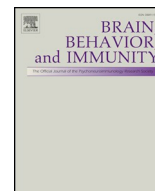




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Assessing the fear of COVID-19 among different populations: A response to Ransing et al. (2020)



Dear editors,

Ransing et al. (2020) recently summarized the current available instruments for assessing mental health issues relating to the COVID-19 pandemic in *Brain, Behavior, and Immunity*. Among the four instruments reviewed by Ransing et al. (2020) was the Fear of COVID-19 Scale (FCV-19S) that we co-developed and rated as having the most evidence in relation to its psychometric properties. While the Coronavirus Anxiety Scale (CAS) (Lee, 2020) and the Obsession with COVID-19 Scale (OCS) (Lee, 2020) both have versions in other languages, only their English versions have been psychometrically validated. Moreover, the COVID Stress Scale (CSS) (Taylor et al., 2020) has only been validated in English. However, the FCV-19S, as reviewed by Ransing et al. (2020), has been translated into different language versions and tested in different country populations. Ransing et al. (2020) recommend that there is a need to translate, validate, and cultural-adapt the existing instruments. We would like to point out that the FCV-19S has already been validated in many languages with good psychometric properties including English (Harper et al., 2020), Persian (Ahorsu et al., 2020), Bangla (Sakib et al., 2020), Italian (Soraci et al., 2020), Hebrew (Bitan et al., 2020), Arabic (Alyami et al., 2020), Russian (Reznik et al., 2020), and Turkish (Satici et al., 2020). We are also aware that there are other versions currently under review including versions in Chinese, Spanish, Japanese, Hindi, Malaysian, and Polish. To the best of our knowledge, these research teams have also found good psychometric properties for the FCV-19S. Therefore, we are confident that the FCV-19S has already fulfilled the recommendation made by Ransing et al. (2020). Moreover, the FCV-19S is arguably more theoretically grounded than other COVID-19-related instruments in that it was developed using the Protection Motivation Theory (Rogers, 1975), while the other three instruments do not report any theoretical framework to support their development.

However, we would like to clarify the remarks made by Ransing et al. (2020) regarding the unstable factor structure of the FCV-19S (i.e., a two-factor structure found in the Russian FCV-19S [Reznik et al., 2020]). In addition to the Russian version, the Hebrew FCV-19S (Bitan et al., 2020) also reported a two-factor structure. However, we are of the opinion that the two-factor structure proposed by both the Russian and Hebrew versions are a consequence of their inappropriate use of principal component analysis (PCA) or exploratory factor analysis (EFA). Given that many language versions of the FCV-19S (Alyami et al., 2020; Sakib et al., 2020; Soraci et al., 2020) confirmed its unidimensional structure, the use of PCA or EFA is not justified because a confirmatory factor analysis (CFA) should have been performed (Pakpour et al., 2020). Only if the researchers have strong reasons to doubt the theoretical framework, should they have considered applying EFA for further understanding in an instrument's factor structure.

Ransing et al. (2020) also recommend validating the instruments among vulnerable populations, including elderly, children, adolescents, young adults, and people with pre-existing physical and mental illness. We totally agree with the recommendation and would like to respond that we have already collected FCV-19S among individuals with mental illness (Chinese version), elderly people who have visited an outpatient department in a medical center (Chinese version), and adolescents (Bangla version). The collections included face-to-face interviews that were administered by several research assistants and online surveys. Those with mental illness ($n = 516$; 294 males; mean age = 47.5 years) were interviewed between March 23 and May 15, 2020 from the Jianan Psychiatric Center, Taiwan. Elderly individuals ($n = 139$; 42 males; mean age = 71.7) were interviewed between May 1 and 15, 2020 from the Wan Fang Hospital, Taiwan. The adolescents ($n = 582$; 274 males; mean age = 18.02 years) completed an online survey between March and April 2020 from a Bangla community (Sakib et al., 2020). Utilizing CFA with the estimator of diagonally weighted least squares, we found that the FCV-19S also supported the unidimensional structure in the three vulnerable samples (Table 1). Therefore, we believe that the FCV-19S can assess fear of COVID-19 among clinical and vulnerable samples. Nevertheless, we agree with the other future directions proposed by Ransing et al. (2020) regarding the need for the development of both clinically administered instruments and instruments assessing stigma (Lin, 2020).

Table 1

Factor structure of the Fear of COVID-19 Scale (FCV-19S) in three vulnerable samples.

Item #	Mental illness ($n = 516$)	Elderly ($n = 139$)	Adolescent ($n = 582$)
	Factor loading		
F1	0.66	0.72	0.72
F2	0.81	0.54	0.66
F3	0.82	0.29	0.73
F4	0.82	0.65	0.77
F5	0.85	0.77	0.69
F6	0.82	0.46	0.64
F7	0.86	0.38	0.65
Fit statistics			
χ^2 (df)/p	44.97 (14)/ < 0.001	24.10 (14)/ 0.045	21.53 (14)/ 0.09
CFI	0.992	0.960	0.997
TLI	0.989	0.941	0.995
RMSEA	0.066	0.072	0.030
90% CI of RMSEA	0.045, 0.087	0.011, 0.120	0.000, 0.055

CFI = comparable fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation.

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Appendix A. Supplementary data

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References

- Ahorsu, D.K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M.D., Pakpour, A.H., 2020. The Fear of COVID-19 Scale: development and initial validation [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00270-8>.
- Alyami, M., Henning, M., Krägeloh, C.U., Alyami, H., 2020. Psychometric evaluation of the Arabic version of the Fear of COVID-19 Scale [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00316-x>.
- Bitan, D.T., Grossman-Giron, A., Bloch, Y., et al., 2020. Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population [published online ahead of print]. *Psychiatry Res.* <https://doi.org/10.1016/j.psychres.2020.113100>.
- Harper, C.A., Satchell, L.P., Fido, D., Litzman, R.D., 2020. Functional fear predicts public health compliance in the COVID-19 pandemic [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00281-5>.
- Lee, S.A., 2020. How much “Thinking” about COVID-19 is clinically dysfunctional? [published online ahead of print]. *Brain Behav. Immun.* <https://doi.org/10.1016/j.bbi.2020.04.067>.
- Lee, S.A., 2020. Coronavirus Anxiety Scale: a brief mental health screener for COVID-19 related anxiety. *Death Stud.* 44, 393–401. <https://doi.org/10.1080/07481187.2020.1748481>.
- Lin, C.-Y., 2020. Social reaction toward the 2019 novel coronavirus (COVID-19). *Soc. Health Behav.* 3, 1–2. https://doi.org/10.4103/SHB.SHB_11_20.
- Pakpour, A.H., Griffiths, M.D., Lin, C.-Y., 2020. Assessing the psychological response to the COVID-19: A response to Bitan et al. “Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population”. [published online ahead of print]. *Psychiatry Res.* <https://doi.org/10.1016/j.psychres.2020.113127>.
- Ransing, R., Ramalho, R., Orsolini, L., et al., 2020. Can COVID-19 related mental health issues be measured?: assessment options for mental health professionals [published online ahead of print]. *Brain Behav. Immun.* <https://doi.org/10.1016/j.bbi.2020.05.049>.
- Reznik, A., Gritsenko, V., Konstantinov, V., Khamenka, N., Isralowitz, R., 2020. COVID-19 fear in Eastern Europe: Validation of the Fear of COVID-19 Scale [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00283-3>.
- Rogers, R.W., 1975. A Protection Motivation Theory of fear appeals and attitude change. *J. Psychol.* 91 (1), 93–114. <https://doi.org/10.1080/00223980.1975.9915803>.
- Sakib, N., Mamun, M.A., Bhuiyan, A.K.M.I., et al., 2020. Psychometric validation of the Bangla Fear of COVID-19 Scale: Confirmatory factor analysis and Rasch analysis [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00289-x>.
- Satici, B., Gocet-Tekin, E., Deniz, M.E., Satici, S.A., 2020. Adaptation of the Fear of COVID-19 Scale: its association with psychological distress and life satisfaction in Turkey [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00294-0>.
- Soraci, P., Ferrari, A., Abbiati, F.A., et al., 2020. Validation and psychometric evaluation of the Italian version of the Fear of COVID-19 Scale [published online ahead of print]. *Int. J. Ment. Health Addict.* <https://doi.org/10.1007/s11469-020-00277-1>.
- Taylor, S., Landry, C., Paluszek, M., Fergus, T.A., McKay, D., Asmundson, G.J.G., 2020. Development and initial validation of the COVID stress scales. *J. Anxiety Disord.* 102232. <https://doi.org/10.1016/j.janxdis.2020.102232>.

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