

The COVID-19 pandemic and its effect on the Brief-COPE structure

La pandemia de COVID-19 y su efecto en la estructura del Brief-COPE

A pandemia de COVID-19 e seu efeito na estrutura do Brief-COPE

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Abstract

This study aimed to investigate the dimensional structure of Brief-COPE during the COVID-19 pandemic. Six hundred and sixty-six adults from all regions of Brazil, mostly women (77 %), aged between 18 and 79 years old ($M = 36.70$; $SD = 13.12$), took part in this research. They answered sociodemographic questions and the Brief-COPE. Descriptive and confirmatory factor analyzes were performed. The first order dimensional structure was confirmed with the 14 original factors. The second order structure did not converge, and a new second order structure was proposed based on the correlation indexes among the first order factors. The proposed new model presented adequate indexes of adjustment to the data. Such results suggest that the pandemic may have changed the way participants perceive and relate coping strategies.

Keywords: pandemic; COVID-19; coping; instrument; factor analysis

Resumen

El presente estudio tuvo como objetivo investigar la estructura dimensional de Brief-COPE durante la pandemia de COVID-19. Seiscientos sesenta y seis adultos de todas las regiones de Brasil participaron en esta investigación, en su mayoría mujeres (77 %), con edades entre 18 y 79 años ($M = 36.70$; $DE = 13.12$). Los participantes respondieron preguntas sociodemográficas y el Brief-COPE. Se realizaron análisis descriptivos y análisis factoriales confirmatorios. Se confirmó la estructura dimensional de primer orden, con 14 factores. La estructura de segundo orden no convergió y se propuso una



nueva estructura de segundo orden basada en la correlación entre los factores de primer orden. El nuevo modelo propuesto presentó índices adecuados de ajuste a los datos. Estos resultados sugieren que la pandemia puede haber cambiado la forma en que los participantes perciben y relacionan las estrategias de afrontamiento.

Palabras clave: pandemia; COVID-19; afrontamiento; instrumento; análisis factorial

Resumo

O presente estudo teve como objetivo investigar a estrutura dimensional do Brief-COPE durante a pandemia de COVID-19. Participaram desta pesquisa 666 adultos de todas as regiões do Brasil, majoritariamente mulheres (77 %), com idade entre 18 e 79 anos ($M = 36,70$; $DP = 13,12$). Estes responderam perguntas sociodemográficas e o Brief-COPE. Foram realizadas análises descritivas e Análises Fatoriais Confirmatórias. A estrutura dimensional de primeira ordem foi confirmada, com 14 fatores. A estrutura de segunda ordem não convergiu, sendo proposta uma nova estrutura de segunda ordem tomando como base a correlação entre os fatores de primeira ordem. O novo modelo proposto apresentou índices adequados de ajuste aos dados. Tais resultados sugerem que a pandemia pode ter alterado a forma como os participantes percebem e relacionam as estratégias de enfrentamento.

Palavras-chave: pandemia; COVID-19; enfrentamento; instrumento; análise fatorial

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The current COVID-19 pandemic is considered to be the most pressing health crisis faced by humanity in more than a hundred years. Its impact on physical and mental health is so pervasive that the World Health Organization and the United Nations released guidelines on the importance of mental health support during these times (United Nations, 2020; World Health Organization [WHO], 2020). Many psychologists and psychological researchers around the world are currently involved in studies to investigate the impact of the crisis and the most effective ways of coping with it (Dubey et al., 2020).

To comprehend the many different forms that people tend to cope with difficulties, psychological coping mechanisms are usually the construct to investigate. Defined as “the cognitive and behavioral efforts that are implemented to solve problems and reduce the stress that these problems may cause” (Baumstarck et al., 2017, p. 1), coping styles have been investigated for many years and generated a vast literature (Naseem & Khalid, 2010).

This field of research suggests that there are non-adaptive and adaptive strategies for coping with stress (Konaszewski et al., 2019; Thompson et al., 2010). Adaptive coping “reflects attempts to change the perception of the stressor or its characteristics, whereas non-adaptive coping includes actions and thought processes used to avoid direct confrontation with stress” (Konaszewski et al., 2019, p. 2). Examples of non-adaptive coping strategies would be ruminating about the stressor, emotional numbing, escape, and intrusive thoughts. These strategies are associated with increased levels of anxiety, depression, and stress. Adaptive coping strategies, on the other hand, are associated with a decrease in levels of psychological distress. Common examples are cognitive

restructuring, problem-solving coping, humor, emotional regulation, positive thinking, and acceptance (Thompson et al., 2010).

A common non-adaptive coping strategy already identified during the COVID-19 pandemic is the use of alcohol and other substances. Studies have registered an increase in alcohol consumption during social distancing or lockdown (Garcia & Sanchez, 2020). An increase of 262 % of alcohol on-line sales has been registered in the United States when compared to 2019 sales (Pollard et al., 2020). Dealing with grief, loneliness, and the uncertainty of the situation has been suggested as potential motives for the increased intake (Garcia & Sanchez, 2020).

According to Konaszewski et al. (2019), for a coping strategy to be considered adaptive or non-adaptive it is dependent on the type of stressor and the emotional processes involved. Therefore, specific coping strategies may change from adaptive to non-adaptive according to the situation. Distancing from people you love, in general, is considered a non-adaptive strategy, because it is based on avoidance. However, it is a necessary action during this sanitary crisis, turning it not only into an adaptive strategy, but also into an expression of love towards people you care about (United Nations, 2020). Considering the COVID-19 pandemic is an entirely new situation for the world's population, people were challenged to find new ways of managing the pandemic-related stress caused by the isolation, fear, distancing from loved ones, grief, and other factors (United Nations, 2020).

Qualitative research conducted in Brazil has already identified changes regarding coping strategies during the pandemic (Sousa et al., 2020). Alongside with the usual strategies focused on the problem or focused on the emotion, the authors identified a strategy focused on meaning. Participants reported the importance of trying to deal with the situation by searching for a meaning for the pandemic and the experiences they were living during these troublesome times. In this sense, the pandemic could cause a restructuring of the usual ways people tend to cope with stress, possibly changing the dimensional structure of the construct.

The most important questionnaire used to evaluate coping styles is the Coping Orientation to Problems Experienced (COPE; Carver et al., 1989). The Brief-COPE is its short form, developed by Carver (1997), and presents all 14 originally proposed first order dimensions measured with two items per dimension. Carver (1997) chose the two items from the original version that presented the highest factor loadings and that were accessible to any population. The proposal was that an instrument this size would be easier to introduce in natural contexts, allowing the evaluation of coping mechanisms in difficult real-life situations.

The original dimensions proposed by Carver et al. (1989) are: 1) Active coping: to limit or remove the stressor; 2) Planning: thinking of ways to limit or remove the stressor; 3) Instrumental support: seeking help to take decisions; 4) Emotional support: seeking help to deal with emotions; 5) Religion: seeking religious-related activities; 6) Positive reinterpretation: trying to see the positive side of the situation; 7) Self-blame: thinking that the stressor is one's own fault; 8) Acceptance: accepting the stressor as real; 9) Venting: expressing one's emotional distress; 10) Denial: rejecting the reality or the existence of the stressor; 11) Self-distraction: do something else that take one's mind off the stressor; 12) Behavioral disengagement: stop one's efforts or give up trying to reach stressor-related goals; 13) Substance abuse: using alcohol and other drugs to alleviate the effect of the stressor; and 14) Humor: dealing with the stressor with humor.

Baumstarck et al. (2017) have shown the existence of second-order dimensions when analyzing the Brief-COPE factors. The 14 original dimensions were empirically distributed into four general dimensions: Seeking Social Support (including Venting,

Emotional Support, Instrumental Support, and Religion), Problem Solving (including Active Coping, and Planning), Avoidance (including Behavioral Disengagement, Self-Distracted, Substance Use, Denial, and Self-Blame), and Positive Thinking (including Humor, Positive Reframing, and Acceptance). These broader dimensions facilitate the association of the coping styles with other constructs in research. Therefore, this study aims at testing the Baumstarck et al. (2017) proposal with confirmatory factor analysis, investigating the first-order (Carver et al., 1989) and the second-order dimensions of the Brief-COPE during the COVID-19 pandemic.

Method

Participants

Based on a convenience sampling method, potential participants were invited to take part in a larger study regarding the impact of the COVID-19 pandemic on the mental health of adults in Brazil. Inclusion criteria were a) being at least 18 years old; b) living in Brazil during the isolation period defined by the health authorities; and c) agreeing to participate in the research. The data exclusion criteria after participation were answers that presented missing or extreme values. From 682 participants of the broader study, after applying the exclusion criteria, the final sample was composed of 666 adults from all five regions of Brazil. The majority were women (76.6 %), with a mean age of 36.71 ($SD = 13.12$), ranging from 18 to 79 years. They were mainly single (35.1 %) and from the Southeast region (30.2 %). When questioned about any previous mental disorder diagnosis received, 76 % informed never having received any diagnose before ($N = 508$).

Instruments

As previously mentioned, this questionnaire is part of a larger research project evaluating the psychological impact of the COVID-19 pandemic with many other instruments. The instruments described here are the ones of interest to the present study.

Sociodemographic questions. Participants were requested to answer questions regarding their gender, age, relationship status, and state of residence.

Brief Coping Orientation to Problems Experienced (Brief COPE). The version used in this study was adapted to Brazilian Portuguese by Maroco et al. (2014). The instrument is composed of 28 items that are grouped into 14 dimensions of coping strategies. Items (e.g., I've been expressing my negative feelings) must be answered on a Likert-type scale that ranges from 1 (*I haven't been doing this at all*) to 4 (*I've been doing this a lot*), with higher values indicating the coping strategies that are most used by the participants. Cronbach's alpha for the inventory in this sample was .83.

Procedure

This research was approved by the National Committee of Ethics in Research (CONEP; CAAE: 30892620.3.0000.5542). Individuals were invited to participate via e-mail, social networking sites and apps. Potential participants were informed about all the ethical aspects of the research, which included confidentiality, anonymity, and voluntary participation. Only those who expressed their agreement by downloading the informed consent form and clicking to continue their participation had access to the first page of the questionnaire. The average time of participation was around 20 minutes. The questionnaire was developed using Google Forms and Google Sheets was used for data entry. Data collection occurred between May and December 2020.

Data analysis

R software (R Development Core Team, 2015) was used to investigate the factor structure of the Brief-COPE by testing the originally proposed 14 first-order factors, gathering evidence of validity (Carver, 1997). A second model was then tested, investigating the four second-order factors proposed with the 28 items. Finally, a third model performed the same analysis using the mean scores of the original 14 factors as observed variables, in order to present a reduced and more organized factor structure, based on correlation analyses.

For this purpose, a Confirmatory Factor Analysis (CFA) with Lavaan (Roussel, 2012) was conducted. The Weighted Least Squares Mean and Variance-Adjusted (WLSMV) method was chosen due to the ordinal nature of the items, analyzing the data via polychoric matrixes, and showing more precise results (WLSMV; Muthén & Muthén, 2014). Adequacy indices used to evaluate the models were as follow: a) χ^2/df coefficient, which should be below 5 as an acceptable value; b) comparative fit index (CFI) and Tucker-Lewis index (TLI), with acceptable fit values equal to or above .90; and c) Root Mean Square Error of Approximation (RMSEA), which should be below .08, with the upper level of the confidence interval below .10 (Brown, 2015).

Results

Model 1 tested the adequacy of the original model proposed by Carver (1997), where the 28 items group into 14 first-order factors, using a CFA, and would be compared to Model 2 results, that follows the Baumstarck et al. (2017) proposal. In Model 2, the 28 items group themselves into the 14 first order factors, that in turn group into four second-order dimensions: Seeking Social Support, Problem Solving, Avoidance, and Positive Thinking.

As it can be observed in Table 1, Model 1 is not only adequate but superior to all the other tested models, with fit indices following the expected criteria. However, Model 2 did not converge after the CFA was conducted.

In order to investigate a possible change in the association among the 14 first-order factors and propose a new second-order solution, correlation analyses were conducted. Correlations were chosen as the modification indices were not available due to the lack of convergence of the second-order solution. Results showed that Self-distraction, usually considered an avoidant coping strategy, did not show any significant correlation with other avoidant coping strategies (Denial $r = .025$, $p = .52$; Substance use $r = .02$, $p = .68$; Behavioral disengagement $r = -.09$, $p = .06$; and Self-blame $r = .02$, $p = .68$). However, it was directly correlated with Active coping ($r = .49$, $p < .001$), Planning ($r = .38$, $p < .001$), Acceptance ($r = .34$, $p < .001$), presenting moderate effect sizes, and with Religion ($r = .16$, $p = .01$), Emotional Support ($r = 0.26$, $p < .001$), Instrumental Support ($r = .27$, $p < .001$), Positive Reframing ($r = .29$, $p < .001$) and Humor ($r = .20$, $p < .001$), with small effect sizes.

Table 1*Model comparison of the first-order and second-order dimensions of the Brief-COPE*

Model	χ^2 (df)	χ^2/df	CFI	TLI	RMSEA
Model 1	647.552** (259)	2.50	0.94	0.92	0.047 (IC 90%= 0.043 – 0.052)
Model 2	No convergence				
Model 3	1296.039** (330)	3.92	0.91	0.90	0.066 (IC 90%= 0.063 – 0.070)
Model 4	324.789** (71)	4.57	0.92	0.90	0.073 (IC 90%= 0.065 – 0.081)

Note. Model 1 = 14 first-order factors; Model 2 = Baumstarck et al. (2017) second-order factors; Model 3 = Proposed first and second-order factors; Model 4 = Proposed second-order factors with score means as observed variables.

* $p < .05$

** $p < .01$.

Another unexpected association observed was regarding the Religion coping strategy, which was proposed by Baumstarck et al. (2017) to be part of the Seeking Social Support dimension, and it was only weakly related to Emotional Support ($r = .19, p = .01$) and moderately related to Instrumental Support ($r = .32, p < .001$), but not related to Venting ($r = .12, p = .08$). Instead, Religion showed strong correlation with Positive Reframing ($r = .42, p < .001$), a moderate positive relation with Planning ($r = .30, p < .001$) and weak correlations with Acceptance ($r = .16, p = .01$) and Active coping ($r = .20, p < .001$).

Considering the correlation matrix and the moderate effect sizes of the observed relations, a new second-order dimensional model was proposed with the following specifications: Positive Problem Solving: including the first order factors of Active Coping, Planning, Self-Distraction, Humor, and Acceptance; Coping by Hope: including Positive Reframing and Religion; Seeking Social Support: including Emotional Support and Instrumental Support; and Avoidance: including Behavioral Disengagement, Substance Use, Denial, Self-Blame, and Venting. This model was tested as Model 3 (see Table 1) through a CFA with the 28 items grouping into the 14 first-order factors, that grouped themselves into the 4 new proposed second-order factors. The same model was tested again with a CFA using the mean factor scores as observed variables (Model 4). Both models not only converged but also showed adequate fit indexes according to the specified criteria (Brown, 2015). All factor loadings (λ) were different from zero ($\lambda \neq 0; t > 1.96, p < 0.05$).

To evaluate the equivalence of the second-order measurement model, two multi-group confirmatory factor analyses were conducted. The first considered male and female participants, and the second considered the existence of a previous diagnosis of mental disorder (0 - no; 1 - yes). Three models were tested for each grouping variable: configural, metric, and scalar invariance. Model invariance is accepted if CFI values do not change by more than .01 (Cheung & Rensvold, 2002). Results are presented in Table 2.

Table 2*Invariance test results of the Brief-COPE second-order structure by gender and diagnosis*

Gender	χ^2/df	<i>p</i>	RMSEA (90% IC)	TLI	CFI	ΔCFI
Configural	2.45	<.001	.066 (.058 - .075)	.92	.93	-
Metric	2.65	<.001	.071 (.063 - .079)	.91	.92	-.01
Scalar	2.55	<.001	.068 (.061 - .076)	.91	.91	-.01
Diagnosis	χ^2/df	P	RMSEA (90% IC)	TLI	CFI	ΔCFI
Configural	2.37	<.001	.064 (.056 – .073)	.93	.94	-
Metric	2.83	<.001	.074 (.066 – .083)	.91	.92	-.02
Scalar	2.73	<.001	.072 (.064 – .080)	.91	.92	.00

The second-order model presented metric and scalar invariance by gender. However, when testing the invariance by diagnosis, metric invariance was not observed although the fit-indices are still adequate.

Discussion

This study aimed at testing the first- and second-order dimensional structures of the Brief-COPE during the COVID-19 pandemic. Results confirmed the first-order solution, with all 14 originally proposed factors. However, the Baumstarck et al. (2017) second-order dimensions could not be reached by the analyses conducted. According to Harrington (2009) and Brown (2015), the lack of convergence suggests that the tested model is not well-adjusted to the data. Therefore, Baumstarck et al. (2017) proposed second-order dimensions are not a good solution. Correlational analyses were performed and suggested unexpected associations to the first-order factors that were implemented as a new second-order solution, which presented good fit to the data.

The new proposed second-order dimensions integrate different coping strategies with new roles, corroborating Konaszewski et al. (2019) proposal that coping strategies may change their classification as adaptive or non-adaptive according to the situation. Initially categorized as an avoidant (and therefore, non-adaptive) coping strategy by Baumstarck et al. (2017), Self-distraction was interpreted by the participants as a positive and problem-solving way of coping with the COVID-19 pandemic. This change could be related to the lack of control and the helplessness associated with the social isolation and the need to do something that take one's mind off the pandemic. The integration of Humor and Acceptance in this new dimension also points to this necessity of dealing with the situation in a lighter way. Self-distraction remains an 'avoidant' coping strategy in a sense that it is used to avoid a direct confrontation with the stressor (Konaszewski et al., 2019), but this is interpreted as a positive way of dealing with the pandemic, considering that there was nothing the participants could do to solve the situation themselves.

The other proposed second-order dimension entitled Coping by Hope is also a positive way of dealing with it, but it considers a more existential interpretation: the need to reframe the situation to learn from the experience and the religious/spiritual aspects of dealing with the unexpected and uncontrollable. This may be interpreted as a search for

meaning or the expectation of future positive outcomes from all this experience, already identified in previous qualitative results in Brazil (Sousa et al., 2020).

It is important to consider the limitations in this study. The proposed second-order dimension is based on correlational analyses, as Model 2 did not converge, and modification indices were not available. These correlations might be influenced by other variables which could potentially explain their associations. Only changes based on a moderate effect sized correlation were included in the new structure proposed. However, it is still important to point out that no large effect size was observed in the associations among the coping strategies.

Testing for the invariance of the measurement model was an important step to show the second-order model holds for male and female participants of the study. Nevertheless, invariance was not observed when comparing participants with and without a previous diagnosis of mental disorder. It is important that future studies address these issues by performing stronger statistical analyses with new data.

Results could also be specific to the Brazilian culture, as coping strategies are influenced by the culture (Chun et al., 2006). Although relevant, these limitations suggest that future studies should be pursued to understand the impact of the pandemic in individuals' perceptions on how to cope with this new situation. Considering that coping strategies are defined as one's effort to reduce a problem-related stress (Baumstarck et al., 2017), these results show that people's perception about how to cope with problems might have changed due to the characteristics of the stressor, i.e., the COVID-19 pandemic.

According to Dawson and Golijani-Moghaddam (2020), psychological flexibility may influence the selection of coping responses, by turning avoidant styles into functional and adaptive according to the context. These new higher order solution demands further investigation. Future studies could verify their associations with participants levels of anxiety, depression, and stress to test their classification as adaptive or non-adaptive coping strategies (Konaszewski et al., 2019). It is also important to verify their association with psychological flexibility and other coping instruments. Further studies are needed to understand the impact of the pandemic in the way the population is coping with the fundamental changes in their lives and how these new ways of coping affect the dimensional structure of known instruments.

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