Psychological Thought
psyct.swu.bg | 2193-7281
South-West University "Neofit Rilski"

Research Article

Test of Invariance of the Anomie Brief Scale with the Alignment Method in 12 Latin American Countries

Tomás Caycho-Rodríguez *[a], Lindsey W. Vilca [b], José Ventura-León[c], Carlos Carbajal-León[b] , Pablo D. Valencia[d], Mario Reyes-Bossio[e], Mariel Delgado-Campusano[e], Daniel E. Yupanqui-Lorenzo[f], Rubí Paredes-Angeles[g,h] Claudio Rojas-Jara[i], Miguel Gallegos[i,j,k,l], Mauricio Cervigni[k,l,m], Pablo Martino[n], Roberto Polanco-Carrasco[ñ], Diego Alejandro Palacios[o], Rodrigo Moreta-Herrera[p], Antonio Samaniego-Pinho[q], Marlon Elías Lobos-Rivera[r], Andrés Buschiazzo Figares[s], Diana Ximena Puerta-Cortés[t], Ibraín Enrique Corrales-Reyes[u], Raymundo Calderón[v], Walter L. Arias Gallegos[w], Olimpia Petzold[x], Andrés Camargo[y], Julio Torales[z], J. Arkangel Monge Blanco[aa], Pedronel González[ab], Vanessa Smith-Castroa[ac], Wendy Yamilet Matute Rivera[ab], Daniela Ferrufino-Borja[ad], Paula Ceballos-Vásquez[ae], Agueda Muñoz-del-Carpio-Toia[af], Jorge Palacios[ag], Carmen Burgos-Videla[ah], Ana María Eduviges Florez León[ai], Ibeth Vergara[aj], Diego Vega[ak], Marion K. Schulmeyer[ad]

[a] Faculty of Psychology, Universidad Científica del Sur, Lima, Peru.
[b] South American Center for Education and Research in Public Health, Norbert Wiener University, Lima, Peru.

[c] Faculty of Health Sciences, Universidad Privada del Norte, Lima, Peru.

[d] Faculty of Higher Studies Iztacala, National Autonomous University of Mexico, Tlanepantla de Baz, State of Mexico, Mexico.

[e] Faculty of Psychology, Peruvian University of Applied Sciences, Lima, Peru.

[f] School of Psychology, University of Sciences and Humanities, Lima, Peru.

[g] CRONICAS Center of Excellence in Chronic Diseases, Cayetano Heredia Peruvian University, Lima, Peru.

[h] Advances in Psychological Measurement Study Group, National University of San Marcos, Lima, Peru.

[i] Faculty of Health Sciences. Department of Psychology, Catholic University of Maule, Talca, Chile.

[j] Post-Graduation Program in Psychology, Pontifical Catholic University of Minas Gerais, Belo Horizonte, Brazil.

[k] National Council for Scientific and Technical Research, Buenos Aires, Argentina.

[l] Faculty of Psychology, National University of Rosario, Rosario, Argentina.

[m] Interdisciplinary Center for Research in Health and Behavioral Sciences, Universidad Adventista del Plata, La Plata, Argentina.

[n] Behavioral Sciences Research Laboratory, Faculty of Psychology, National University of San Luis, San Luis, Argentina.

[ñ] Neuropsychology Notebooks, Center for Academic Studies in Neuropsychology, Rancagua, Chile.

[o] Center for Human Development, Mariano Gálvez University, Guatemala, Guatemala.

[p] School of Psychology, Pontifical Catholic University of Ecuador, Ambato, Ecuador.

[q] School of Psychology, Faculty of Philosophy, National University of Asunción, Asunción, Paraguay.

[r] School of Psychology, Faculty of Social Sciences, Technological University of El Salvador, San Salvador, El Salvador.

[s] Alfred Adler Uruguay Institute, Center for Adlerian Studies, Montevideo, Uruguay.

[t] Psychology Program, University of Ibagué, Ibagué, Colombia.

[u] Maxillofacial Surgery Service, Carlos Manuel de Céspedes University General Hospital, University of Medical Sciences of Granma, Bayamo, Granma, Cuba.

[v] State College of Intervention Psychologists of Jalisco A.C. Guadalajara, Jalisco, Mexico

[w] Department of Psychology, San Pablo Catholic University, Arequipa, Peru.

[x] Lone Star College, Conroe, The United States of America.

[y] School of Health and Sport Sciences, University Foundation of the Andean Area, Bogotá, Colombia

[z] Department of Psychiatry, Faculty of Medical Sciences, Universidad Nacional de Asunción, San Lorenzo, Paraguay.

[aa] Nicaraguan Association for the Development of Psychology, Managua, Nicaragua.

[ab] Research Department, Jesús de Nazareth University, Tegucigalpa, Honduras.

[ac] Institute of Psychological Research, Faculty of Social Sciences, University of Costa Rica.

[ad] Psychological Research and Counseling Center, Faculty of Humanities, Communication and Arts, Private University of Santa Cruz de la Sierra, Santa Cruz, Bolivia.

[ae] Department of Nursing, Faculty of Health Sciences, Universidad Católica del Maule, Talca, Chile.

[af] Vice-rector for research, Graduate School, School of Human Medicine, Catholic University of Santa María, Arequipa, Peru.

[ag] Psychology Major, Faculty of Health Sciences, Universidad del Valle de Mexico, Mexico City, Mexico.

[ah] Institute for Research in Social Sciences and Education, University of Atacama, Copiapó, Chile.

[ai] Panamanian Association of Psychologists, Panama City, Panama.

[aj] School of Psychology, Latin University of Panama, Panama City, Panama.

[ak] School of Psychology, Universidad Latina de Costa Rica, San José, Costa Rica.

Abstract

The Social Anomie Brief Scale (SAS10) is a self-report measure of social anomie against new social standards implemented during the current COVID-19 pandemic. The main objective of this study was to evaluate the invariance of the cross-cultural measurement of the SAS10 in a sample of 12 Latin American countries. Additionally, the difficulty and discrimination characteristics of the items were evaluated using the IRT and social anomie was compared between the participating countries. A total of 4,911 people from 12 Latin American countries (Argentina, Bolivia, Chile, Colombia, Cuba, Ecuador, Guatemala, Mexico, Paraguay, Peru, Uruguay, and Venezuela) selected by non-probabilistic snowball sampling participated. The results indicated that the original two-factor model of the SAS10 shows estimation problems and low fit indices in several countries. However, a model of two related dimensions (behavioral and affective) of nine items (SAS-9) presented adequate fit indices in all countries. This model presents adequate estimation of reliability and approximate cross-cultural measurement invariance. Peru was the country with the highest score in the behavioral dimension of social anomie; while Venezuela and Bolivia presented the highest scores in the affective dimension. Mexico was one of the countries with the lowest anomie scores. The results of the IRT would indicate that the characteristics of the SAS-9 items were appropriate. It is concluded that the SAS-9 has shown good psychometric properties

when evaluated in 12 Latin American countries and can be used in future studies that compare social anomie cross-culturally.

Keywords: social anomie; COVID-19; invariance; cross-cultural.

Table of Contents

Psychological Thought, 2023, Vol. 16(2), 349-388, https://doi.org/10.37708/psyct.v16i2.811
Received: 2023-01-31. Accepted: 2023-08-24. Published (VoR): 2023-10-31.
Handling Editor: Natasha Angelova, South-West University "Neofit Rilski", Blagoevgrad, Bulgaria.
*Corresponding author at: Tomás Caycho-Rodríguez, Faculty of Psychology, Universidad Científica del Sur, Lima, Peru. E-mail: tcay-cho@cientifica.edu.pe

Since the beginning of the COVID-19 pandemic, the World Health Organization (WHO) has suggested different public health measures to try to contain the transmission of the virus causing the disease, such as the implementation of healthy lifestyles, social and physical distancing, the use of masks and large-scale social restrictions (Indrayathi et al., 2021). However, many people have not complied with these recommendations (Aschwanden, 2020; Frieden, & Lee, 2020), a large number of people continued to meet with friends at social events, putting themselves and others at risk (Martínez et al., 2021). In this context, and for a better control of the COVID-19 pandemic, it is important to understand what prompted people not to comply with public health recommendations despite the available scientific evidence. In this sense, it is possible to identify a behavioral factor, referring to the non-compliance with the norms, and an affective factor, referring to the dissatisfaction and concern generated by the new norms implemented during the pandemic (Nosratabadi, & Halvaiepour, 2021; Roblain et al., 2022).

Public health measures to try to contain the transmission of the COVID-19 virus generated a conflict between individual needs, the decisions of different governments and regulatory norms that significantly affected people's daily lives by sacrificing individual freedoms for the "greater

good" (Powell et al., 2021). In this context, social anomie is a recurring problem (Vilca et al., 2022) that is understood as the perceived difference between people's desires and the availability of means to achieve those desires. (Merton, 1968). In addition, social anomie is a perception shared by individuals within society, characterized by the perception of disintegration, expressed in the distrust and breakdown of social cohesion, and deregulation, expressed in the perception of inefficiency of political leaders (Teymoori et al., 2017). Anomie causes people to protect their own interests and to be indifferent to the state of health and well-being of others in their community (Roblain et al., 2022). This approach considers anomie as a psychological state characterized by a tendency towards selfishness, rejection of social norms and feelings of isolation from society (Bjarnason, 2009; Fischer, 1973; Konty, 2005). These differences generate a rejection of the norms in force in the society and their normal fulfillment (Parales-Quenza, 2008). Anomie appears and develops in situations of social, economic or health crisis (Teymoori, et al., 2016).

Social anomie undermines community relationships and leads to symptoms of stress, frustration, and anxiety (Powell et al., 2021), including a sense that life lacks purpose and helplessness (Teymoori et al., 2016). It has also been suggested that, prior to the COVID-19 pandemic, the presence of social anomie was related to decreased life satisfaction, happiness, and increased depressive symptoms (Blanco & Díaz, 2007; Brockmann et al., 2009; Lantz, & Harper, 1990). During the pandemic, studies have indicated that anomie may mediate the relationship between conspiracy beliefs about COVID-19 and hesitancy to receive the disease vaccine (McCarthy et al., 2022), in addition to being a significant predictor of fear of COVID-19 (Kasapoğlu, 2020). Despite the importance of social anomie, there are few instruments to measure it.

The few existing instruments focus on measuring exclusion, uncertainty, degradation and estrangement (Aceituno et al., 2009), early identification of likely political instability (Li et al., 2019) and perception of the state of society based on perceived breakdown of leadership and perceived breakdown of the social fabric (Teymoori et al., 2016). Furthermore, while there are recent adaptations and validations of anomie measures in Latin American countries such as Colombia (Cortazar, 2018; Fleury et al., 2018), they are aimed at assessing general anomie, but none are developed in the context of the current COVID-19 pandemic. In this regard, it has been suggested that in the context of the COVID-19 pandemic having general measures of aspects of mental health may generate underdiagnosis or overdiagnosis (Ransing et al., 2020). Thus, measures with items designed to identify problems specific to the context of the COVID-19 pandemic are needed. In this regard, the Social Anomie Brief Scale (SAS10; Vilca et al., 2022) was recently

developed in Peru to measure social anomie in the face of the new social standards implemented during the current COVID-19 pandemic. During the COVID-19 pandemic, Peru was characterized by its limited capacity of the health system, the collapse of health services in the first wave of the pandemic, limited number of intensive care unit (ICU) beds and the lack of oxygen (Schwalb & Seas, 2021). This meant that Peru was the country with the highest number of deaths from COVID-19 per 100,000 inhabitants worldwide (Taylor, 2021). In 2020, 93,851 people died from COVID-19 in Peru, in 2021 the number of deaths reached 202,524; while by 2023 the total number of deaths was 220,673 (Ministerio de Salud [MINSA], 2023).

The psychometric results indicated that the SAS10 presents a bifactor structure with good fit indices; in addition to adequate levels of reliability for the general factor and the affective and behavioral dimensions. In the bifactor model, there is a general factor that affects all items and specific factors. In this sense, each of the items load on both the general factor and the specific factors, which makes it possible to identify the variance shared by all the items, and the unique variance, specific to each item (Hukkelberg & Ogden, 2019). This Bifactor model would allow us to have a measure of general social anomie, as well as of the two affective and behavioral dimensions. Although the SAS10 has shown good psychometric indicators, it would be appropriate to have a cross-cultural measure to obtain comparative information on social anomie between different countries. Having this information is specifically important in Latin American countries, where inconsistent compliance with public health measures to contain the progression of COVID-19 has been reported (Garcia et al., 2020). In addition, overconfidence in performing preventive behaviors associated with COVID-19 has recently been shown to exist in 10 Latin American countries (Boruchowicz, & Lopez Boo, 2022).

If one wishes to use the SAS10 in a cultural context different from the context in which it was originally developed (in this case Peru), it is not possible to assume the comparability of the SAS10 between these cultural groups, since the construct, in this case social anomie, will depend on the cultural context in which the instrument is used (Caycho-Rodríguez et al., 2022). In this sense, if SAS10 is to be used to compare social anomie in different countries, it is necessary to demonstrate the presence of measurement invariance (MI). However, MI is still a rarely performed procedure despite its interest for cross-cultural research (Boer et al., 2018). Specifically, MI aims to demonstrate that items on self-report measures, such as the SAS10, have the same meaning and whether responses to these same items load on the same factors in different groups where the measure is applied (Vandenberg & Lance, 2000). If MI is not demonstrated, conclusions about

possible cross-cultural differences in social anomie may be biased (Caycho, 2017). Traditionally, cross-cultural MI has been conducted using confirmatory multigroup factor analysis (CFA-MG) that assesses three levels of measurement invariance (configurational, metric, and scalar). However, the AFC-MG has been found to be demanding, especially when a large number of groups are evaluated, since scalar invariance is necessary to conclude that the measure has MI (Cieciuch et al., 2019). In response to this, an alignment method has been developed, based on Bayesian statistical models, which overcomes this problem (Muthen & Asparouhov, 2013). The alignment method evaluates the approximate MI, which allows to obtain means that are as reliable and invariant as possible, thus allowing to compare constructs between groups. This procedure has already been used recently in other self-report measures during the pandemic (e.g., Caycho-Rodríguez et al., 2021; Sawicki et al., 2022).

Additionally, the original SAS study10 did not evaluate item characteristics from Item Response Theory (IRT). In recent years, IRT-based models have been used for the development and psychometric evaluation of different measurement instruments (Volk et al., 2021). IRT considers each item of an instrument as a unit of analysis; in addition, it establishes a functional relationship between the latent trait measured (in this case, social anomie), the probability of response to items measuring that same trait, and the difficulty and discrimination characteristics of the items (Crocker & Algina, 1986). Likewise, IRT models assume that the model parameters are independent of the sample and information can be obtained about the degree of accuracy of the items to measure the trait according to its different levels (Hambleton & Jones, 1993; Raykov & Marcoulides, 2013).

Considering all of the above, the aim of the present study was to evaluate the cross-cultural MI of the SAS10 in a sample of 12 Latin American countries. Additionally, item difficulty and discrimination characteristics were evaluated using IRT and social anomie was compared among the participating countries.

Method

The design of the study was transversal, instrumental (Ato et al., 2013) multinational with a non-probabilistic snowball sampling, which was carried out according to the guidelines of the Consensus-based Standards for the selection of measurement instruments health measurement (Mokkink et al., 2018).

Participants

The participants were 4911 people from 12 Latin American countries (Argentina, Bolivia, Chile, Colombia, Cuba, Ecuador, Guatemala, Mexico, Paraguay, Peru, Uruguay, and Venezuela). The inclusion criteria were 1) people aged over 18 years and, 2) to have given informed consent to participate in the study.

Table 1 (Appendix) shows that the highest average age belongs to participants living in Guatemala (*M* = 44; *SD* = 13.6 years) and Venezuela (*M* = 43.8; *SD* = 16.7 years). While the lowest average age belongs to participants living in Mexico (*M* = 24.9; *SD* = 8.7 years) and Peru (*M* = 26.5; *SD* = 7.9 years). Furthermore, it can be seen that in all countries there is a higher proportion of women (> 60%) than men (< 40%). There is also a higher proportion of singles in most of the countries (> 40%). Regarding the educational level of the participants, it is observed that the majority have completed university studies (> 50%), except in some countries such as Colombia (26%), Argentina (43.8%), Ecuador (43.2%) and Mexico (26.4%), where the proportion is much lower. On the other hand, it can be seen that most of the participants have a permanent job, except in the countries of Colombia (26.7%), Ecuador (35.2%), Mexico (32.6%) and Peru (40.9%). It can also be seen that most of the participants reside in an urban area (> 70%). Regarding the pandemic, most of the participants indicated that they have not had COVID-19 (> 40%) except in Peru (46.3%). However, the majority of participants in almost all countries report that they have had family members (> 50%) and friends with COVID-19 (> 50%). It can also be seen that Venezuela (59.5%) is the country with the most people using social networks as a source of information about the COVID-19 vaccine. Finally, it is observed that the majority of participants from Bolivia (55.2%), Guatemala (49.3%) and Venezuela (52.7%) believe that SARS-CoV-2 was created in a laboratory.

Instruments

Social Anomie Short Scale (SAS-10, Vilca et al., 2022). The SAS-10 is made up of 10 items with four response options (0= totally disagree to 3= totally agree). The SAS-10 has a two-dimensional structure (affective and behavioral). The sum of the scores of each item gives a total score, where a higher value indicates a greater presence of social anomie.

Procedure

The study was approved by the Ethical Committee of the Universidad Privada del Norte (registration number: 20213002) and followed the recommendations of the Helsinki declaration.

Members of the research team developed an online survey for distribution in the participating countries, taking into account the social constraints due to the COVID-19 pandemic. The survey was developed on the Google Form platform and distributed between 15 and October 25, 2021 through different social networks (WhatsApp, Twitter, Facebook and Instagram) and emails to expand the sample in different countries and age ranges. The first part of the survey consisted of the study objectives and the informed consent document, which informed about voluntary and anonymous participation in the study. Responding to the survey lasted approximately 15 minutes and no financial payment was given for participating in the study.

Data Analysis

In the Confirmatory Factor Analysis (CFA), since the items had four response categories, the Diagonally Weighted Least Squares with Mean and Variance corrected (WLSMV) estimator was used (Brown, 2015). The adjustment criteria used to evaluate the fit of the model were the following: RMSEA (< .08), SRMR (< .08), CFI (> .95), and TLI (> .95) (Kline, 2016; Schumacker & Lomax, 2015). The scale's internal consistency was evaluated through Cronbach's alpha coefficient (Cronbach, 1951) and the omega coefficient (McDonald, 1999). A value greater than .70 was considered adequate (Viladrich et al., 2017).

The Multi-Group Factor Analysis Alignment (Asparouhov & Muthén, 2014) was used to evaluate the factorial invariance of the scale according to the participant's country. An unrestricted configural model was first fitted to all groups. Then, this configural model was optimized using a component loss function (Asparouhov & Muthén, 2014). The invariance tolerance criteria for the factorial weights and intercepts were .40 and .20, respectively (Robitzsch, 2020). The power of alignment was also established at .25 for both parameters (Fischer & Karl, 2019). The invariance of the parameters was evaluated through the R2 index; values close to 0 indicate a low degree of invariance; on the contrary, values close to 1 show a high level of invariance (Asparouhov & Muthén, 2014). In addition, a limit of 25% was established for the factorial weights and intercepts so that a value higher than the established one evidenced a scale as non-invariant (Asparouhov & Muthén, 2014). This process was performed for each dimension separately. Once the invariance of the scale was verified, the items were added to obtain a total score for each dimension to compare the differences between the countries. Differences between countries were assessed using Cohen's d test.

In Item Response Theory (IRT), an extension of the 2-parameter logistic model (2-PLM) was used for ordered polytomous items (Hambleton et al., 2010), which is based on the Graded Response

Model (GRM, Samejima, 1997). Before evaluating the items' parameters, the model's fit was first estimated through the C2 test developed for ordinal items (Cai & Monroe, 2014). The adjustment criteria to assess the GRM model were the following: RMSEA ≤ .05 (Maydeu-Olivares & Joe, 2014) and SRMSR ≤ .05 (Maydeu-Olivares, 2013). For the CFI and TLI values, criteria similar to those used in SEM models (≥ .95) were used (Lubbe & Schuster, 2019). Regarding the item parameters, the discrimination (a) and difficulty (b) parameters were used. The Information Curves for the Items and the scale (IIC and TIC, respectively) were also calculated.

All statistical analyzes were performed using the “lavaan” package (Rosseel, 2012) for the AFC, the “sirt” package (Robitzsch, 2020b) for the Alignment method, and the “mirt” package for the GRM (Chalmers, 2012). The RStudio environment (RStudio Team, 2018) for R (R Core Team, 2019) was used in all cases.

Results

Descriptive analysis

Table 2 (Appendix) shows that item 2 ("It bothers me that the new rules and/or laws do not help those who need it most") presents the highest average score in most of the countries. In other words, most of the participants agree with this statement. It can also be seen that item 7 ("When I want something, I don't mind breaking the rules and/or laws of my country") presents the lowest average score, i.e. most participants disagree with this item. All the items present adequate indices of skewness and kurtosis (As < ±2; Ku < ±7; Finney & DiStefano, 2006).

Validity based on internal structure

Table 3 (Appendix) shows that the ten-item bi-factor model (model 1) shows estimation problems and low fit indices in several countries. Similarly, the model with two related dimensions (model 2) does not show adequate fit indices in most of the countries. In view of this, after a conceptual analysis of the items, item two ("It bothers me that the new rules and/or laws do not help those who need it most") was removed, since it was the only one that referred to other people. The bi-factor model with nine items (model 3) presented serious estimation problems in half of the countries evaluated. Finally, the model with two related factors (model 4) presented adequate fit indices in all countries.

It can also be seen that the factorial weight of the items is high in all the countries evaluated and the correlation between both factors varies between .11 and .56 (see Table 4).

Table 4.
Factor weights and reliability of model 4 items in different countries of the America.

Country	Factorial Weight (λ)										Correlation	Reliability (ω)	
	A1	A2	A3	A4	A5	B6	B7	B8	B9	B10	F1 – F2	F1	F2
Argentina (1)	.60	–	.81	.85	.87	.81	.93	.89	.91	.94	.29	.85	.92
Bolivia (2)	.67	–	.87	.89	.87	.81	.91	.92	.90	.91	.11	.86	.93
Chile (3)	.74	–	.82	.78	.90	.83	.92	.88	.89	.92	.40	.86	.92
Colombia (4)	.65	–	.88	.92	.87	.87	.92	.93	.92	.95	.17	.87	.94
Cuba (5)	.76	–	.94	.88	.95	.82	.90	.90	.89	.92	.56	.91	.92
Ecuador (6)	.68	–	.87	.89	.91	.85	.94	.91	.94	.93	.27	.87	.94
Guatemala (7)	.63	–	.84	.83	.91	.84	.92	.93	.89	.91	.25	.86	.92
México (8)	.66	–	.80	.78	.88	.85	.93	.93	.91	.91	.41	.83	.93
Paraguay (9)	.59	–	.84	.91	.91	.77	.91	.90	.90	.94	.33	.86	.92
Perú (10)	.64	–	.83	.88	.88	.90	.97	.93	.93	.89	.45	.85	.95
Uruguay (11)	.78	–	.89	.88	.88	.87	.96	.92	.98	.93	.45	.91	.94
Venezuela (12)	.69	–	.89	.89	.97	.78	.92	.92	.85	.86	.28	.90	.90

Scale reliability

As shown in Table 4, both the affective dimension (ω = .83–.91) and the behavioral dimension (ω = .90–.95) showed adequate reliability indices in all countries.

Factor invariance by country

Table 5 shows that the factor structure in both factors is invariant for both factor loadings (R2 = .99) and item intercepts (R2 = .99). Regarding the percentage of non-invariant parameters by country, it is observed that all factor weights are invariant (0%) in both the affective and behavioral dimensions. With respect to the intercepts, in the affective dimension there were only three non-invariant parameters (6.2%). In the behavioral dimension, no non-invariant parameters were found (0%). Therefore, these findings support the metric and scalar invariance of the scale.

Table 5.
ML Invariance aligent (IA) in American countries.

Dimension	Parameters	Ítems	*M*	*SD*	Countries												R^2	%
Affective	Factorial Weight	1	.58	.05	1	2	3	4	5	6	7	8	9	10	11	12	.99	0.0%
		3	.79	.02	1	2	3	4	5	6	7	8	9	10	11	12		
		4	.80	.04	1	2	3	4	5	6	7	8	9	10	11	12		
		5	.83	.04	1	2	3	4	5	6	7	8	9	10	11	12		
	Intercept	1	1.67	.11	1	2	(3)	4	5	6	7	8	9	10	11	12	.99	6.2%
		3	1.70	.14	1	2	3	4	(5)	6	7	8	9	10	11	12		
		4	1.83	.11	1	2	3	(4)	5	6	7	8	9	10	11	12		
		5	1.70	.01	1	2	3	4	5	6	7	8	9	10	11	12		
Behavioral	Factorial Weight	6	.72	.05	1	2	3	4	5	6	7	8	9	10	11	12	.99	0%
		7	.77	.03	1	2	3	4	5	6	7	8	9	10	11	12		
		8	.83	.04	1	2	3	4	5	6	7	8	9	10	11	12		
		9	.77	.03	1	2	3	4	5	6	7	8	9	10	11	12		
		10	.81	.03	1	2	3	4	5	6	7	8	9	10	11	12		
	Intercept	6	.62	.07	1	2	3	4	5	6	7	8	9	10	11	12	.99	0%
		7	.46	.04	1	2	3	4	5	6	7	8	9	10	11	12		
		8	.62	.09	1	2	3	4	5	6	7	8	9	10	11	12		
		9	.49	.04	1	2	3	4	5	6	7	8	9	10	11	12		
		10	.54	.05	1	2	3	4	5	6	7	8	9	10	11	12		

Note: % = Percentage of non-invariant item parameters. The parentheses indicate that the parameter is not invariant for that specific group (country).

Figure 1 shows a graphical representation of the affective dimension scores by country. The vast majority of differences were small; however, differences of moderate size were also observed. For example, Bolivia presented higher scores than Argentina (d = -.52), Mexico (d = .75) and Uruguay (d = .54); while Peru obtained higher scores compared to Mexico (d = -.51) and Venezuela scored higher than Mexico (d = -.70).

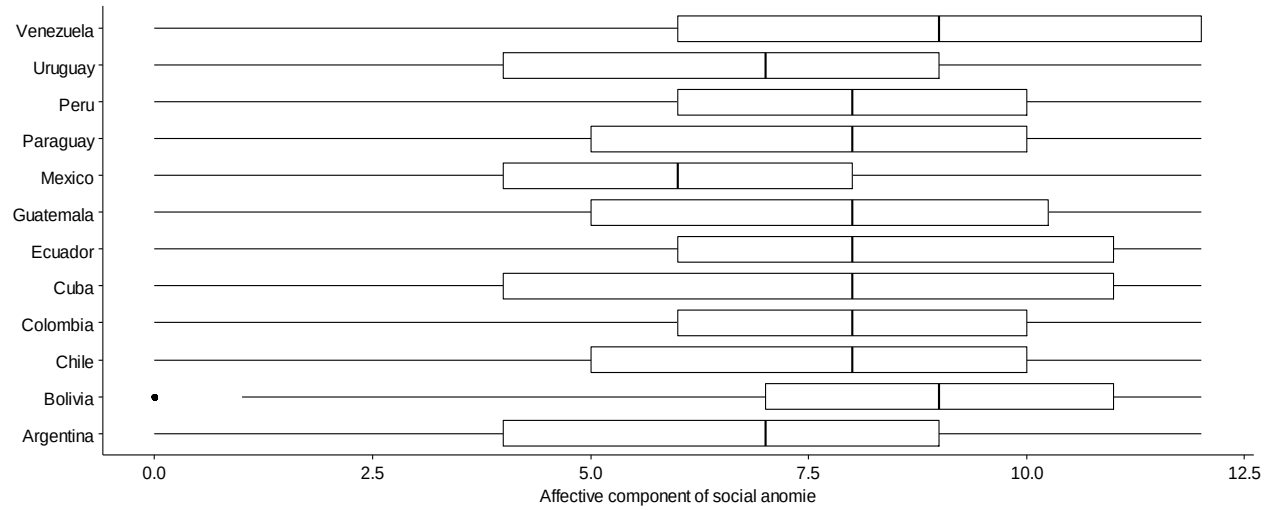


Figure 1. Comparison of the scores of the affective factor of social anomie.

On the other hand, Figure 2 presents a graphical representation of the behavioral dimension scores in each country. As in the affective dimension, most of the differences were small;

however, there were also differences of moderate size. Among the countries that showed a greater difference, Peru scored higher than Argentina (*d* = -.75), Bolivia (*d* = -.60), Chile (*d* = -.60), Cuba (*d* = -.62), Guatemala (*d* = -.72) and Mexico (*d* = -.64).

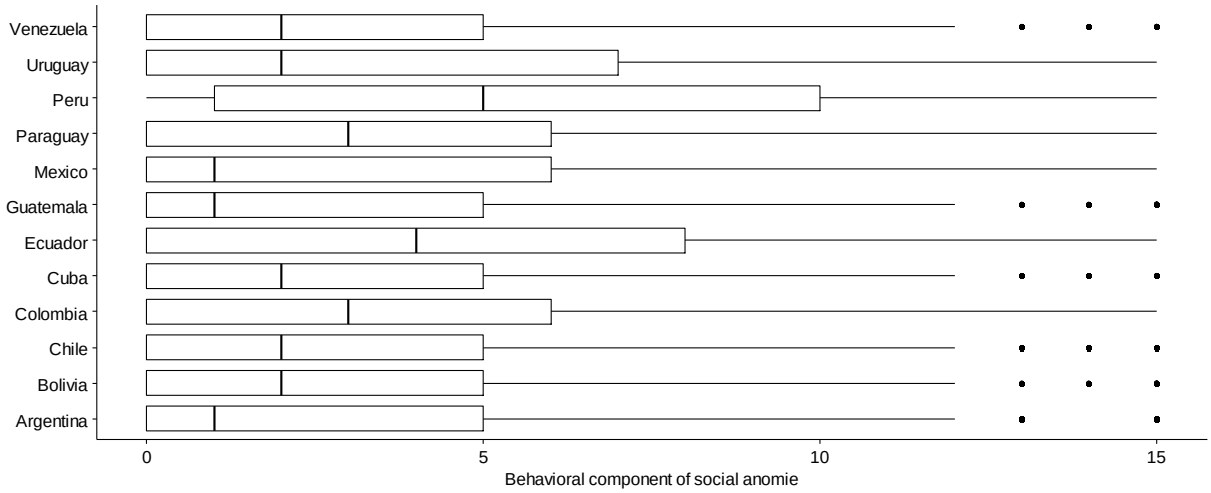


Figure 2. Comparison of the behavioral factor scores of social anomie

Item Response Theory Model: Graded Response Model (GRM)

Table 6 shows that the GRM model for the affective dimension presents adequate fit indices (C2[df] = 75.77[2]; p < .01; RMSEA = .079; SRMRS = .041; TLI = .98; CFI = .99). Similarly, the behavioral dimension presented acceptable fit indices (C2[df] = 260.68[5]; p < .01; RMSEA = .102; SRMRS = .039; TLI = .98; CFI = .99). It is also observed in Table 6 that all items present discrimination parameters above the value of 1, generally considered as good discrimination (Zickar, et al., 2002). With respect to the difficulty parameters, all the threshold estimators increased monotonically.

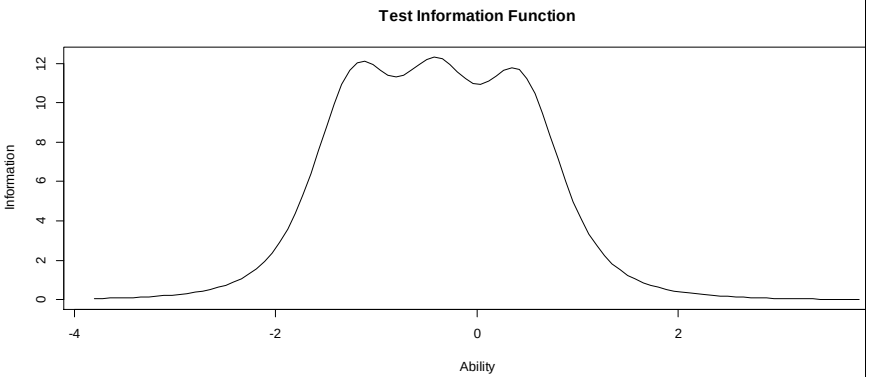
Table 6.

Parameters and fit indexes of the items and fit indexes of the GRM model for each factor.

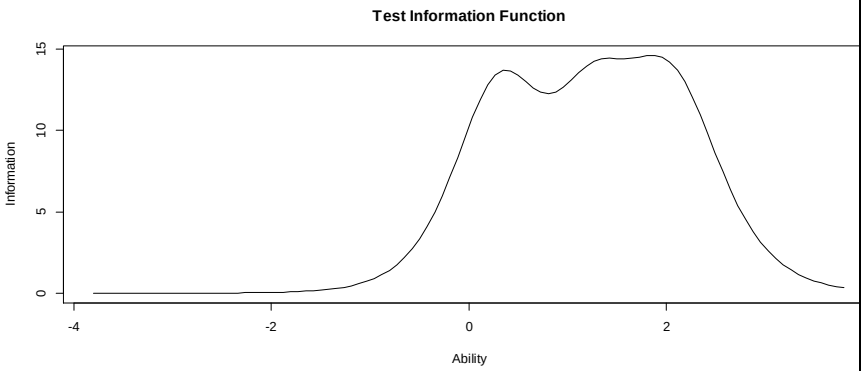
Model	Item Parameters					Model Fit Indices					
	Item	a	b_1	b_2	b_3	C2 (df)	p	RMSEA	SRMRS	TLI	CFI
Affective	1	1.77	-1.52	-.47	.78	75.77 (2)	<.01	.079	.041	.98	.99
	3	3.39	-1.18	-.39	.46						
	4	3.61	-1.24	-.52	.29						
	5	4.24	-1.19	-.37	.45						
Behavioral	6	2.54	.15	1.64	2.45	260.68 (5)	<.01	.102	.039	.98	.99
	7	3.78	.38	1.14	1.86						
	8	3.50	.17	1.34	2.12						
	9	3.04	.42	1.50	2.15						
	10	3.50	.39	1.25	2.09						

a= discrimination parameters; b= difficulty parameters

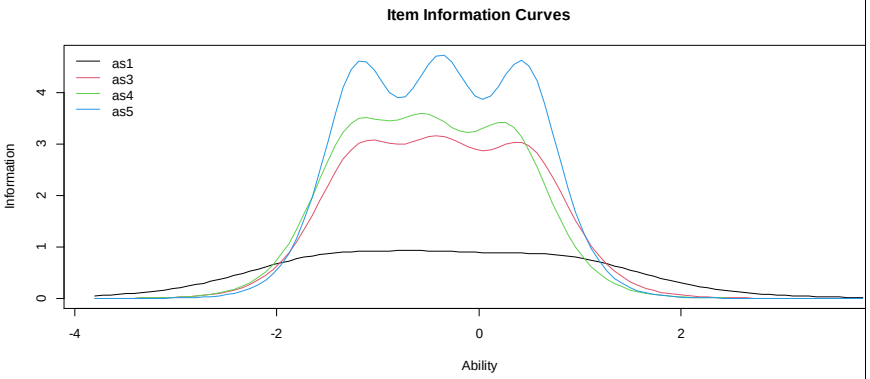
Regarding the affective dimension, the IIC indicates that item 5 is the precise one, while the ICT indicated that the factor is more reliable or precise in the range of the scale between -1.5 and 1. In the behavioral dimension, the IIC indicated that item 7 is more precise and the ICT shows that the factor is more reliable (precise) in the range of the scale between -.5 and 2.5.



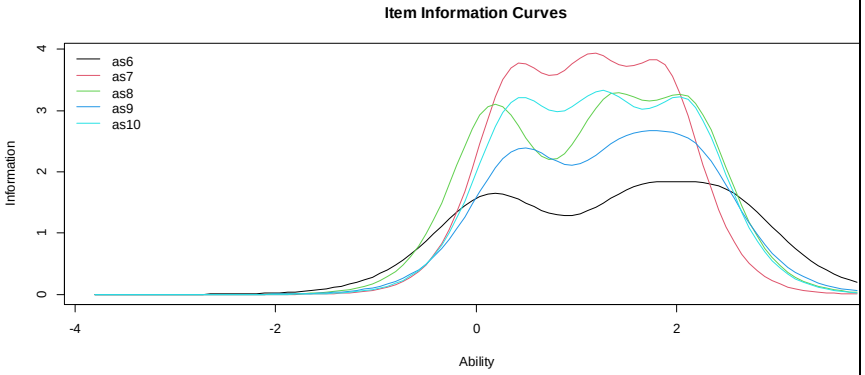
Tests Information Curves (TIC) of affective factor



Tests Information Curves (TIC) of behavior factor



Item Information Curves (IIC) of affective factor



Item Information Curves (IIC) of behavior factor

Figure 3. Item and Test Information Curves for the Scale

Discussion

It has been suggested that anomie generates people to trust others less and engage in more selfish behaviors (Jolley et al., 2019; Teymoori et al., 2016), which may increase public health problems associated with the pandemic. However, few instruments exist to measure social anomie. Therefore, the aim of the present study was to evaluate the cross-cultural MI of the SAS10 in a sample of 12 Latin American countries. First, the results indicate that the original 10-item Bifactor model presents estimation problems and low fit indices in several countries, as does the nine-item Bifactor model. The estimation problem refers to the presence of improper solutions when estimating the model parameters, such as the presence of negative error variances or Heywood cases. Thus, if at the time of estimating a model there are convergence problems or an inadequate solution, then the model is poorly defined and, therefore, results should not be interpreted (Oliver et al., 1999; Tomás et al., 2000). Estimation problems are to be expected because Bifactor models include a larger number of parameters and the loading of some factors is expected to be low due to the distribution of variance between the two factors.

Due to the above, other models of two related dimensions with 10 and nine items were tested. The findings indicated that the nine-item two related dimensions (affective and behavioral) model (SAS-9) presented adequate fit indices in all countries. In this model, item two ("It bothers me that the new rules and/or laws do not help those who need it most"), which referred to other external people, was eliminated, while the remaining items refer to oneself, one's own satisfaction, one's own economic income, worsening of one's own situation, one's own needs, among other things. This is related to the conceptualization of anomie at the individual level as a psychological state that has as one of its characteristics the tendency to egoism, personal confusion, lack of meaning and isolation (Konty, 2005).

The estimation problems of the Bifactor models and the adequate fit indices of the SAS-9 model with two related dimensions would only allow obtaining scores for each of the dimensions, but not a general social anomie score. This is important to keep in mind, since the calculation of a total score and specific scores by sum weights, based on Bifactor models, presents better accuracy and reliability (Liu & Liu 2017). In addition, the presence of an affective and a behavioral dimension is related to the drivers of non-compliance with public health norms (behavioral) and dissatisfaction and concern about the norms implemented during the pandemic (Nosratabadi, & Halvaiepour, 2021; Roblain et al., 2022).

Item analysis using IRT indicated that all SAS-9 items have good discrimination. Therefore, the SAS-9 items can efficiently and clearly differentiate low and high levels of social anomie. In addition, the difficulty parameters were also acceptable, indicating that the nine SAS-9 items explain a wide range of levels of social anomie during the COVID-19 pandemic. That the thresholds of the difficulty parameters increased monotonically would indicate that, a greater presence of the latent trait (in this case social anomie) is needed to answer the higher response categories. The information curves for the items of both dimensions indicated that item 5 ("I feel annoyed by the new rules and/or laws established by the government") was the most accurate for assessing the affective dimension; while item 7 ("When I want something, I don't mind breaking the rules and/or laws of my country") was the most accurate for assessing the behavioral dimension. The fact that both items are the most accurate measures of social anomie could be explained by the fact that the levels of discomfort or annoyance that accompany social isolation and other government-implemented rules lead people to seek to break these rules (Boylan et al., 2021). The IRT results would indicate that the characteristics of the SAS-9 items were appropriate. Finally, the SAS-9 has good reliability for both dimensions in all participating countries, indicating that the SAS-9 is accurate in measuring both dimensions of social anomie during the pandemic.

Having identified the best factor structure, in this case SAS-9, we proceeded to evaluate its MU among all the participating countries. The findings of the approximate MI evidenced the presence of approximate MI of the scale. This would suggest that the participants from the 12 countries understand the concept of social anomie, as measured by the SAS-9, in the same way. In this sense, the scores of both dimensions of social anomie and their relationships with other constructs can be compared with confidence in all participating countries. However, the proxy MI test detected some non-invariant items that could be the most problematic for cross-country comparison. These items are: "The new regulations and/or laws cause me dissatisfaction", "I feel annoyed because the new regulations and/or laws of my country do not allow me to cover my basic needs" and "I feel worried because the new regulations and/or laws of my country affect my economic income". Although it is beyond the scope of the present study to provide possible explanations for why these specific items have difficulty being comparable in Chile, Colombia and Cuba, it is possible that cultural differences in their meanings should be explored in depth. There are methodological and substantive aspects, such as the presence of biases due to social desirability, acquiescence, different understanding of the item or others, that could affect the performance of the items differently between countries (Davidov et al., 2018). In this sense, it has

been suggested that in-depth interviews, from a qualitative approach, can be complementary tools to better understand the causes of the lack of invariance of items within a particular country (Raudenská, 2020).

When comparing the affective and behavioral dimensions of social anomie between countries, it was observed that the differences were irrelevant or small. However, it was observed that Peru is the country with the highest score in the behavioral dimension of anomie, characterized by breaking laws or norms. This was to be expected if we take into account that, in Peru, good prevention practices against COVID-19 ranged from only 22.5% in rural areas to 28.8% in urban areas (Fernandez-Guzman et al., 2022), is well below that reported in other contexts such as Bangladesh (Ferdous, et al., 2020), Ethiopia (Wondimu et al., 2020), and Palestine (Qutob, & Awartani, 2021) whose good prevention practices ranged from 77% to 99%. This low percentage of people performing good prevention practices has already been observed in previous pandemics in Peru and can be explained by a low level of knowledge about the disease (Ávila et al., 2009).

On the other hand, Venezuela and Bolivia presented the highest scores in the affective dimension of social anomie, which would indicate that these countries would present more dissatisfaction and concern for the norms implemented during the pandemic. In the case of Venezuela, this was to be expected since it has been suggested that Venezuelans were optimistic that the world would control and overcome the COVID-19 pandemic, but were very pessimistic about the actions of the public authorities in Venezuela to achieve it (Bates et al., 2021). This could be explained by the negative experiences due to the deep economic and political crisis, as well as the problems in the health system that the country is facing, which diminish confidence in the government's efforts to control COVID-19 (Burki, 2020: Hotez et al., 2017). With respect to Bolivia, the findings are in line with another study indicating a high level of concern among Bolivians about the repercussions of the forced quarantine in the Altiplano country (Loro Ortega, 2021). This concern was explained by uncertainty about the duration of the government's preventive measures and their impact on the country's economy. In addition, a recent study indicated that concerns about corruption in the public sector are an obstacle to an adequate response to the pandemic by the Bolivian government (Velasco-Guachalla et al., 2021). Finally, Mexico was one of the countries with the lowest scores for social anomie, both in its behavioral and affective dimensions. This is to be expected since, at the behavioral level, compliance with prevention and social distancing measures increased significantly as the pandemic dragged on; while, at the affective level,

although there was greater concern about the usefulness of preventive measures imposed by the government, this diminished as time went by (Toledo-Fernández et al., 2021).

Limitations and future research suggestions

The study has limitations. First, it is necessary to consider the presence of sampling bias due to the use of a non-probabilistic procedure, where anyone was free to participate in the study. In addition, this caused sociodemographic variables such as sex, age and others to be unrepresentative of the general population of each of the participating Latin American countries. Also, while the online survey was useful in reaching participants in different countries, it is unlikely to have reached people who cannot access the Internet. All of the above affects the generalizability of the findings. Thus, it is recommended that future studies include balanced percentages of participants based on different sociodemographic variables. Second, the data from this study were collected between 15 and October 25, 2021, more than one year after the start of the COVID-19 pandemic outbreak. This is likely to influence the anomie experienced by participants at the time of assessment and could affect certain findings. Third, using self-report measures leads to possible bias due to the presence of socially desirable responses. Fourth, the study was cross-sectional and did not allow us to assess changes in social anomie across different time periods of the pandemic. Fifth, we did not test the validity and MI of the SAS-9 in countries with languages other than Spanish. This suggests that future studies should consider evaluating the relevance of the SAS-9 in cultural contexts other than Spanish-speaking countries. Finally, the association of social anomie with other variables such as stress, frustration, anxiety, life satisfaction, happiness and depressive symptoms was not evaluated (Blanco & Díaz, 2007; Brockmann et al., 2009; Lantz, & Harper, 1990; Powell et al., 2021). This should be considered in future studies to provide evidence of validity based on the relationship with other variables.

Despite its limitations, the study has important strengths. In this sense, it is the first to show evidence of validity and cross-cultural MI of a measure of social anomie in the general population of several Latin American countries. In addition, the results supported the usefulness of the SAS-9 version for use by researchers interested in assessing social anomie by the COVID-19. Assessing social anomie among Latin American countries is fundamental to prevent the negative physical and psychological outcomes of any pandemic disease by following effective measures. Thus, it is concluded that the SAS-9 has shown good psychometric properties when assessed in 12 Latin American countries and can be used in future studies comparing social anomie cross-culturally during periods of health emergencies.

Conclusion

The results of the study have cross-cultural utility to understand the theoretical foundations of social anomie as a multidimensional construct in all the Latin American countries evaluated. In addition, MI evidence would also broaden our understanding of cross-cultural differences in anomie versus COVID-19 and would identify sources of invariance or non-invariance between different countries. This would provide evidence for developing culturally invariant items within self-report measures of anomie in the future. Having a cross-culturally invariant measure generates greater confidence to interpret the possible differences in the levels of anomie between countries as true and not as the product of a measurement error. On Friday the 5th of May, the WHO declared the end of the public health emergency as an international emergency due to COVID-19. However, this does not mean that COVID-19 is no longer a global health threat, as COVID-19 remains a global public health priority. Therefore, studies on the impact of future pandemics on mental health would benefit from including an assessment of anomie either as an outcome measure or as an explanatory variable related to other mental health indicators.

Funding/Financial Support

The authors have no funding to report.

Other Support/Acknowledgement

The authors have no support to report.

Competing Interests

The authors have declared that no competing interests exist.

References

Aceituno, R., Asún, R., Ruiz, S., Venegas, J. I., Corbalán, F., & Reinoso, A. (2009). Anomia y alienación en estudiantes secundarios de Santiago de Chile: Resultados iniciales de un estudio comparativo 1989-2007. *Psykhe, 18*(2), 3-18. http://dx.doi.org/10.4067/S0718-22282009000200001

Aschwanden, C. (2020). The false promise of herd immunity for COVID-19. *Nature, 587*(7832), 26-28. https://doi.org/10.1038/d41586-020-02948-4

Asparouhov, T., & Muthén, B. (2014). Multiple-Group Factor Analysis Alignment. *Structural Equation Modeling, 21*(4), 495–508. https://doi.org/10.1080/10705511.2014.919210

Ato, M., López-García, J. J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología, 29*(3), 1038-1059. https://doi.org/10.6018/analesps.29.3.178511

Ávila, J., Munayco, C. V., Gomez, J., Nunura, J., & Canahuiri, J. (2009). Conocimientos y prácticas sobre la nueva Influenza A (H1N1) en trabajadores de salud y pacientes ambulatorios, Perú (Mayo 2009). [Knowledge and practices about the new Influenza A (H1N1) in health workers and outpatients, Peru (May 2009)]. *Revista Peruana de Medicina Experimental y Salud Publica, 26*(3), 328-332.

Bates, B. R., Tami, A., Carvajal, A., & Grijalva, M. J. (2021). Knowledge, attitudes, and practices towards COVID-19 among Venezuelans during the 2020 epidemic: an online cross-sectional survey. *PloS one, 16*(4), e0249022. https://doi.org/10.1371/journal.pone.0249022

Bjarnason, T. (2009). Anomie among European adolescents: Conceptual and empirical clarification of a multilevel sociological concept. *Sociological Forum, 24*(1), 135–161. https://doi.org/10.1111/j.1573-7861.2008.01089.x

Blanco, A., & Díaz, D. (2007). Social order and mental health: A social wellbeing approach. *Psychology in Spain, 11*(1), 61–71.

Boer, D., Hanke, K., & He, J. (2018). On detecting systematic measurement error in cross-cultural research: A review and critical reflection on equivalence and invariance tests. *Journal of Cross-Cultural Psychology, 49*(5), 713-734. https://doi.org/10.1177/0022022117749042

Boruchowicz, C., & Lopez Boo, F. (2022). Better than my neighbor? Testing for overconfidence in COVID-19 preventive behaviors in Latin America. *BMC Public Health, 22*(1), 1-13. https://doi.org/10.1186/s12889-022-13311-9

Boylan, J., Seli, P., Scholer, A. A., & Danckert, J. (2021). Boredom in the COVID-19 pandemic: Trait boredom proneness, the desire to act, and rule-breaking. *Personality and Individual Differences, 171*, 110387. https://doi.org/10.1016/j.paid.2020.110387

Brockmann, H., Delhey, J., Welzel, C., & Yuan, H. (2009). The China puzzle: Falling happiness in a rising economy. *Journal of Happiness Studies, 10*(4), 387-405. https://doi.org/10.1007/s10902-008-9095-4

Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research, Second Edition*. Guilford Publications. https://books.google.com.pe/books?id=tTL2BQAAQBAJ

Burki, T. (2020). Covid-19 in Latin America. *The Lancet Infectious Diseases, 20*(5), 547-548. https://doi.org/10.1016/S1473-3099(20)30303-0

Cai, L., & Monroe, S. (2014). *A New Statistic for Evaluating Item Response Theory Models for Ordinal Data*. University of California.

Caycho, T. (2017). Importancia del análisis de invarianza factorial en estudios comparativos en Ciencias de la Salud. [Importance of factorial invariance analysis in comparative studies in Health Sciences] *Revista Cubana de Educacion Medica Superior, 31*(2), 1-3. https://www.medigraphic.com/pdfs/educacion/cem-2017/cem172d.pdf

Caycho-Rodríguez, T., Valencia, P. D., Vilca, L. W., Carbajal-León, C., Vivanco-Vidal, A., Saroli-Araníbar, D., ... & Flores-Mendoza, C. (2022). Cross-cultural validation of the new version of the Coronavirus Anxiety Scale in twelve Latin American countries. *Current Psychology*, 1-18. https://doi.org/10.1007/s12144-021-02563-0

Caycho-Rodríguez, T., Vilca, L. W., Valencia, P. D., Carbajal-León, C., Vivanco-Vidal, A., Saroli-Araníbar, D., ... & Gallegos, W. L. A. (2021). Cross-Cultural Validation of a New Version in Spanish of Four Items of the Preventive COVID-19 Infection Behaviors Scale (PCIBS) in Twelve Latin American Countries. *Frontiers in Psychology, 5088*. https://doi.org/10.3389/fpsyg.2021.763993

Chalmers, R. P. (2012). Mirt: A multidimensional item response theory package for the R environment. *Journal of Statistical Software, 48*(6). https://doi.org/10.18637/jss.v048.i06

Chen, W. H., & Thissen, D. (1997). Local dependence indexes for item pairs using item response theory. *Journal of Educational Behavioral Statistics, 22*, 265–289. https://doi.org/10.2307/1165285

Cieciuch, J., Davidov, E., Schmidt, P., & Algesheimer, R. (2019). How to obtain comparable measures for cross-national comparisons. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie, 71*(1), 157-186. https://doi.org/10.1007/s11577-019-00598-7

Cortazar, F. R. (2018). Escalas de anomia social: Confiabilidad y estructura factorial en una muestra colombiana. *Informes Psicológicos, 18*(2), 169-187.

Crocker, L. y Algina, J. (1986). *Introduction to classical & modern test theory*. New York: Holt, Rinehart & Winston

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16(3), 297–334. https://doi.org/10.1007/BF02310555

Davidov, E., Cieciuch, J., & Schmidt, P. (2018, April). The cross-country measurement comparability in the immigration module of the European Social Survey 2014-15. *Survey Research Methods, 12*(1), 15-27.

Ferdous, M. Z., Islam, M. S., Sikder, M. T., Mosaddek, A. S. M., Zegarra-Valdivia, J. A., & Gozal, D. (2020). Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study. *PloS one, 15*(10), e0239254. https://doi.org/10.1371/journal.pone.0239254

Fernandez-Guzman, D., Soriano-Moreno, D. R., Ccami-Bernal, F., Velasquez-Fernandez, R., Morocho-Alburqueque, N., De-Los-Rios-Pinto, A., ... & Nieto-Gutierrez, W. (2022). Factors associated with prevention practices against COVID-19 in the Peruvian population: Disparities between rural and urban areas. *Plos one, 17*(5), e0267625. https://doi.org/10.1371/journal.pone.0267625

Finney, S. J., & DiStefano, C. (2013). Nonnormal and categorical data in structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 439–492). IAP Information Age Publishing.

Fischer, C. S. (1973). On urban alienations and anomie: Powerlessness and social isolation. *American Sociological Review, 38*(3), 311-326. https://doi.org/10.2307/2094355

Fischer, R., & Karl, J. A. (2019). A primer to (cross-cultural) multi-group invariance testing possibilities in R. *Frontiers in Psychology, 10*, 1–18. https://doi.org/10.3389/fpsyg.2019.01507

Fleury, L. F. D. O., Formiga, N. S., & Souza, M. A. D. (2018). Propiedades psicométricas de la escala de Anomia Social de Srole en trabajadores brasileños. *Pesquisas e Práticas Psicossociais, 13*(4), 1-16.

Frieden, T. R., & Lee, C. T. (2020). Identifying and interrupting superspreading events—implications for control of severe acute respiratory syndrome coronavirus 2. *Emerging Infectious Diseases, 26*(6), 1059- 1066. https://doi.org/10.3201/eid2606.200495

Garcia, P. J., Alarcón, A., Bayer, A., Buss, P., Guerra, G., Ribeiro, H., ... & Atun, R. (2020). COVID-19 response in Latin America. *The American Journal of Tropical Medicine and Hygiene, 103*(5), 1765-1772. https://doi.org/10.4269/ajtmh.20-0765

Hambleton, R. K., & Jones, R. W. (1993). Comparison of classical test theory and item response theory and their applications to test development. *Educational Measurement: Issues and Practice, 12*(3), 38-47.

Hotez, P. J., Basanez, M. G., Acosta-Serrano, A., & Grillet, M. E. (2017). Venezuela and its rising vector-borne neglected diseases. *PLoS Neglected Tropical Diseases, 11*(6), e0005423. https://doi.org/10.1371/journal.pntd.0005423

Hukkelberg, S., & Ogden, T. (2019). General and specific factors of working alliance in parent training: A bifactor exploratory structural equation modelling approach. *Psychotherapy Research, 29*(2), 267-276. https://doi.org/10.1080/10503307.2017.1330574

Hummel, C., Knaul, F. M., Touchton, M., Guachalla, V. X. V., Nelson-Nuñez, J., & Boulding, C. (2021). Poverty, precarious work, and the COVID-19 pandemic: lessons from Bolivia. *The Lancet Global Health, 9*(5), e579-e581. https://doi.org/10.1016/S2214-109X(21)00001-2

Indrayathi, P. A., Januraga, P. P., Pradnyani, P. E., Ward, P. R., & Gesesew, H. A. (2021). Perceived Social Norms as Determinants of Adherence to Public Health Measures Related to COVID-19 in Bali, Indonesia. *Frontiers in Public Health*, 9, 269. https://doi.org/10.3389/fpubh.2021.646764

Jolley, D., Douglas, K. M., Leite, A. C., & Schrader, T. (2019). Belief in conspiracy theories and intentions to engage in everyday crime. *British Journal of Social Psychology, 58*(3), 534-549. https://doi.org/10.1111/bjso.12311

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2018). *semTools: Useful tools for structural equation modeling. R package version 0.5-1.* https://CRAN.R-project.org/package=semTools

Kang, T., & Chen, T. T. (2011). Performance of the generalized S-X2 item fit index for the graded response model. *Asia Pacific Education Review, 12*(1), 89-96.

Kasapoğlu, F. (2020). Examining the relationship between fear of COVID-19 and spiritual well-being. *Spiritual Psychology and Counseling, 5*(3), 341-354. https://dergipark.org.tr/en/download/article-file/1424749

Kline, R. B. (2015). *Principles and Practice of Structural Equation Modeling* (4th ed.). The Guilford Press.

Konty, M. (2005). Microanomie: The cognitive foundations of the relationship between anomie and deviance. *Criminology, 43*(1), 107-132. https://doi.org/10.1111/j.0011-1348.2005.00004.x

Lantz, J., & Harper, K. (1990). Anomic depression and the migrating family. *Contemporary Family Therapy, 12*(2), 153-163. https://doi.org/10.1007/BF00892493

Li, H., Atteslander, P., Tanur, J., y Wang, Q. (1999). Anomie scales: measuring social instability. in A. Peter, B. Gransow y J. Western (Eds.). *Comparative anomie research: hidden barriers-hidden potential for social development* (pp. 23-46). Sidney, Australia: Ashgate.

Liu, Y., & Liu, H. (2017). Reporting overall scores and domain scores of bi-factor models. *Acta Psychologica Sinica, 49*(9), 1234–1246. https://doi.org/10.3724/SP.J.1041.2017.01234

Loro Ortega, D. M. (2021). Percepción de riesgo e impacto psicológico del covid-19 durante el periodo de cuarentena en población boliviana. *Revista Científica Ciencia Médica, 24*(1), 52-58. https://doi.org/10.51581/rccm.v24i1.345

Lubbe, D., & Schuster, C. (2019). A Graded Response Model Framework for Questionnaires With Uniform Response Formats. *Applied Psychological Measurement, 43*(4), 290–302. https://doi.org/10.1177/0146621618789394

Martínez, D., Parilli, C., Scartascini, C., & Simpser, A. (2021). Let's (not) get together! The role of social norms on social distancing during COVID-19. *PloS one, 16*(3), e0247454. https://doi.org/10.1371/journal.pone.0247454

Maydeu-Olivares, A. (2013). Goodness-of-Fit Assessment of Item Response Theory Models. *Measurement, 11*(3), 71–101. https://doi.org/10.1080/15366367.2013.831680

Maydeu-Olivares, A., & Joe, H. (2014). Assessing Approximate Fit in Categorical Data Analysis. *Multivariate Behavioral Research, 49*(4), 305–328. https://doi.org/10.1080/00273171.2014.911075

McCarthy, M., Murphy, K., Sargeant, E., & Williamson, H. (2022). Examining the relationship between conspiracy theories and COVID-19 vaccine hesitancy: A mediating role for perceived health threats, trust, and anomie? *Analyses of Social Issues and Public Policy, 22*(1), 106-129. https://doi.org/10.1111/asap.12291

McDonald, R. P. (1999). *Test Theory: A Unified Treatment*. Taylor & Francis.

Merton, R. K. (1968). *Social theory and social structure*. Simon and Schuster.

Ministerio de Salud (MINSA, 2023). Sala COVID-19. https://www.dge.gob.pe/covid19.html

Mokkink, L. B., Prinsen, C., Patrick, D. L., Alonso, J., Bouter, L., de Vet, H. C., ... & Mokkink, L. (2018). COSMIN methodology for systematic reviews of patient-reported outcome measures (PROMs). *User manual, 78*(1), 6-63. https://cosmin.nl/wp-content/uploads/COSMIN-syst-review-for-PROMs-manual_version-1_feb-2018.pdf

Muthén, B., & Asparouhov, T. (2014). IRT studies of many groups: The alignment method. *Frontiers in Psychology, 5*, 978. https://doi.org/10.3389/fpsyg.2014.00978

Nosratabadi, M., & Halvaiepour, Z. (2021). Identifying psychological perceptions of people ignoring the novel COVID-19 warnings: A qualitative thematic analysis in Isfahan, Iran. *Integrative Psychological and Behavioral Science*, 1-16. https://doi.org/10.1007/s12124-021-09608-w

Oliver, A., Tomás, J. M., & Hontangas, P. M. (1999). Efecto del número de indicadores por factor sobre la identificación y estimación en modelos aditivos de análisis factorial confirmatorio. *Qüestiió: quaderns d'estadística i investigació operativa, 23*(2), 239-259.

Paek, I., & Cole, K. (2020). *Using R for item response theory model applications*. Routledge.

Parales-Quenza, C. J. (2008). Anomie and public mental health. *Revista de Salud Pública, 10*(4), 658-666.

Powell, R. A., Kendall, K., Cislaghi, B., & El-Osta, A. (2021). Self-care, social norms and anomie during COVID-19: from contestation of the greater good to building future normative resilience in the UK. *Journal of Epidemiology & Community Health, 75*(10), 925-926. http://dx.doi.org/10.1136/jech-2021-217292

Qutob, N., & Awartani, F. (2021). Knowledge, attitudes and practices (KAP) towards COVID-19 among Palestinians during the COVID-19 outbreak: A cross-sectional survey. *PLoS One, 16*(1), e0244925. https://doi.org/10.1371/journal.pone.0244925

R Core Team. (2019). *A language and environment for statistical computing (R version 3.6.1). R Foundation for Statistical Computing*. http://www.r-project.org/

Ransing, R., Ramalho, R., Orsolini, L., Adiukwu, F., Gonzalez-Diaz, J. M., Larnaout, A., ... & Kilic, O. (2020). Can COVID-19 related mental health issues be measured? *Brain, Behavior, and Immunity, 88*, 32-34. https://doi.org/10.1016/j.bbi.2020.05.049

Raudenská, P. (2020). The cross-country and cross-time measurement invariance of positive and negative affect scales: Evidence from European Social Survey. *Social Science Research, 86*, 102369. https://doi.org/10.1016/j.ssresearch.2019.102369

Raykov, T., & Marcoulides, G. A. (2016). On the relationship between classical test theory and item response theory: From one to the other and back. *Educational and Psychological Measurement, 76*(2), 325-338. https://doi.org/10.1177/0013164415576958

Rhemtulla, M., Brosseau-Liard, P. E., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods, 17*(3), 354–373. https://doi.org/10.1037/a0029315

Robitzsch, A. (2020a). sirt: Supplementary Item Response Theory Models (R package version 3.9-4). https://cran.r-project.org/package=sirt

Robitzsch, A. (2020b). *sirt: Supplementary Item Response Theory Models* (R package version 3.9-4).

Roblain, A., Gale, J., Abboud, S., Arnal, C., Bornand, T., Hanioti, M., ... & Toma, C. (2022). Social control and solidarity during the COVID-19 pandemic: The direct and indirect effects of causal attribution of insufficient compliance through perceived anomie. *Journal of Community & Applied Social Psychology*. 1-11. https://doi.org/10.1002/casp.2600

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software, 48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

RStudio Team. (2018). *RStudio: Integrated Development Environment for R*. RStudio, Inc. http://www.rstudio.com/

Samejima, F. (1997). Graded response model. In W. J. Van der Linden & R. K. Hambleton (Eds.), *Handbook of modern Item Response Theory* (pp. 85–100). New York, Springer.

Sawicki, A. J., Żemojtel-Piotrowska, M., Balcerowska, J. M., Sawicka, M. J., Piotrowski, J., Sedikides, C., Jonason, P. K., Maltby, J., Adamovic, M., Agada, A. M. D., Ahmed, O., Al-Shawaf, L., Appiah, S. C. Y., Ardi, R., Babakr, Z. H., Bălţătescu, S., Bonato, M., Cowden, R. G., Chobthamkit, P., . . . Zand, S. (2022). The fear of COVID-19 scale: Its structure and measurement invariance across 48 countries. *Psychological Assessment, 34*(3), 294–310. https://doi.org/10.1037/pas0001102

Schumacker, R. E., & Lomax, R. G. (2015). *A Beginner's Guide to Structural Equation Modeling: Fourth Edition* (4th ed.). Routledge.

Schwalb, A., & Seas, C. (2021). The COVID-19 pandemic in Peru: what went wrong? *The American Journal of Tropical Medicine and Hygiene, 104*(4), 1176–1178. https://doi.org/10.4269/ajtmh.20-1323

Taylor, L. (2021). Covid-19: Why Peru suffers from one of the highest excess death rates in the world. *BMJ, 2021*, 372. https://doi.org/10.1136/bmj.n611

Teymoori, A., Bastian, B., & Jetten, J. (2017). Towards a psychological analysis of anomie. *Political Psychology, 38*(6), 1009-1023. https://doi.org/10.1111/pops.12377

Teymoori, A., Jetten, J., Bastian, B., Ariyanto, A., Autin, F., Ayub, N., ... & Wohl, M. (2016). Revisiting the measurement of anomie. *PloS one, 11*(7), e0158370. https://doi.org/10.1371/journal.pone.0158370

Toledo-Fernández, A., Betancourt-Ocampo, D., & González-González, A. (2021). Distress, depression, anxiety, and concerns and behaviors related to covid-19 during the first two months of the pandemic: A longitudinal study in adult mexicans. *Behavioral Sciences, 11*(5), 76. https://doi.org/10.3390/bs11050076

Tomás, J. M., Oliver, A., & Hontangas, P. M. (2000). Análisis factorial confirmatorio de segundo orden y matrices multirrasgo-multimétodo. *Psicothema, 12*, 534-539. https://reunido.uniovi.es/index.php/PST/article/view/7746

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*(1), 4-70. https://doi.org/10.1177/109442810031002

Velasco Guachalla, V. X., Hummel, C., Nelson-Nuñez, J., & Boulding, C. (2021). Crisis-Doble: Bolivia 2020. *Revista de Ciencia Política, 41*(2), 211-237. http://dx.doi.org/10.4067/S0718-090X2021005000116

Viladrich, C., Angulo-Brunet, A., & Doval, E. (2017). A journey around alpha and omega to estimate internal consistency reliability. *Anales de Psicología, 33*(3), 755–782. https://doi.org/10.6018/analesps.33.3.268401

Vilca, L. W., Gonzales, R. D., Pariona-Millán, V., Caycho-Rodríguez, T., & White, M. (2022). Development and Validation of the Social Anomie Brief Scale (SAS-10) Against the New Standards Implemented During the COVID-19 Pandemic. *Electronic Journal of General Medicine, 19*(3), em375. https://doi.org/10.29333/ejgm/11911

Volk, C., Rosenstiel, S., Demetriou, Y., Sudeck, G., Thiel, A., Wagner, W., & Höner, O. (2021). Health-related fitness knowledge in adolescence: evaluation of a new test considering different psychometric approaches (CTT and IRT). *German Journal of Exercise and Sport Research*, 1-13. https://doi.org/10.1007/s12662-021-00735-5

Van der Linden, W. J. (Ed.). (2017). *Handbook of Item Response Theory: Volume* 2. Statistical Tools. CRC Press.

Wondimu, W., Ejigu, A., Ayenew, M., Kidnau, A. W., Niguse, W., Geremaw, M., ... & Berchedi, A. A. (2020). Factors associated with coronavirus disease 2019 prevention practices in three zones of southwest Ethiopia: community-based cross-sectional study. *International Journal of General Medicine, 13*, 1603-1611. https://doi.org/10.2147/IJGM.S288067

Yuan, K.-H., & Bentler, P. M. (2000). Three likelihoodbased methods for mean and Covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*(1), 165–200. https://doi.org/10.1111/0081-1750.00078

Zickar, M. J., Russel, S. S., Smith, C. S., Bohle, P., & Tilley, A. J. (2002). Evaluating two morningness scales with item response theory. *Personality and Individual Differences, 33*(1), 11-24. https://doi.org/10.1016/S0191-8869(01)00131-3

About the Authors

Tomás Caycho-Rodríguez, Ph.D. in Psychology. Senior Researcher at the Universidad Científica del Sur, Research Renacyt Distinguished category. His research interests are psychometrics, psychogerontology, cross-cultural research.

Lindsey W. Vilca, Master in Psychology. Professor and researcher at the Norbert Wiener University in Lima, Peru. His research interests are psychometrics and clinical and health Psychology.

Pablo D. Valencia, PhD Student, School of Higher Studies (F.E.S.) Iztacala, National Autonomous University of Mexico.

José Ventura-León, Ph.D. in Psychology. Senior Researcher at the Universidad Privada del Norte, Renacyt Distinguished Researcher. His research interests are psychometrics, network analysis, statistics, clinical psychology.

Carlos Carbajal-León, Ph.D. in psychology and Master in Educational Psychology. South American Center for Education and Research in Public Health, Norbert Wiener University, Lima, Peru. Research professor at the Peruvian University of Applied Sciences.

Mario Reyes-Bossio, Master in Psychology, University of San Martín de Porres. Researcher at the Peruvian University of Applied Sciences.

Mariel Delgado-Campusano, Master in Psychology, Researcher at the Peruvian University of Applied Sciences.

Daniel E. Yupanqui-Lorenzo, Researcher at the University of Sciences and Humanities.

Rubí Paredes-Angeles, Researcher at the CRONICAS Center of Excellence in Chronic Diseases, Cayetano Heredia Peruvian University, Lima, Peru.

Claudio Rojas-Jara, Master in drug addiction. Master in prevention and treatment of addictive behaviors. Academic of the Department of Psychology, Faculty of Health Sciences, Universidad Catolica del Maule, Chile.

Miguel Gallegos, Ph.D. in Psychology from the National University of Rosario, Argentina, and Doctor of Education from the Federal University of Minas Gerais, Brazil. Post-doctorate from the National Autonomous University of Mexico, and the Pontificia Universidade Catolica de Minas Gerais, Brazil.

Mauricio Cervigni, Ph.D. in Psychology from the National University of Rosario (UNR). Researcher at the National Council for Scientific and Technical Research (CONICET - Argentina). Professor-Researcher at the National University of Rosario (UNR).

Pablo Martino, Ph.D. in Psychology (National University of San Luis-Arg). Adjunct professor at the Faculty of Psychology, National University of Rosario. National Council for Scientific and Technical Research postdoctoral fellow.

Roberto Polanco-Carrasco, Bachelor of Psychology, Scientific Editor of Cuadernos de Neuropsicologıa – Panamerican Journal of Neuropsychology. Director of the Chilean Association of Scientific Journals of Psychology.

Diego Alejandro Palacios, Clinical Psychologist, Master in Clinical Psychology and Mental Health. Psychotherapist at the Human Development Center Clinics -CDH- and teacher at the University of San Carlos de Guatemala.

Rodrigo Moreta-Herrera, Clinical Psychologist and University Master's Degree in Psychology. Doctor (c) in Psychology from the University of Girona. Professor and researcher at the Pontifical Catholic University of Ecuador.

Antonio Samaniego-Pinho, Psychologist with a specialty in Occupational Psychology. Master in Clinical Psychology. Teacher in the career of Psychology at the Faculty of Philosophy (National University of Asuncion).

Marlon Elías Lobos Rivera, Psychologist. Master in University Education. Research professor at the School of Psychology, Faculty of Social Sciences, Technological University of El Salvador.

Andrés Buschiazzo Figares, Degree in Psychology (University of the Republic, Uruguay). Psychotherapist. Academic Director of the Center for Adlerian Studies, Uruguay.

Diana Ximena Puerta-Cortés, Ph.D. in Psychology (Ramon LLull University of Barcelona, Spain). Master's degree in psychology with an emphasis on addictions and violence (Universidad Catolica de Colombia). She is a researcher for the GESS group and director of the NeuroTech research hotbed. Professor at the University of Ibagué in Colombia.

Ibraín Enrique Corrales-Reyes, Dentist. Maxillofacial surgeon. Professor and researcher at the Carlos Manuel de Céspedes General University Hospital. Granma University of Medical Sciences. Cuba. Editor of the Cuban Journal of Stomatology and the Cuban Journal of Biomedical Research.

Raymundo Calderón, Master of Science in Education. National Director of Psychology, Universidad Del Valle de México.

Walter L. Arias Gallegos, Ph.D. in Psychology, San Agustín National University, Arequipa, Peru. Researcher at the San Pablo Catholic University, Arequipa, Peru.

Olimpia Petzold, Ph.D. in Psychology, Lone Star College, Conroe, The United States of America.

Andrés Camargo, Ph.D. in Psychology, School of Health and Sport Sciences, Fundación Universitaria del Area Andina, Bogotá, Colombia.

Julio Torales, Head of the Neuroscience Department. School of Medical Sciences, Universidad Nacional de Asunción.

J. Arkangel Monge Blanco, Ph.D. in Psychology, Nicaraguan Association for the Development of Psychology.

Pedronel González, Ph.D. in Psychology, Jesus of Nazareth University, Honduras.

Vanessa Smith-Castro, Ph.D. in Psychology, Institute of Psychological Research, Faculty of Social Sciences, University of Costa Rica.

Wendy Yamilet Matute Rivera, Ph.D. in Psychology, Research Department Universidad Jesús de Nazareth; Honduras.

Daniela Ferrufino-Borja, Graduate in Psychology, Psychological Research and Counseling Center, Faculty of Humanities, Communication and Arts, Private University of Santa Cruz de la Sierra, Santa Cruz, Bolivia.

Paula Ceballos-Vásquez, Ph.D. in Nursing. Adult ICU nurse. Research professor, Department of Nursing, Faculty of Health Sciences, Universidad Católica del Maule, Talca, Chile.

Agueda Muñoz-del-Carpio-Toia, Doctor of Medicine and Master of Public Health. Full-time Research Professor in the Vice-Rector's Office for Research. Professor at the Graduate School of the Catholic University of Santa María (UCSM).

Jorge Palacios, Ph.D. in Psychology, Professor of Psychology, Faculty of Health Sciences, Universidad del Valle de Mexico, Mexico City, Mexico.

Carmen Burgos-Videla, Teacher of Basic General Education, Graduate with a master's degree in Education, curricular design by competencies. Doctor in Educational Sciences. Academic, researcher at the University of Atacama.

Ana María Eduviges Florez León, Graduate in Psychology, Coordinator of the School of Psychology at the Universidad Latina.

Ibeth Vergara, Graduate in Psychology. Professor, School of Psychology, Universidad Latina de Panamá, Panama.

Diego Vega, Graduate in Psychology. Professor, School of Psychology, Universidad Latina de Costa Rica, San José, Costa Rica.

Marion K. Schulmeyer, Graduate in Philosophy and Letters, Psychology Section from the Universidad Pontificia Comillas (Spain). Dean of the Faculty of Humanities and Communication of the Private University of Santa Cruz de la Sierra, Santa Cruz, Bolivia.

Corresponding Author`s Address [TOP]

Facultad de Psicología, Universidad Científica del Sur
Campus Villa II, Ctra. Panamericana S 19, Villa EL Salvador, Lima, Peru
Email: tcaycho@cientifica.edu.pe

Appendix

Table 1.

Sociodemographic characteristics of the participants.

Sociodemographic Data	Argentina (*n* = 361)	Bolivia (*n* = 563)	Chile (*n* = 453)	Colombia (*n* = 461)	Cuba (*n* = 334)	Ecuador (*n* = 438)
Age (M ± SD)	37.7 ± 16	38.6 ± 11.4	35.1 ± 12	27.3 ± 12.1	27.6 ± 10.5	29.7 ± 10.7
Sex, *n* (%)						
Male	108 (29.9%)	142 (25.2%)	139 (30.7%)	139 (30.2%)	103 (30.8%)	127 (29.0%)
Female	253 (70.1%)	421 (74.8%)	314 (69.3%)	322 (69.8%)	231 (69.2%)	311 (71.0%)
Civil Status, *n* (%)						
Single	198 (54.8%)	245 (43.5%)	264 (58.3%)	367 (79.6%)	194 (58.1%)	289 (66%)
Married	74 (20.5%)	222 (39.4%)	99 (21.9%)	61 (13.2%)	64 (19.2%)	98 (22.4%)
Cohabitant	45 (12.5%)	31 (5.5%)	61 (13.5%)	23 (5%)	65 (19.5%)	22 (5%)
Divorced	28 (7.8%)	58 (10.3%)	24 (5.3%)	8 (1.7%)	8 (2.4%)	25 (5.7%)
Widower	16 (4.4%)	7 (1.2%)	5 (1.1%)	2 (.4%)	3 (.9%)	4 (.9%)
Education Level, *n* (%)						
Complete University	158 (43.8%)	417 (74.1%)	266 (58.7%)	120 (26%)	167 (50%)	189 (43.2%)
Incomplete University	137 (38%)	83 (14.7%)	106 (23.4%)	127 (27.5%)	152 (45.5%)	140 (32%)
Complete technical studies	17 (4.7%)	42 (7.5%)	43 (9.5%)	52 (11.3%)	7 (2.1%)	11 (2.5%)
Incomplete technical studies	2 (.2%)	3 (.5%)	6 (1.3%)	3 (.7%)	2 (.6%)	5 (1.1%)
Completed high school	39 (10.8%)	15 (2.7%)	28 (6.2%)	141 (30.6%)	5 (1.5%)	78 (17.8%)
Incomplete high school	6 (1.7%)	3 (.5%)	2 (.4%)	14 (3%)	0 (0%)	14 (3.2%)
Complete primary	2 (.6%)	0 (0%)	2 (.4%)	3 (.7%)	0 (0%)	1 (.2%)
Incomplete primary	0 (0%)	0 (0%)	0 (0%)	1 (.2%)	1 (.3%)	0 (0%)
Type of job, *n* (%)						
Permanent job	165 (45.7%)	238 (42.3%)	253 (55.8%)	123 (26.7%)	190 (56.9%)	154 (35.2%)
Temporary job	59 (16.3%)	158 (28.1%)	64 (14.1%)	104 (22.6%)	28 (8.4%)	103 (23.5%)
Unemployed	87 (24.1%)	148 (26.3%)	125 (27.6%)	218 (47.3%)	114 (34.1%)	159 (36.3%)
Retired	50 (13.9%)	19 (3.4%)	11 (2.4%)	16 (3.5%)	2 (.6%)	22 (5%)
Residence area, *n* (%)						
Rural	17 (4.7%)	33 (5.9%)	73 (16.1%)	41 (8.9%)	58 (17.4%)	94 (21.5%)
Urban	344 (95.3%)	530 (94.1%)	380 (83.9%)	420 (91.1%)	276 (82.6%)	344 (78.5%)
Had COVID-19, *n* (%)						

Yes	110 (30.5%)	188 (33.4%)	44 (9.7%)	128 (27.8%)	97 (29%)	122 (27.9%)
No	178 (49.3%)	246 (43.7%)	368 (81.2%)	213 (46.2%)	158 (47.3%)	226 (51.6%)
I don't know but I think not	48 (13.3%)	52 (9.2%)	35 (7.7%)	47 (10.2%)	24 (7.2%)	31 (7.1%)
I don't know, but I think so	25 (6.9%)	77 (13.7%)	6 (1.3%)	73 (15.8%)	55 (16.5%)	59 (13.5%)
Family with COVID-19, *n* (%)						
Yes	255 (70.6%)	451 (80.1%)	266 (58.7%)	346 (75.1%)	274 (82%)	327 (74.7%)
No	106 (29.4%)	112 (19.9%)	187 (41.3%)	115 (24.9%)	60 (18%)	111 (25.3%)
Friends with COVID-19, *n* (%)						
Yes	336 (93.1%)	531 (94.3%)	336 (74.2%)	391 (84.8%)	327 (97.9%)	361 (82.4%)
No	25 (6.9%)	32 (5.7)	117 (25.8%)	70 (15.2%)	7 (2.1%)	77 (17.6%)
Vaccine Information Source *n* (%)						
Television, radio and written press	160 (44.3%)	246 (43.7%)	131 (28.9%)	150 (32.5%)	152 (45.5%)	114 (26%)
official government sources	105 (29.1%)	79 (14%)	165 (36.4%)	104 (22.6%)	104 (31.1%)	144 (32.9%)
Social networks (Facebook, etc)	77 (21.3%)	214 (38%)	137 (30.2%)	149 (32.3%)	51 (15.3%)	146 (33.3%)
Family and/or friends	19 (5.3%)	24 (4.3%)	20 (4.4%)	58 (12.6%)	27 (8.1%)	34 (7.8%)
Beliefs about the origin of COVID-19 *n* (%)						
Animal origin	148 (41%)	132 (23.4%)	183 (40.4%)	125 (27.1%)	126 (37.7%)	118 (26.9%)
Created in a laboratory	103 (28.5%)	311 (55.2%)	177 (39.1%)	169 (36.7%)	84 (25.1%)	192 (43.8%)
Not precise	110 (30.5%)	120 (21.3%)	93 (20.5%)	167 (36.2%)	124 (37.1%)	128 (29.2%)
Sociodemographic Data	Guatemala (*n* = 420)	México (*n* = 484)	Paraguay (*n* = 417)	Perú (*n* = 203)	Uruguay (*n* = 392)	Venezuela (*n* = 385)
Age (M ± SD)	44 ± 13.6	24.9 ± 8.7	32.2 ± 10.2	26.5 ± 7.9	34.9 ± 11	43.8 ± 16.7
Sex, *n* (%)						
Male	123 (29.3%)	153 (31.6%)	125 (30%)	56 (27.6%)	120 (30.6%)	109 (28.3%)
Female	297 (70.7%)	331 (68.4%)	292 (70%)	147 (72.4%)	272 (69.4%)	276 (71.7%)
Civil Status, *n* (%)						
Single	172 (41%)	407 (84.1%)	258 (61.9%)	165 (78%)	227 (57.9%)	166 (43.1%)
Married	179 (42.6%)	57 (11.8%)	94 (22.5%)	21 (14%)	73 (18.6%)	145 (37.7%)
Cohabitant	31 (7.4%)	7 (1.4%)	45 (10.8%)	15 (6.5%)	62 (15.8%)	22 (5.7%)

Divorced	29 (6.9%)	13 (2.7%)	13 (3.1%)	2 (1.2%)	26 (6.6%)	44 (11.4%)
Widower	9 (2.1%)	0 (0%)	7 (1.7%)	0 (0%)	4 (1%)	8 (2.1%)
Education Level, *n* (%)						
Complete University	267 (63.6%)	128 (26.4%)	269 (64.5%)	86 (42.4%)	175 (44.6%)	259 (67.3%)
Incomplete University	98 (23.3%)	276 (57%)	112 (26.9%)	49 (24.1%)	127 (32.4%)	73 (19%)
Complete technical studies	19 (4.5%)	35 (7.2%)	7 (1.7%)	26 (12.8%)	26 (6.6%)	19 (4.9%)
Incomplete technical studies	0 (0%)	1 (.2%)	1 (.2%)	5 (2.5%)	4 (1%)	1 (.3%)
Completed high school	30 (7.1%)	39 (8.1%)	24 (5.8%)	32 (15.8%)	36 (9.2%)	28 (7.3%)
Incomplete high school	6 (1.4%)	5 (1%)	1 (.2%)	5 (2.5%)	23 (5.9%)	4 (1%)
Complete primary	0 (0%)	0 (0%)	3 (.7%)	0 (0%)	1 (.3%)	0 (0%)
Incomplete primary	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (.3%)
Type of job, *n* (%)						
Permanent job	258 (61.4%)	158 (32.6%)	254 (60.9%)	83 (40.9%)	264 (67.3%)	226 (58.7%)
Temporary job	87 (20.7%)	88 (18.2%)	85 (20.4%)	77 (37.9%)	51 (13%)	58 (15.1%)
Unemployed	44 (10.5%)	226 (46.7%)	70 (16.8%)	40 (19.7%)	67 (17.1%)	67 (17.4%)
Retired	31 (7.4%)	12 (2.5%)	8 (1.9%)	3 (1.5%)	10 (2.6%)	34 (8.8%)
Residence area, *n* (%)						
Rural	31 (7.4%)	26 (5.4%)	55 (13.2%)	35 (17.2%)	35 (8.9%)	24 (6.2%)
Urban	389 (92.6%)	458 (94.6%)	362 (86.8%)	168 (82.8%)	357 (91.1%)	361 (93.8%)
Had COVID-19, *n* (%)						
Yes	97 (23.1%)	135 (27.9%)	152 (36.5%)	94 (46.3%)	60 (15.3%)	113 (29.4%)
No	285 (67.9%)	256 (52.9%)	182 (43.6%)	47 (23.2%)	300 (76.5%)	186 (48.3%)
I don't know but I think not	13 (3.1%)	47 (9.7%)	27 (6.5%)	14 (6.9%)	25 (6.4%)	27 (7%)
I don't know, but I think so	25 (6%)	46 (9.5%)	56 (13.4%)	48 (23.6%)	7 (1.8%)	59 (15.3%)
Family with COVID-19, *n* (%)						
Yes	322 (76.7%)	396 (81.8%)	344 (82.5%)	169 (83.3%)	169 (43.1%)	295 (76.6%)
No	98 (23.3%)	88 (18.2%)	73 (17.5%)	34 (16.7%)	223 (56.9%)	90 (23.4%)
Friends with COVID-19, *n* (%)						
Yes	404 (96.2%)	417 (86.2%)	397 (95.2%)	175 (86.2%)	264 (67.3%)	360 (93.5%)
No	16 (3.8%)	67 (13.8%)	20 (4.8)	28 (13.8%)	128 (32.7%)	25 (6.5%)
Vaccine Information Source *n* (%)						
Television, radio and written press	120 (28.6%)	108 (22.3%)	102 (24.5%)	65 (32%)	138 (35.2%)	78 (20.3%)

official government sources	110 (26.2%)	183 (37.8%)	176 (42.2%)	70 (34.5%)	148 (37.8%)	36 (9.4%)
Social networks (Facebook, etc)	147 (35%)	143 (29.5%)	118 (28.3%)	57 (28.1%)	69 (17.6%)	229 (59.5%)
Family and/or friends	43 (10.2%)	50 (10.3%)	21 (5%)	11 (5.4%)	37 (9.4%)	42 (10.9%)
Beliefs about the origin of COVID-19 *n* (%)						
Animal origin	93 (22.1%)	167 (34.5%)	100 (24%)	42 (20.7%)	150 (38.3%)	80 (20.8%)
Created in a laboratory	207 (49.3%)	157 (32.4%)	186 (44.6%)	96 (47.3%)	141 (36%)	203 (52.7%)
Not precise	120 (28.6%)	160 (33.1%)	131 (31.4%)	65 (32%)	101 (25.8%)	102 (26.5%)

Table 2.

Item descriptive analysis and item response rates.

Region - Country	Ítems	*M*	*SD*	*g1*	*g2*	Response Rate			
						0	1	2	3
Argentina (*n* = 361)	1	1.62	.97	-.12	-.95	14.1%	30.5%	34.9%	20.5%
	2	2.13	.91	-.76	-.33	6.1%	16.9%	34.6%	42.4%
	3	1.61	1.03	-.11	-1.13	16.9%	28.8%	30.5%	23.8%
	4	1.92	1.03	-.54	-.89	12.7%	19.1%	31.9%	36.3%
	5	1.70	1.01	-.17	-1.09	13.6%	29.6%	30.2%	26.6%
	6	.55	.87	1.49	1.27	64.3%	21.3%	9.1%	5.3%
	7	.47	.79	1.77	2.56	67%	23%	5.5%	4.4%
	8	.76	.96	1.09	.13	52.4%	28.3%	10.8%	8.6%
	9	.51	.84	1.64	1.79	66.8%	20.5%	7.8%	5%
	10	.52	.86	1.59	1.59	66.5%	19.9%	8.3%	5.3%
Bolivia (*n* = 563)	1	2.11	.93	-.69	-.58	6.4%	19.5%	31.1%	43%
	2	2.34	.88	-1.28	.82	6.4%	8.5%	29.7%	55.4%
	3	2.10	.92	-.68	-.52	6.2%	19%	33.7%	41%
	4	2.15	.92	-.77	-.44	6%	17.9%	31.1%	44.9%
	5	2.14	.92	-.70	-.59	5.5%	20.1%	29.5%	44.9%
	6	.76	.95	1.06	.07	51.3%	29%	11.7%	8%
	7	.47	.79	1.77	2.56	60.4%	25.6%	8.2%	5.9%
	8	.76	.96	1.09	.13	52.9%	26.5%	13.1%	7.5%
	9	.51	.84	1.64	1.79	62.2%	22%	9.8%	6%
	10	.52	.86	1.59	1.59	57.5%	24.2%	11.5%	6.7%
Chile (*n* = 453)	1	1.98	.89	-.54	-.46	6.8%	20.1%	41.7%	31.3%
	2	2.39	.85	-1.34	1.03	5.1%	8.8%	28.3%	57.8%
	3	1.74	1.00	-.24	-1.03	13%	27.4%	32.5%	27.2%
	4	1.85	1.02	-.37	-1.05	12.1%	24.7%	29.6%	33.6%
	5	1.86	.95	-.40	-.79	9.7%	23.8%	37.1%	29.4%
	6	.73	.97	1.19	.32	54.7%	27.2%	8.8%	9.3%
	7	.55	.81	1.52	1.71	61.1%	27.6%	6.8%	4.4%
	8	.84	.97	.91	-.27	47.7%	29.6%	14.1%	8.6%
	9	.61	.88	1.35	.89	59.6%	25.2%	9.5%	5.7%
	10	.67	.88	1.17	.23	55%	28.3%	11.3%	5.5%
Colombia (*n* = 461)	1	1.84	.95	-.46	-.69	11.3%	20.8%	40.8%	27.1%
	2	2.24	.91	-1.04	.17	6.9%	11.7%	31.9%	49.5%
	3	1.88	1.01	-.45	-.92	11.9%	21.9%	32.5%	33.6%
	4	2.02	.98	-.68	-.61	10%	17.1%	33.4%	39.5%
	5	2.02	.93	-.61	-.56	7.4%	19.5%	36.7%	36.4%

Region - Country	Ítems	*M*	*SD*	*g1*	*g2*	Response Rate			
						0	1	2	3
	6	.86	1.00	.82	-.57	49.5%	24.3%	17.4%	8.9%
	7	.77	.98	1.05	-.09	53.8%	24.7%	12.6%	8.9%
	8	.82	.99	.95	-.29	50.3%	26.7%	13.7%	9.3%
	9	.75	.97	1.05	-.06	54%	24.7%	13%	8.2%
	10	.80	.99	.91	-.43	52.5%	22.8%	16.7%	8%
Cuba (*n* = 334)	1	1.68	1.04	-.17	-1.15	15.6%	28.1%	29.3%	26.9%
	2	1.70	1.11	-.22	-1.31	18.6%	24.9%	24.6%	32%
	3	1.96	1.08	-.54	-1.07	13.2%	21%	23.1%	42.8%
	4	1.93	1.09	-.51	-1.11	14.1%	21%	23.1%	41.9%
	5	1.69	1.12	-.17	-1.36	18.9%	26.6%	21.6%	32.9%
	6	.74	.93	1.16	.42	51.5%	31.4%	8.7%	8.4%
	7	.59	.80	1.40	1.52	56.6%	32.3%	6.6%	4.5%
	8	.79	.95	1.01	-.02	49.4%	30.2%	12%	8.4%
	9	.61	.86	1.42	1.34	57.5%	29.9%	6.6%	6%
	10	.61	.86	1.43	1.35	57.8%	29.6%	6.6%	6%
Ecuador (n = 438)	1	1.82	1.01	-.39	-.95	12.8%	22.8%	34%	30.4%
	2	2.05	1.02	-.76	-.61	11.6%	14.8%	30.4%	43.2%
	3	1.94	.97	-.58	-.67	10.5%	18.7%	36.8%	34%
	4	2.09	.96	-.77	-.42	8.7%	15.8%	33.8%	41.8%
	5	1.93	.98	-.48	-.84	9.8%	22.4%	33.1%	34.7%
	6	1.03	1.09	.59	-1.02	43.8%	23.5%	18.9%	13.7%
	7	.91	1.04	.76	-.72	47.9%	24%	17.4%	10.7%
	8	.98	1.03	.64	-.85	42.9%	26.7%	19.4%	11%
	9	.91	1.05	.75	-.79	49.1%	21.7%	15.5%	10.7%
	10	.96	1.07	.69	-.88	46.8%	22.8%	18%	12.3%
Guatemala (*n* = 420)	1	1.89	1.02	-.52	-.88	13.1%	19%	33.8%	34%
	2	2.29	.95	-1.22	.43	8.6%	8.8%	27.6%	55%
	3	1.88	1.03	-.49	-.93	13.6%	19.5%	32.6%	34.3%
	4	1.88	1.05	-.46	-1.04	13.6%	21.4%	28.8%	36.2%
	5	1.90	.98	-.43	-.92	10%	24%	31.9%	34%
	6	.57	.92	1.48	1.03	65.7%	18.1%	9.3%	6.9%
	7	.47	.84	1.82	2.38	70%	18.3%	6%	5.7%
	8	.58	.89	1.49	1.25	62.9%	22.9%	7.6%	6.7%
	9	.53	.91	1.66	1.65	68.1%	18.1%	6.4%	7.4%
	10	.56	.89	1.48	1.09	65.5%	18.8%	9.8%	6%
México (*n* = 484)	1	1.41	.96	-.04	-.99	21.5%	28.9%	37%	12.6%
	2	2.01	1.01	-.72	-.61	12%	14.7%	33.7%	39.7%
	3	1.46	1.02	.05	-1.09	20.5%	31.6%	29.3%	15.6%
	4	1.75	1.01	-.35	-.95	14.7%	22.3%	36.6%	26.4%
	5	1.55	.96	-.05	-.94	15.5%	32.2%	34.3%	18%
	6	.67	.90	1.11	.09	57.9%	22.3%	14.9%	5%
	7	.56	.86	1.36	.70	65.1%	18%	13%	3.9%
	8	.66	.93	1.12	-.01	60.5%	18.2%	16.1%	5.2%
	9	.61	.90	1.28	.46	62.6%	19%	13.2%	5.2%
	10	.68	.93	1.09	-.03	58.9%	19.8%	15.7%	5.6%
Paraguay (*n* = 417)	1	1.65	.97	-.18	-.93	13.9%	28.5%	36.2%	21.3%
	2	2.13	.93	-.92	.01	8.9%	11%	38.4%	41.7%
	3	1.94	.96	-.49	-.77	8.9%	22.3%	35%	33.8%
	4	2.00	1.00	-.65	-.69	10.8%	17.5%	32.6%	39.1%
	5	1.79	.96	-.29	-.92	10.6%	27.1%	34.8%	27.6%
	6	.85	.91	.87	-.10	43.2%	36%	13.7%	7.2%
	7	.70	.90	1.15	.38	54%	28.5%	11.3%	6.2%
	8	.94	.98	.71	-.61	42.2%	30.9%	18%	8.9%
	9	.72	.90	1.11	.37	51.3%	31.4%	10.8%	6.5%
	10	.80	.94	.94	-.16	48.9%	29.5%	14.1%	7.4%
Perú (*n* = 203)	1	1.77	.92	-.46	-.54	11.8%	20.7%	46.3%	21.2%
	2	2.17	.86	-.89	.19	5.9%	12.3%	40.9%	40.9%
	3	1.95	.91	-.62	-.34	8.9%	17.2%	44.3%	29.6%

Region - Country	Ítems	*M*	*SD*	*g1*	*g2*	Response Rate			
						0	1	2	3
	4	2.09	.91	-.77	-.23	7.4%	15.3%	38.4%	38.9%
	5	1.93	.92	-.61	-.37	9.4%	17.2%	44.3%	29.1%
	6	1.28	1.09	.27	-1.22	31%	28.1%	23.2%	17.7%
	7	1.18	1.06	.34	-1.16	35%	26.1%	25.1%	13.8%
	8	1.24	1.07	.25	-1.22	33%	25.1%	27.1%	14.8%
	9	1.13	1.01	.41	-.99	34%	30.5%	24.1%	11.3%
	10	1.20	1.09	.29	-1.26	36%	22.7%	26.6%	14.8%
Uruguay (*n* = 392)	1	1.74	.94	-.38	-.69	12.5%	22.7%	43.1%	21.7%
	2	2.07	.99	-.74	-.57	9.7%	16.6%	31.1%	42.6%
	3	1.56	.99	-.05	-1.04	16.6%	31.4%	31.6%	20.4%
	4	1.77	.98	-.33	-.89	12.8%	24.2%	36.7%	26.3%
	5	1.70	1.03	-.23	-1.09	15.6%	25.8%	31.9%	26.8%
	6	.80	.97	.84	-.55	52%	22.2%	19.1%	6.6%
	7	.64	.91	1.16	.16	60.7%	19.4%	15.1%	4.8%
	8	.83	.98	.79	-.63	50.8%	22.4%	19.6%	7.1%
	9	.67	.91	1.08	-.03	58.7%	20.4%	16.1%	4.8%
	10	.73	.96	.99	-.31	56.9%	19.4%	17.3%	6.4%
Venezuela (*n* = 385)	1	1.81	1.04	-.40	-1.01	14.5%	21.3%	33%	31.2%
	2	2.28	.93	-1.16	.37	7.5%	10.1%	29.1%	53.2%
	3	2.24	1.01	-1.08	-.11	9.9%	11.9%	22.6%	55.6%
	4	2.31	.97	-1.25	.37	9.1%	9.4%	23.1%	58.4%
	5	2.10	1.01	-.80	-.56	10.4%	15.6%	27.8%	46.2%
	6	.83	1.01	.94	-.33	50.4%	26.2%	13.2%	10.1%
	7	.53	.82	1.58	1.83	63.1%	25.5%	6.8%	4.7%
	8	.76	.94	1.04	.019	51.9%	27.8%	12.7%	7.5%
	9	.55	.85	1.58	1.75	62.9%	25.2%	60.2%	5.7%
	10	.67	.89	1.19	.46	55.8%	27%	11.4%	5.7%

Nota. *M*=Mean; *SD*=Standard Deviation; *g1*= Skewness; *g2*= Kurtosis; 0 = Strongly disagree; 1 = Disagree; 2 = Agree; 3 = Totally Agree

Table 3.

Fit indices of the different models of the SAS-10 scale in the countries of the America

Model	Country	χ^2	*df*	*p*	CFI	TLI	SRMR	RMSEA [90%CI]
1	Argentina (1)	90.69	25	.000	.99	.98	.043	.085 [.067 – .105]
	Bolivia (2)	48.16	25	.000	.99	.99	.029	.041 [.023 – .058]
	Chile (3)[a]	37.69	25	.050	.99	.99	.023	.034 [.002 – .054]
	Colombia (4)	55.03	25	.000	.99	.99	.033	.051 [.033 – .069]
	Cuba (5)[b]	–	–	–	–	–	–	–
	Ecuador (6)	75.43	25	.000	.99	.99	.024	.065 [.048 – .083]
	Guatemala (7)[a]	72.83	25	.000	.99	.99	.032	.068 [.050 – .086]
	México (8)[b]	–	–	–	–	–	–	–
	Paraguay (9)[a]	108.49	25	.000	.99	.98	.028	.090 [.073 – .107]
	Perú (10)	43.11	25	.014	.99	.99	.026	.060 [.027 – .089]
	Uruguay (11)	126.89	25	.000	.99	.99	.031	.102 [.085 – .120]
	Venezuela (12)[a]	68.09	25	.000	.99	.99	.028	.067 [.048 – .086]
2	Argentina (1)	126.17	34	.000	.98	.98	.066	.087 [.071 – .103]
	Bolivia (2)	133.75	34	.000	.99	.99	.057	.072 [.060 – .085]
	Chile (3)	95.66	34	.000	.99	.99	.046	.063 [.049 – .079]
	Colombia (4)	159.75	34	.000	.99	.99	.064	.090 [.076 – .104]
	Cuba (5)	75.60	34	.000	.99	.99	.039	.061 [.042 – .079]
	Ecuador (6)	145.90	34	.000	.99	.99	.059	.087 [.073 – .102]

Model	Country	χ^2	*df*	*p*	CFI	TLI	SRMR	RMSEA [90%CI]
	Guatemala (7)	188.36	34	.000	.98	.97	.081	.104 [.090 – .119]
	México (8)	137.11	34	.000	.99	.99	.072	.079 [.066 – .093]
	Paraguay (9)	147.78	34	.000	.99	.98	.059	.090 [.075 – .105]
	Perú (10)	96.51	34	.000	.99	.99	.062	.095 [.073 – .118]
	Uruguay (11)	214.67	34	.000	.99	.98	.084	.117 [.102 – .132]
	Venezuela (12)	116.07	34	.000	.99	.98	.060	.079 [.064 – .095]
3	Argentina (1)[a]	–	–	–	–	–	–	–
	Bolivia (2)	34.76	18	.010	.99	.99	.024	.041 [.019 – .061]
	Chile (3)[a]	–	–	–	–	–	–	–
	Colombia (4)	34.46	18	.003	.99	.99	.024	.050 [.028 – .071]
	Cuba (5)[a]	34.22	18	.012	.99	.99	.019	.052 [.024 – .078]
	Ecuador (6)	34.39	18	.011	.99	.99	.019	.046 [.021 – .069]
	Guatemala (7)	45.07	18	.000	.99	.99	.024	.060 [.038 – .082]
	México (8)[b]	–	–	–	–	–	–	–
	Paraguay (9)[b]	–	–	–	–	–	–	–
	Perú (10)	23.23	18	.182	.99	.99	.019	.038 [.000 – .077]
	Uruguay (11)[a]	33.35	18	.015	.99	.99	.019	.047 [.020 – .071]
	Venezuela (12)	61.32	18	.000	.99	.99	.023	.079 [.058 – .101]
4	Argentina (1)	74.32	26	.000	.99	.99	.048	.072 [.053 – .091]
	Bolivia (2)	74.32	26	.000	.99	.99	.046	.058 [.042 – .073]
	Chile (3)	80.97	26	.000	.99	.99	.042	.068 [.052 – .086]
	Colombia (4)	73.82	26	.000	.99	.99	.037	.063 [.047 – .080]
	Cuba (5)	56.33	26	.001	.99	.99	.038	.059 [.038 – .080]
	Ecuador (6)	109.56	26	.000	.99	.99	.054	.086 [.070 – .103]
	Guatemala (7)	82.34	26	.000	.99	.99	.051	.072 [.055 – .090]
	México (8)	35.17	26	.108	.99	.99	.030	.027 [.000 – .048]
	Paraguay (9)	89.89	26	.000	.99	.99	.043	.077 [.060 – .095]
	Perú (10)	51.24	26	.002	.99	.99	.040	.069 [.041 – .097]
	Uruguay (11)	98.02	26	.000	.99	.99	.046	.084 [.067 – .102]
	Venezuela (12)	77.56	26	.000	.99	.99	.056	.072 [.054 – .091]

Note. [a] = Negative Error Variances/variances are negative; [b] = A solution has NOT been found; χ2 = Chi square; df = degrees of freedom; SRMR: Standardized Root Mean Square Residual; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; ω = Omega de McDonald. Model 1 = Bi-factor model; Model 2 = two correlated factor model; Model 3 = Bi-factor model without item 2