVID-19. The items (e.g., *I am very afraid of COVID-19*) are rated on a five-point scale from 1 (*strongly disagreement*) to 5 (*strongly agreement*). The higher the score, the greater the fear of COVID-19. The FCV-19S has

consistently reported acceptable psychometric properties (e.g., Ahorsu et al., 2020; Reznik et al., 2021). For the present study, the validated version adapted to the Argentinian context was used (Furman et al., 2020). The psychometric properties of the scale in the present study are reported in the 'Results' section.

Brief Fear of Death Scale (BFODS). The eight-item BFODS (Collett & Lester, 1969) was used to assess the fear of death. The scale has two dimensions: *fear of own death* (Items 1-4; e.g., *What will it be like to be dead*) and *fear of the death of others* (Items 5-8; e.g., *The loss of a loved one*). Items are rated on a five-point scale from 1 (*Not at all*) to 5 (*A lot*). The first set of items respond to the question of *What degree of worry or anxiety do you experience in relation to the following aspects related to your own death?*, while the second set of items respond to the question of *What degree of worry or anxiety do you experience in relation to the following aspects related to the death of other people?*. For the present study, a version adapted to the Argentinian context was used (Quintero & Simkin, 2017). The scale demonstrated adequate reliability for both the *fear of own death* factor ($\alpha = .73$), *fear of the death of others* ($\alpha = .82$), and the global scale ($\alpha = .82$).

Sociodemographic variables. The survey also included a number of questions regarding socio-demographic information (e.g., age, sex, place of residence).

Procedure and Ethics

In accordance with the specialized literature on this methodology (Jiménez-Ortiz et al., 2020), the survey was hosted on a virtual platform and participants were recruited via the Facebook so-

cial networking platform from November 2020 to February 2021. Participation was voluntary and none of the participants received any financial compensation for taking part in the study. The participants were invited to participate in the study anonymously and they provided informed consent. They were told that the results would be used exclusively for academic-scientific purposes in accordance with National Law 25.326 on the protection of personal data, therefore complying with the codes of ethical conduct established by the National Council for Scientific and Technical Research (CONICET; Res. DN° 2857/06). Ethical approval for the study was provided by the Ethics Committee from the first author's University.

Data Analysis

For the purposes of the present study, both descriptive and inferential statistics were carried out by means of statistical software (SPSS 24 and EQS 8.80). First, the construct validity was analyzed by performing a confirmatory factor analysis with the arbitrary generalized least squares (AGLS) as an estimation method, following the recommendations of previous FCV-19S validation studies (Ahorsu et al., 2020; Chi et al., 2022; Iversen et al., 2021; Masuyama et al., 2020). The χ^2 (Satorra-Bentler), the incremental fit index (IFI), the non-normed fit index (NNFI) and the compar-

ative fit index (CFI) were used while considering values greater than .90 as a cut-off point (Brown, 2015); and the standardized root mean squared residual (SRMR) was used while considering values lower than .1 as indicators of a reasonable adjustment (Harrington, 2009; Schreiber et al., 2006). Subsequently, the parsimony of the five models proposed in the literature was analyzed considering the Akaike information criterion (AIC) and the consistent Akaike information criterion (CAIC), with high values indicating a worse fit (Akaike, 1974; Anderson et al., 1998). The reliability of the scale was subsequently evaluated according to the internal consistency analysis from Cronbach's alpha since it is most widely used in the specialized literature in this line of research (Ahorsu et al., 2020; Chi et al., 2022; Iversen et al., 2021; Masuyama et al., 2020). Values greater than .70 were considered adequate (Brown, 2002). Finally, a correlation analysis was carried out to test the scale in relation to other variables.

Results

Confirmatory Factor Analysis of the Fear Covid-19 Scale

As proposed by specialized studies on this methodology (Peña-Contreras et al., 2020), a confirmatory factor analysis was carried out first, which evaluated the five models presented in the

Table 1
Confirmatory factor analysis of the Fear of COVID-19 Scale.

	$\chi^2_{(df)}$	NNFI	CFI	IFI	SRMR
Unidimensional model	87.544 ₍₁₃₎	.961	.976	.976	.121
Two correlated factors model	66.250 ₍₁₁₎	.966	.982	.982	.095
Higher-order model	66.250 ₍₉₎	.957	.981	.982	.095
Bi-factor model with one specific factor	20.575 ₍₈₎	.989	.996	.996	.035
Bi-factor model with two specific factors	20.575 ₍₄₎	.972	.995	.995	.035

Note. NNFI = non-normed fit index; CFI = comparative fit index; IFI = incremental fit index; SRMR = standardized root mean squared residual.

Table 2
Parsimony indices of the different models.

Model	AIC	CAIC Model	CAIC Independent	Δ CAIC
Unidimensional model	61.544	-6.376	2956.722	2963.098
Two correlated factors model	44.250	-13.220	2956.722	2969.942
Higher-order model	48.250	1.229	2956.722	2955.493
Bi-factor model with one specific factor	4.575	-37.221	2956.722	2993.943
Bi-factor model with two specific factors	12.575	-8.323	2956.722	2965.045

Note. AIC = Akaike information criterion; CAIC = consistent Akaike information criterion.

literature according to the goodness of fit indices (Table 1). Table 1 demonstrates that there were acceptable properties and supports a bi-factor model, especially regarding the standardized root mean squared residual (SRMR) and both for a bi-factor model with one specific factor and for a bi-factor model with two specific factors.

On the other hand, the parsimony of the five models proposed in the literature was analyzed (Table 2). Here the bi-factor model with two specific factors obtained the best fit.

According to the results, the bi-factor model which includes two specific factors (Figure 1) is the one that best fitted the data.

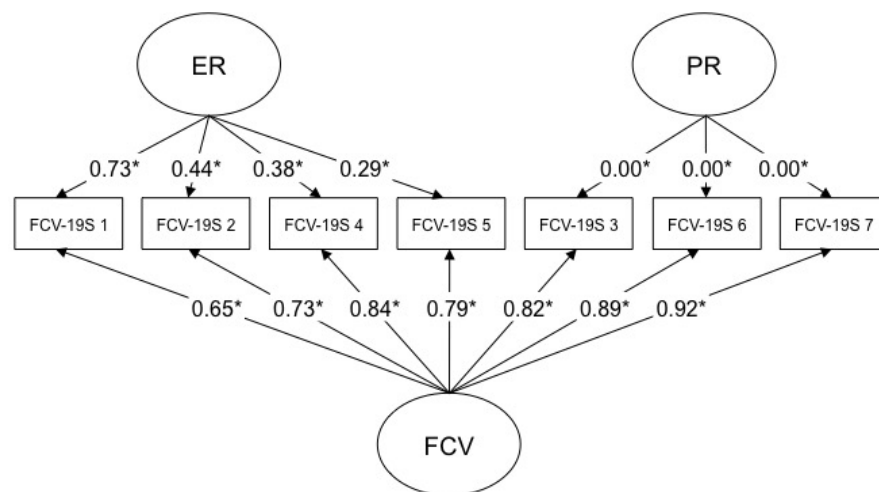
Internal Consistency of the Fear of COVID-19 Scale

Internal consistency was evaluated using Cronbach's alpha (Viladrich et al., 2017), and very good values were obtained for the global scale ($\alpha = .89$), the *physiological response* factor ($\alpha = .83$), and the *emotional response* factor ($\alpha = .87$).

Evidence of Validity in Relation to Other Variables

Regarding validity in relation to other variables, a correlational analysis was performed be-

Figure 1
Structural model of the Fear COVID-19 Scale.



Note. FCV = fear of COVID-19 (general factor); PR = physiological response; ER = emotional response.

Table 3
Correlations between the Fear of COVID-19 Scale and the Brief Fear of Death Scale.

	FOD	FDOT	FD (GF)
FCV	.379**	.271**	.376**
PR	.228**	.114*	.199**
ER	.420**	.328**	.432**

Notes. FCV = fear of COVID-19 (general factor); PR = physiological response; ER = emotional response; FOD = fear of own death; FDOT = fear of the death of others; FD (GF) = fear of death (general factor). **Significant at $p < .01$.

tween the Fear of COVID-19 Scale (FCV-19S) and the Brief Fear of Death Scale (BFODS), taking into account the theoretical relevance of the relationship between both constructs. Positive relationships were obtained between the different dimensions of both scales (Table 3).

Discussion

The present study psychometrically evaluated five structural models for the Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) which was previously translated, adapted and validated to the Argentinian context (Furman et al., 2020). In this regard, although the original study and most previous studies that have validated the FCV-19S support a one-factor unidimensional solution, few studies have compared different possible models. The minority of studies which have done so tend to opt for other solutions such as those reporting a bi-factor structure (Caycho-Rodríguez, Tomás et al., 2022; Chi et al., 2022; Dadfar et al., 2021; Huarcaya-Victoria et al., 2022; Masuyama et al., 2020; Moreta-Herrera et al., 2021).

In line with this minority of studies, the results of the present study suggest that the bi-factor model that considers a general factor with two specific factors is the one that best fitted the data

collected among Argentinian adults. It is worth mentioning that applications of the bi-factor model have recently proliferated because it allows evaluating the degree to which a measure produces a unique total score and, in a related way, the degree to which the subscales that represent theoretically different constructs produce reliable scores after considering the general factor (Bonifay et al., 2017). Therefore, utilizing a bi-factor model with the FCV-19S offers the possibility of obtaining both a general measure of fear of COVID-19 (composed of seven items), as well as two additional measures, that is, emotional responses (items 1, 2, 4 and 5) and physiological responses (items 3, 6 and 7) that a given population experiences from fear of the virus.

The present study also demonstrated adequate values for the FCV-19S in terms of its internal consistency ($\alpha \geq .89$). This is in line with internal consistencies found by previous research in the same language: Cuba ($\alpha \geq .87$; Broche-Pérez et al., 2020), Mexico ($\alpha \geq .902$; García-Reyna et al., 2022), and Peru ($\alpha \geq .83$; Huarcaya-Victoria et al., 2022). However, it should be noted that one-third of these studies have postulated a bi-factor structure. Furthermore, according to the literature review of Huarcaya-Victoria et al. (2022), similar values have also been observed in the international context. According to these authors, this indicates that the measurements of the different versions of the FCV-19S are inherently stable.

Finally, the correlational analysis with the Brief Fear of Death Scale (BFODS) yielded positive associations. This makes it possible to associate a greater fear of COVID-19 with a greater fear of death, which corroborates the concurrent validity of the FCV-19S in relation to other variables. In this regard, it is worth mentioning that the study of both constructs has been previously addressed and indicates the same relationship between them (Kumar & Nayar, 2020; Menzies &

Menzies, 2020; Pradhan et al., 2022).

Limitations

First, the sample size was a relatively small sample of the general population. It would be of great interest to expand the sample and also work with specific populations, such as the elderly or patients with pre-existing high-risk diseases. Second, participants were surveyed online and, even though this provided a potentially wider reach, the control of variables was less accurate. Third, the study employed a cross-sectional design. Therefore, relationships between the study variables do not provide causal implications. Future research should utilize longitudinal designs in order to assess causal relationships between antecedents, outcomes, and fear of COVID-19 (Caycho-Rodríguez, Tomás et al., 2022). Fourth, as most of the participants in this study were women (66.5%), this may affect the generalizability of our results. Fifth and last, the use of self-report measures may also generate biases in the responses, whether due to social desirability, memory recall effects and/or other method biases. Future studies should use other types of measures (e.g., in-depth interviews).

Conclusion

The present study not only demonstrated that the FCV-19S provides valid and reliable interpretations for the evaluation of fear of COVID-19 in the Argentinian context, but also provides empirical support for a bi-factor model with one general factor and two specific factors for the structure of the scale. As noted, having valid and reliable tools for measuring the psychological consequences of COVID-19 outbreak, including the degree of fear perceived by individuals, constitutes an element

of great value in order to be able to address this delicate issue in all of its complexity.

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