PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Relationship between self-care activities, stress and well-being during COVID-19 lockdown: a cross-cultural mediation model
AUTHORS	Luis, Elkin; Bermejo-Martins, Elena; Martinez, Martín; Sarrionandia, Ainize; Cortes, Cristian; Oliveros, Edwin; Garces, María Sol; Oron, José Victor; Fernández-Berrocal, Pablo

VERSION 1 – REVIEW

REVIEWER	Roma, Paolo Sapienza University of Rome
REVIEW RETURNED	17-Feb-2021

GENERAL COMMENTS	Thank you for the opportunity to review this manuscript.
GENERAL COMMENTS	Introduction pag.3 line 38. Rather than "current coronavirus", "Coronavirus Disease 19 (COVID-19)" is preferable. Regarding the first part of the Introduction. Authors should consider expanding this section to give the reader a clearer understanding of the detrimental effects of COVID-19 and related protective measures (e.g. lockdown) on the general population's mental health. On this note, the sentence "The major negative psychological outcome of the current pandemic is the anxiety and distress caused by it" should be integrated with references to longitudinal/follow-up studies, since is implying causation; for instance, Roma et al. (2020, "A 2-month follow-up study of psychological distress among Italian people during the COVID-19 lockdown." Int. J. Environ. Res. Public Health. https://doi.org/10.3390/ijerph17218180) found that "our results showed an increase in stress and depression over 2 months of
	lockdown in Italy". Authors introduce the construct of "self-care"; however, they do not offer a definition for this construct or what behaviours it includes. Please extend the theoretical background for this variable. Introduction. Since Authors are proposing a possible mediating role of self-care between stress and psychological well-being, they should also include studies that investigated the mediation role of self-care rather than its direct effect. Introduction pag.5 line 3. I believe it should be "remains" rather than "reminds". Sample pag.5 line 15 and throughout the manuscript. Please use the decimal comma for readability (3,452).

For the instruments used, please add items' examples.

Table1. Rephrase the caption to better represent the table's content.

Authors should consider displaying all of the descriptive statistics of the sample with a table.

Discussion pag.17 lines 37-49. Here Authors introduce the concept of adherence with protective health measures (e.g. wearing a mask), however it seems that a link is missing between their results and this interpretation. Please elaborate.

REVIEWER	Krampe, Henning Humboldt-Universitat zu Berlin
REVIEW RETURNED	17-Mar-2021

GENERAL COMMENTS

In their paper, "Self-care activities to buffer stress and gain psychological well-being during COVID-19 lockdown: a transnational mediation", Elkin O Luis and colleagues report on data from a cross-sectional survey study that was conducted during the early weeks of the public restrictions due to the COVID-19 pandemic in Chile, Colombia, Ecuador, and Spain, including 1,082 participants from the general population. The authors investigated whether self-care activities statistically mediated the relation between perceived stress and perceived psychological well-being. The results of simple mediation analyses showed a significant statistical mediation effect of self-care. Higher perceived stress was related to lower self-care, and higher self-care was in turn related to higher wellbeing. This indirect effect of stress on well-being was found in the total sample, as well as in the four subsamples from Chile, Colombia, Ecuador, and Spain. The authors conclude that the findings of the study provide evidence of the positive influence of self-care activities to reduce stress and improve psychological well-being during the early stages of the COVID-19 pandemic.

The findings of this study are of relevance for public health promotion, particularly as potential information for the development of effective stress prevention strategies. Those novel strategies might be applied in future pandemics, epidemics, or comparable health-threatening situations requiring temporary restrictions of mobility and close physical interactions. Among the major strengths of the study is the data collection in four different countries from South America and Europe. The major results hold true for all four subsamples, suggesting that the findings are rather robust and independent of national differences concerning contextual background, but also differences regarding the state of the pandemic and the respective public restriction measures. However, in its current state the paper is very confusing and it should be revised substantially. My major concern is that the mediation analysis is not yet accurate concerning (1) theoretical foundation, primarily the reasons for classifying the specific study variables into independent variable, mediator, and dependent variable, (2) description and application of statistical methods, as well as (3) interpretation of the results of mediation analyses. However, these issues should easily be resolvable in a major revision of the paper.

Major issues:

- Issues concerning the mediation analyses and multiple linear regression analyses:
- Title: "Self-care activities to buffer stress and gain psychological well-being during COVID-19 lockdown: a transnational mediation model"

The title is confusing regarding two aspects: (1) The information of the mediating role of self-care activities is lacking. The wording 'self-care activities to buffer stress and gain psychological well-being' suggests that self-care is either an independent factor influencing two dependent variables, stress and well-being, or that self-care works as a buffer; however, this would mean that self-care was a moderator of the association of stress and well-being. (2) 'a transnational mediation model' This sounds as if transnationality was the mediator variable.

- Introduction: The authors should present a clear foundation of their choice to classify perceived stress as independent factor, self-care activities as mediator, and well-being as dependent variable. This choice would mean that the objective of the study was to investigate to what extent the effect of stress (X) on wellbeing (Y) would operate through self-care activities (M) [Hayes & Rockwood, 2017]. According to Hayes & Rockford (2017): " ... X affects Y because X affects the mediator variable M, and this causal effect then transmits X's effect to Y through the effect of M on Y. Thus, a mediation model is a set of two or more causal events chained together in sequence of the form X/M/Y. So by definition, mediator variable M must be causally located between X and Y. It must be affected by X, and it in turn must affect Y." The current argumentation of the paper leads to choose self-care as a causal stress prevention strategy. This would, for example, mean that self-care (X) leads to less stress (M), and less stress in turn would improve well-being (Y). Or even simpler: 'Self-care affects the two outcomes, stress and wellbeing. In this case, no mediation model would be necessary at all, and as a consequence no theoretical foundation of any mediation.

Another line of reasoning might be to conceive of self-care as a buffer (moderator) of the relation between stress (X) and well-being (Y): 'The higher the self-care the smaller the relation between X and Y'. Since data are collected at the same time, there are many possible choices of potential causal relationships. The authors should choose the most convincing line of reasoning. It is widely known that perceived stress and perceived psychological well-being correlate highly. So why should this not be the case in times of the COVID-19 pandemic? For a major objective, it does not seem innovative enough to determine once more the well-known negative correlation between stress and wellbeing. However, the second objective of the paper is much more innovative, to explore the relations between sociodemographic variables and well-being in times of COVID-19, especially in the context of four different countries.

- Methods, statistical analysis, page 9 (pages counted according to 'page x of 28'): The mediation analyses should be described more properly and in detail, with the corresponding literature references for regression-based path analysis and the PROCESS Macro, e.g. Hayes, 2018. The cited reference of Hayes (2012) is missing in the reference list.
- In regression-based path analyses, the most important parameter of simple mediation analysis is the product of the paths a*b, where path 'a' demonstrates the direct effect of the independent variable

- X on the mediator, and path 'b' refers to the direct effect of the mediator on the dependent variable. If I am not mistaken, this information is missing in the statistics section, and no values of the product a*b are reported in the results section. Reporting only confidence intervals is not sufficient.
- -Results, page 13: The report of parameters indicating the significant mediation effect seems confusing, e.g.:
- "Furthermore, the 95% confidence interval of the indirect (mediated) effect of Stress Self-care was [-0.40, -0.22], and in the case of Well-being Self-care it was [0.37, 0.54], which indicates the existence of significant mediation. On the other hand, a lower level of perceived stress was associated with higher levels of psychological well-being (c'= -0.63, p<.0001) ..."
- What do the two parameter CI's actually refer to? Maybe to the paths a and b, indicating the two direct effects of X and M? Why not simply report the product a*b with the corresponding confidence intervals? The concept of a 'Partial mediating effect' is obsolete in contemporary mediation analyses, please see e. g. Hayes & Rockwood (2017) for a discussion of this topic.
- Why has age a significant effect on stress in the multiple regression analyses of the proposed mediation model? In the proposed mediation model, there should be no regression with stress as dependent variable.
- Figure 2: This seems to look like a figure based on structural equation modelling (SEM). Which specific PROCESS model is the figure referring to?
- Discussion: The discussion should be revised according to the mediation-related necessary revisions in the introduction, methods, and results.

Other major issues

- Methods, sample, page 6 lines 10 to 33:
- -The authors should give references for the different days of confinement in the four countries.
- a flow-chart would be necessary to document the decrease of sample size from N=3,452 to n=1,082. What were the specific reasons for excluding which number of participants at the different stages of sample size 'extraction'?
- Methods, statistics, pages 8 to 9
- If the analyses of associations between sociodemographic variables, stress, well-being and self-care were only 'Preliminary analyses', the determination of simple zero-order correlations would be sufficient. Multiple regression analyses are not preliminary but rather complex. In order to explore potential covariates for the regression models of mediation analyses, zero-order correlations should be sufficient.
- Why was Bonferroni correction applied in explorative preliminary analyses?

Minor issues:

- 1. Abstract, page 3, typo: 'Prymary outcome ...'
- 2., Introduction, page 4, line 39: 'The current coronavirus outbreak' The authors might reconsider using the word 'current'. What would 'current' mean when reading the paper in e. g. 10 years?
- 3. Methods, measurements, page:

- For all questionnaires, the authors should report the time frame that the items refer to, e. g. 14 days for perceived stress.
- Is reference 22 the reference to the original PWBS questionnaire? If not, the original reference should be reported, too.
- The current reliability data of the measures should be reported in the methods section instead the results section.
- -What is HADS-T? Maybe HADS total score, i. e. HADS-D and HADS-A?
- 4. Results, page 9, lines 24ff: How do these two points fit: The sample is a general population sample, and at the same time, 33.9% of the participants considered themselves as front-line workers? Were only 64% of the sample in confinement while the others worked 'in frontline' of health / social care?

5. Tables:

Table captions should be included in all tables. The captions should briefly inform about measurements, scaling, coding in categorical variables, as well as dummy codes in dummy variables. The best table is one that is more or less self-explanatory, without the need to search through the methods section in order to be able to understand and interpret the data. Table 2:

- What does 'E' indicate?
- Does it make sense to report standardized beta regression coefficients for categorical variables? If yes, what would they indicate?
- The dummy variable 'Colombia' cannot be understood without knowing the reference category.
- Is the variable age scaled in years, or in categories of years, as reported in the abstract?

Table 3: the correlation between well-being and self-care seems to be missing.

References

Hayes, A. F. (2018). Mediation, moderation, and conditional process analysis: A regression-based approach; second edition. New York: Guilford Press.

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. Behav Res Ther, 98, 39-57.

VERSION 1 – AUTHOR RESPONSE

Reviewer 1 (R1)

Responses from Authors to reviewer's comments (R1C)

R1C. In the new version of the manuscript, we have highlighted in yellow the words and paragraphs that imply changes from the last version. Moreover, we have included a cleaned version of the manuscript with such changes applied.

R1 Introduction pag.3 line 38. Rather than "current coronavirus", "Coronavirus Disease 19 (COVID-19)" is preferable.

R1C1. We want to thank the reviewer for this comment.

R1. Regarding the first part of the Introduction. Authors should consider expanding this section to give the reader a clearer understanding of the detrimental effects of COVID-19 and related protective measures (e.g. lockdown) on the general population's mental health. On this note, the sentence "The major negative psychological outcome of the current pandemic is the anxiety and distress caused by it" should be integrated with references to longitudinal/follow-up studies, since is implying causation; for instance, Roma et al. (2020, "A 2-month follow-up study of psychological distress among Italian people COVID-19 lockdown." the Int. J. Environ. Res. Public during Health. https://doi.org/10.3390/ijerph17218180) found that "our results showed an increase in stress and depression over 2 months of lockdown in Italy".

R1C2. We agree with the reviewer. We have included a new paragraph in the introduction of the current version considering the detrimental effect of COVID-19 and related protective measures on the general population's mental health.

R1. Authors introduce the construct of "self-care"; however, they do not offer a definition for this construct or what behaviours it includes. Please extend the theoretical background for this variable.

R1C3. We have included the following paragraph in the introduction in order to define self-care construct. Moreover, we have extended its theoretical background.

R1. Introduction. Since Authors are proposing a possible mediating role of self-care between stress and psychological well-being, they should also include studies that investigated the mediation role of self-care rather than its direct effect.

R1C4. We agree with the reviewer. In the new paragraph discussed in the previous response (R1C3), we have included references to previous studies that investigated the mediation role of self-care.

R1. Introduction pag.5 line 3. I believe it should be "remains" rather than "reminds".

R1C5. We have changed "reminds" by "remains".

R1. Sample pag.5 line 15 and throughout the manuscript. Please use the decimal comma for readability (3,452).

R1C6. We have changed the thousands separators from points to commas throughout the manuscript.

R1. For the instruments used, please add items' examples.

R1C7. We have added two item's examples for each psychological instrument.

R1. Table1. Rephrase the caption to better represent the table's content.

R1C7. We have rephrased the caption of Table 1.

R1. Authors should consider displaying all of the descriptive statistics of the sample with a table.

R1C8. We have included a new table 1 within the manuscript with The descriptive statistics of the sample variables of interest used in this study.

R1. Discussion pag.17 lines 37-49. Here Authors introduce the concept of adherence with protective health measures (e.g. wearing a mask), however it seems that a link is missing between their results and this interpretation. Please elaborate.

R1C9. According to the reviewer, this point was confusing and has been now clarified and elaborated the main idea in the discussion

Reviewer 2 (R2)

Responses from Authors to reviewer's comments (R2C)

R2C. In the new version of the manuscript, we have highlighted in yellow the words and paragraphs that imply changes from the last version. Moreover, we have included a cleaned version of the manuscript with such changes applied.

R2. In their paper, "Self-care activities to buffer stress and gain psychological well-being during COVID-19 lockdown: a transnational mediation", Elkin O Luis and colleagues report on data from a cross-sectional survey study that was conducted during the early weeks of the public restrictions due to the COVID-19 pandemic in Chile, Colombia, Ecuador, and Spain, including 1,082 participants from the general population. The authors investigated whether self-care activities statistically mediated the relation between perceived stress and perceived psychological well-being. The results of simple mediation analyses showed a significant statistical mediation effect of self-care. Higher perceived stress was related to lower self-care, and higher self-care was in turn related to higher wellbeing. This indirect effect of stress on well-being was found in the total sample, as well as in the four subsamples from Chile, Colombia, Ecuador, and Spain. The authors conclude that the findings of the study provide evidence of the positive influence of self-care activities to reduce stress and improve psychological well-being during the early stages of the COVID-19 pandemic.

The findings of this study are of relevance for public health promotion, particularly as potential information for the development of effective stress prevention strategies. Those novel strategies might be applied in future pandemics, epidemics, or comparable health-threatening situations requiring temporary restrictions of mobility and close physical interactions. Among the major strengths of the study is the data collection in four different countries from South America and Europe. The major results hold true for all four subsamples, suggesting that the findings are rather robust and independent of national differences concerning contextual background, but also differences regarding the state of the pandemic and the respective public restriction measures.

However, in its current state the paper is very confusing, and it should be revised substantially. My

major concern is that the mediation analysis is not yet accurate concerning (1) theoretical foundation, primarily the reasons for classifying the specific study variables into independent variable, mediator, and dependent variable, (2) description and application of statistical methods, as well as (3) interpretation of the results of mediation analyses. However, these issues should easily be resolvable in a major revision of the paper.

R2C1. We appreciate your valuable comments and for this reason, we have revised the manuscript so that all tables and figures are related within the text for a greater clarity of the reader.

Major issues:

Issues concerning the mediation analyses and multiple linear regression analyses:

R2. Title: "Self-care activities to buffer stress and gain psychological well-being during COVID-19 lockdown:

a transnational mediation model"

The title is confusing regarding two aspects: (1) The information of the mediating role of self-care activities is lacking. The wording 'self-care activities to buffer stress and gain psychological well-being' suggests that self-care is either an independent factor influencing two dependent variables, stress, and well-being, or that self-care works as a buffer; however, this would mean that self-care was a moderator of the association of stress and well-being. (2) 'a transnational mediation model' This sounds as if transnationality was the mediator variable.

R2C2. We agree with the reviewer in that the words 'buffer' and 'transnational' are not the most appropriate in our case. We propose the following: "Relationship between self-care activities, stress and well-being during COVID-19 lockdown: a cross-cultural mediation model". Furthermore, in agreement with an editor's comment (EC2), we have changed the title of the manuscript in order to avoid

a declarative statement.

R2. Introduction: The authors should present a clear foundation of their choice to classify perceived stress as an independent factor, self-care activities as mediator, and well-being as dependent variables. This choice would mean that the objective of the study was to investigate to what extent the effect of stress (X) on well-being (Y) would operate through self-care activities (M) [Hayes & Rockwood, 2017]. According to Hayes & Rockford (2017): " ... X affects Y because X affects the mediator variable M, and this causal effect then transmits X's effect to Y through the effect of M on Y. Thus, a mediation model is a set of two or more causal events chained together in sequence of the form X/M/Y. So by definition, mediator variable M must be causally located between X and Y. It must be affected by X, and it in turn must

affect

Y."

The current argumentation of the paper leads to choose self-care as a causal stress prevention strategy. This would, for example, mean that self-care (X) leads to less stress (M), and less stress in turn would improve well-being (Y). Or even simpler: 'Self-care affects the two outcomes, stress and wellbeing. In this case, no mediation model would be necessary at all, and as a consequence no theoretical foundation of any mediation. Another line of reasoning might be to conceive of self-care as a buffer (moderator) of the relation between stress (X) and well-being (Y): 'The higher the self-care the smaller the relation between X and Y'. Since data are collected at the same time, there are many possible choices of potential causal relationships. The authors should choose the most convincing line of reasoning.

It is widely known that perceived stress and perceived psychological well-being correlate highly. So why should this not be the case in times of the COVID-19 pandemic? For a major objective, it does not seem innovative enough to determine once more the well-known negative correlation between stress and wellbeing. However, the second objective of the paper is much more innovative, to explore the relations between sociodemographic variables and well-being in times of COVID-19, especially in the context of four different countries.

R2C3. We greatly appreciate the explanation provided by the reviewer. Based on the possible alternatives, we believe that the most appropriate reasoning is that the implementation of self-care behaviours mediates the relationship between stress and well-being. Our reasoning is that during the confinement situation, many people must endure a dynamic process that persists as they have to face various changes in their lifestyle in order to protect themselves from the possible risk of contagion. In other words, stress experiences are addressed through the possible implementation of self-care behaviours necessary to adapt to the contagious risk conditions imposed by COVID-19. Therefore, people require continuous self-care to minimize the risk and the consequences of confinement necessary to maintain optimal physical and mental health conditions that allow them to prevent contagion and its negative consequences. Self-care is a dynamic and interactive daily process in which people face the potential risk of losing their health. This concept requires people to manage potential challenges and risks while adapting to lifestyle changes that involve the physical and psychological consequences of confinement.

We start from the assumption of the perceived stress as an independent variable given that the confinement context leads to a highly demanding situation for coping strategies with little time for adaptation (which makes it even more stressful). Faced with this situation perceived as stressful, where people also assume that they do not have enough information to face this situation, we suppose that the implementation of self-care behaviours can be a strategy that allows the reduction of the possible risk of contagion, and therefore, facilitator of experimentation of states of well-being. Therefore, our main argument is that the implementation of self-care behaviours represents a fundamental coping strategy in a highly demanding context that makes it possible to experience better control of the situation, and therefore, greater well-being.

Our main objective tries to explain how self-care equips people with tools that allow them to face stressful situations in order to obtain the greatest experimentation of well-being. This would try to justify the mediating role of self-care in the well-known relationship between stress and well-being. In line with the above, the aim of this preliminary work is not to check how the effect of the independent variable changes on the dependent variable, but to explain the role of self-care in the relationship between stress and well-being.

Consequently, we have included a new paragraph in the introduction which justifies the potential role of self-care in the relationship between stress and well-being, and we also include a recent work that examines this effect (R1C3).

- **R2.** Methods, statistical analysis, page 9 (pages counted according to 'page x of 28'): The mediation analyses should be described more properly and in detail, with the corresponding literature references for regression-based path analysis and the PROCESS Macro, e.g. Hayes, 2018. The cited reference of Hayes (2012) is missing in the reference list.
- **R2C4.** We have included references to Hayes (2012, 2018) associated with the PROCESS Macro and regression-based path analysis, and we have also described more properly the mediation analyses.
- **R2.** In regression-based path analyses, the most important parameter of simple mediation analysis is the product of the paths a*b, where path 'a' demonstrates the direct effect of the independent variable X on the mediator, and path 'b' refers to the direct effect of the mediator on the dependent variable. If I am not mistaken, this information is missing in the statistics section, and no values of the product a*b are reported in the results section. Reporting only confidence intervals is not sufficient.
- **R2C5.** We have rewritten the corresponding paragraph in the results indicating the value of the path a*b, and we have modified Table 4 in order to offer a more detailed description of the paths involved in mediation analyses.
- **R2.** Results, page 13: The report of parameters indicating the significant mediation effect seems confusing, e.g.:

"Furthermore, the 95% confidence interval of the indirect (mediated) effect of Stress - Self-care was [-0.40, -0.22], and in the case of Well-being - Self-care it was [0.37, 0.54], which indicates the existence of significant mediation. On the other hand, a lower level of perceived stress was associated with higher levels of psychological well-being (c'= -0.63, p<.0001) ..." What do the two parameter CI's actually refer to? Maybe to the paths a and b, indicating the two direct effects of X and M? Why not simply report the product a*b with the corresponding confidence intervals?

- **R2C6.** As the reviewer points out, these confidence intervals correspond to the indirect pathway. Considering the reviewer's recommendation, we have now included the product a*b with the corresponding confidence interval (R2C5).
- **R2.** The concept of a 'Partial mediating effect' is obsolete in contemporary mediation analyses, please see e. g. Hayes & Rockwood (2017) for a discussion of this topic.
- **R2C7.** We understand the issue addressed by the reviewer and the recommendations performed in Hayes & Rockwood (2017) regarding desirable complete mediations. Consequently, we have included a new paragraph to discuss this limitation together with possible future research addressing this issue.

Nevertheless, we need to take in account some considerations related with the partial mediation of self-care in the relationship between stress and well-being. First, a partial mediation indicates that self-care does not explain the totality of perceived stress effect on well-being. Although recent works claim that partial mediation has little value and should be abandoned (Rucker et al., 2011; Hayes, 2013, pp. 170-172; Hayes and Rockwood, 2017), others support that a more realistic goal of psychological studies dealing with phenomena that have multiple causes may be to seek mediators that significantly decrease the direct path rather than eliminating the relation between the independent and dependent variables altogether (Baron and Kenny, 1986). From a theoretical perspective, a significant reduction

demonstrates that a given mediator is indeed potent, albeit not both a necessary and a sufficient condition for an effect to occur.

Although the Perceived Stress Scale is the most widely used psychological instrument for measuring the perception of stress, most of its items associate stress with negative emotions and "threat" characterized by situational demands exceeding coping resources (Blascovich et al., 1999). Moreover, despite the Self-care Activities Screening Scale considers four important dimensions of self-care (health consciousness, nutrition and physical activity, sleep, and intra-personal and inter-personal coping skills) and it was validated on general population at the beginning of the COVID-19 context (when coping strategies were not probably fully established), it is supposed that psychological, emotional, professional and spiritual components may also participate in the mediating effect between stress and well-being. Furthermore, considering that not all stressors that explain well-being can be explained by self-care, it is not surprising that self-care cannot explain the totality of such a relationship by itself. For this reason, it is crucial to identify the factors that can act as promoters and maintainers of the search for well-being (Espinosa & Restrepo, 2008).

- **R2.** Why has age a significant effect on stress in the multiple regression analyses of the proposed mediation model? In the proposed mediation model, there should be no regression with stress as a dependent variable.
- **R2C8.** Multiple linear regression models were performed on each variable of the mediation model in order to determine the covariates which could significantly affect the mediation. As age affects commonly and significantly on stress, self-care and well-being, we included it in the mediation model as a covariate in order to show a more clean effect of such a relationship.
- **R2.** Figure 2: This seems to look like a figure based on structural equation modelling (SEM). Which specific PROCESS model is the figure referring to?.
- **R2C9.** We replicated the analysis with another software to verify the results, but the original analyses were performed under Model 4 in PROCESS. Given that age acted as a covariate and that PROCESS does not export the corresponding graphical representation, we depicted the model in Powerpoint.
- **R2.** Discussion: The discussion should be revised according to the mediation-related necessary revisions in the introduction, methods, and results.
- **R2C10.** We have revised and changed the discussion according to the comments performed previously (R2C2, R2C3 and R2C7).

R2. sample, 33: Methods, page 6 lines 10 -The authors should give references for the different days of confinement in the four countries.

R2C11. Information on the days of confinement in the four countries is provided in the description of the sample (methods).

R2. a flow-chart would be necessary to document the decrease of sample size from N=3,452 to n=1,082. What were the specific reasons for excluding which number of participants at the different stages of sample size 'extraction'?

R2C12. In order to have a similar distribution of participants in each country, data from each country was age and gender matched between countries while a random selection was applied after removing missing data. Considering the importance of this information, we have included a flow-chart figure in supplementary material (i.e., Supplementary Figure 1).

R2. Methods, statistics, pages 8 to 9- If the analyses of associations between sociodemographic variables, stress, well-being and self-care were only 'Preliminary analyses', the determination of simple zero-order correlations would be sufficient. Multiple regression analyses are not preliminary but rather complex. In order to explore potential covariates for the regression models of mediation analyses, zeroorder correlations should be sufficient.

R2C13. Although we understand that the exploration of the potential covariates for the mediation model can be assessed with zero-order correlations, we applied multiple regression analyses in order to consider the most influential socio-demographic predictors and to control for the relative influence which would have on the dependent variable. Furthermore, we also consider that multiple regression analyses are not preliminary, and thus, we have deleted this word.

R2. Why was Bonferroni correction applied in explorative preliminary analyses?

R2C14. We agree with the reviewer and apologize for this misprint. Correlation analyses have not been corrected for multiple comparisons with Bonferroni, so we have deleted this.

Minor issues:

R2. 1. Abstract, page 3, typo: 'Prymary outcome ...'

R2C15. This typo has been corrected.

'The R2. 2., Introduction, page 4, line 39: current coronavirus The authors might reconsider using the word 'current'. What would 'current' mean when reading the paper in e. g. 10 years?

R2C16. This typo has been corrected.

R2. 3. Methods, measurements, page:

For all questionnaires, the authors should report the time frame that the items refer to, e. g. 14 days for perceived stress.

R2C17. Considering that the questions on the PSS-10 refer to feelings and thoughts during the past month, we preferred to maintain the time window in all questionnaires..

R2. Is reference 22 the reference to the original PWBS questionnaire? If not, the original reference should be reported, too.

R2C18. We have added the original reference where the PWBS is validated.

Ryff CD (1989): Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57:1069-1081.

Ryff CD and Keyes CL (1995): The structure of psychological well-being revisited. Journal of Personality and Social Psychology, 69(4): 719-727.

R2. The current reliability data of the measures should be reported in the methods section instead of the results section.

R2C19. We have added the information on the reliability of the scales in the methods.

R2. -What is HADS-T? Maybe HADS total score, i. e. HADS-D and HADS-A?

R2C18. The reviewer is right as the HADS-T corresponds to the total score (combined HADS-D and HADS-A). We have now included this description.

R2. Results, page 9, lines 24ff: How do these two points fit: The sample is a general population sample, and at the same time, 33.9% of the participants considered themselves as front-line workers? Were only 64% of the sample in confinement while the others worked 'in frontline' of health / social care?

R2C19. It is worth noting that our population sample is general and was confined in their respective countries at the moment in which data was registered, but one third were workers of health and basic services (i.e., frontline COVID-19 workers). Considering that some front-line workers, while confined, worked longer hours than normal (e.g., health workers), or fewer hours (e.g., supermarket workers) and that these could be exposed to a greater risk of contagion, it would be interesting to address the impact of self-care on the relationship between stress and well-being in this population in future research.

Given the importance of the reviewer's comment, we believe it is appropriate to point out that in the discussion.

5. Tables:

R2. Table captions should be included in all tables. The captions should briefly inform about measurements, scaling, coding in categorical variables, as well as dummy codes in dummy variables. The best table is one that is more or less self-explanatory, without the need to search through the methods section in order to be able to understand and interpret the data.

R2C20. We are thankful for this suggestion. We have added a more complete description of captions in all the tables.

Table 2:

R2. What does 'E' indicate?

R2C21. Standard error (SE). We have corrected this and also added the description of all the parameters.

R2. Does it make sense to report standardized beta regression coefficients for categorical variables? If yes, what would they indicate?

R2C22. We understand that reporting standardized beta coefficients for categorical variables does not make sense at all. In order to get a better interpretation, we avoid reporting the standardized coefficients, standard error, and lower and upper limits of the 95% confidence intervals of categorical variables, while reporting their unstandardized beta coefficients and maintaining the p-value. Sorry for the mistake.

R2. The dummy variable 'Colombia' cannot be understood without knowing the reference category.

R2C23. Truth. The reference country category was Spain. We have corrected this as the variable name is country rather than Colombia.

R2.Is the variable age scaled in years, or in categories of years, as reported in the abstract?

R2C24. This is a typo. The variable age was treated as continuous in the analyses, but it was also recoded as an interval variable in order to perform the matching of age and sex between countries during sample selection (see Supplementary Figure 1).

R2. Table 3: the correlation between well-being and self-care seems to be missing.

R2C25. We have now added the correlation coefficient between well-being and stress in Table 3. We apologize for this error.

References

Hayes, A. F. (2018). Mediation, moderation, and conditional process analysis: A regression-based approach; second edition. New York: Guilford Press. Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. Behav Res Ther, 98,

R2C26. Thank you for the suggestion. We have added these references to the bibliography.

VERSION 2 - REVIEW

REVIEWER	Roma, Paolo
<u> </u>	

	Sapienza University of Rome	
REVIEW RETURNED	28-Jul-2021	
GENERAL COMMENTS	Authors did a very good job improving their manuscript, which is now much clearer.	
REVIEWER	Krampe, Henning Humboldt-Universitat zu Berlin	
REVIEW RETURNED	30-Jun-2021	
GENERAL COMMENTS	I would like to thank the authors for their response to the initial review, as well as for addressing all relevant concerns. Principally, the authors did a good job with this revision. However, there are still two issues that I do not understand. Issue 1: Theoretical foundation, description, application and results / interpretation of the mediation analyses. Issue 2: The role of age as a covariate in the mediation analyses. My concerns are detailed below.	
	Ad issue 1: Theoretical foundation, description, application and results/interpretation of the mediation analyses. The current mediation analysis investigates to what extent the effect of stress (X) on well-being (Y) would operate through self-care activities (M). Hayes & Rockwood (2017) explain the general approach " X affects Y because X affects the mediator variable M, and this causal effect then transmits X's effect to Y through the effect of M on Y. Thus, a mediation model is a set of two or more causal events chained together in sequence of the form X/M/Y. So by definition, mediator variable M must be causally located between X and Y. It must be affected by X, and it in turn must affect Y."	
	From my perspective, the authors' handling of the mediation approach is not consistent and sometimes it is confusing. Here are some paragraphs from the response to the reviewer, as well as from the revised manuscript.	
	Response R2C3 from authors to the reviewers' comments: " Our main objective tries to explain how self-care equips people with tools that allow them to face stressful situations in order to obtain the greatest experimentation of well-being. This would try to justify the mediating role of selfcare in the well-known relationship between stress and well-being. In line with the above, the aim of this preliminary work is not to check how the effect of the independent variable changes on the dependent variable, but to explain the role of self-care in the relationship between stress and well-being."	
	In this argumentation, self-care activities are presented as an independent factor that affects both perceived stress and wellbeing. If I am not mistaken, there is no statement concerning an effect of the independent variable x, here stress, on the mediator, here self-care activities. However, the argumentation of the authors might be the base for a mediation model examining the effect of self-care activities (X) on well-being (Y) through stress (M).	

Revised introduction, page 6, lines 24 ff:

"Therefore, this study seeks to address knowledge gaps that may positively benefit understanding the role of self-care in a general population during the COVID-19 pandemic and across four different countries. Understanding the contribution of adopting self-care activities may clarify how far promoting healthy behaviours can serve as a worldwide critical strategy to reduce people's stress perception and increase their psychological well-being for the present COVID-19 wave and future pandemics."

If I am not mistaken, the rationale is the same like in the answer to the reviewer (please see above).

Revised introduction, page 6, lines 38 ff:

"Purpose of the Present Study

Firstly, this study is aimed to investigate whether psychological well-being can be predicted by people's stress perception, which other socio-demographics variables can be implied in this relationship and are common in four Ibero-American countries: Chile, Colombia, Ecuador and Spain. Secondly, it seeks to determine whether the adoption of selfcare activities mediates the relationship between stress and well-being and lastly, if this mediation role remains similar across these four countries." Here, the mediating role of self- care activities are reported in the sequence of X-M-Y.

Revised statistics, page 10, lines 24 ff:

"Lastly, mediation analyses were performed for each country and for the total sample in order to examine the mediation role of self-care in the relationship between perceived stress and psychological well-being, where stress was included as the dependent variable (X), wellbeing as the independent variable (Y), and self-care was added between them as a mediating variable (M). Additionally, the covariates that significantly alter this relationship were considered in this model to account for confounding effects"

Here, X and Y, as well as dependent and independent variables are confused; this might be typos.

Revised results, page 15, lines 25 ff:

"Mediating role of self-care activities between stress and wellbeing

Results from the mediation model assessing the effect of self-care on the relationship between perceived stress and psychological well-being with age as a covariate showed that a lower level of perceived stress is significantly associated with a greater level of self-care, which in turn is significantly associated with higher levels of well-being [F(3,1078)=370.01, p<0.001, R2=0.507]. The indirect effect of perceived stress on well-being through self-care is negative and statistically different from zero (a*b = -0.144, p<0.001, with a 95% bootstrap confidence interval of -0.20 to -0.095). The direct effect is weaker than it was prior to this control in the negative direction (c=-0.672), but remained statistically significant (c'=-0.626, p<0.001). These results indicate that self-care partially mediates the effect of perceived stress on well-being (see Figure 1)."

In the first part of the first sentence, self-care is presented as an independent variable that has an effect on the relationship between stress and well-being. From my perspective, this might be

a rationale for a moderation analysis but not for self-care as a mediator. In the second part of the sentence, the line of reasoning seems to be 'the lower the stress, the better the self-care activities, resulting in increased well-being'. However, why is the stress lower in the context of the COVID-19 pandemic?

From my perspective, a more convincing description would be: The stressful context of the pandemic leads to higher perceived stress that has a negative effect on self-care activities, resulting in lower wellbeing because self-care and wellbeing are positively associated.

Revised discussion, page 17, lines 44 ff:

"Therefore, our results suggest that the more a person engages in self-care activities, the lower their level of perceived stress and the greater their sense of well-being. The present results are in line with those studies conducted in psychology students (16) or professionals (13), which have shown the relationship between personal care and well-being. In the same way, in the context of COVID-19 pandemic, the improvement in personal resources seems to be relevant to overcome stress and its associated health problems (45). Thus, these results highlight the essential role of people in creating their own health and well-being, since self-care can be considered as an important individual health asset for the maintenance of one's own health and that of society in general (46-48)."

This interpretation is similar to the lines of reasoning in the response R2C3 and in the revised introduction. It presents self-care activities as an independent variable, with a negative association with perceived stress, and a positive association with well-being. It is far from clear whether a mediation model is necessary at all to understand these results and their interpretation.

Ad issue 2: The role of age as a covariate in the mediation analyses

and nonstandardized coefficients in Table 4)."

Revised results, page 15, lines 48 ff, and Figure 1: "Regarding age, the mediation analysis showed a significant effect only on stress (p < 0.001), but not on self-care and well-being, reflecting an association between high stress with lower age, and vice versa. Thus, stress, self-care and age variables predict 50.7% of well-being variability (see standardized coefficients in Figure 1

As far as I remember, the PROCESS mediation model 4 analyses the effect of X on Y through M. In the first regression analyses of the current model, the dependent variable would be self-care, and in the second regression, the dependent variable would be well-being. Stress would be an independent variable in both models. The model also examines the relations of the covariate age with self-care and well-being. But how can the meditation model show a relation of the covariate age with the independent variable stress? Was there an additional model with stress as a dependent variable?

References

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. Behav Res Ther, 98, 39-57

VERSION 2 – AUTHOR RESPONSE

Responses from Authors to Reviewer 2 comments (R2)

R2.C1.I would like to thank the authors for their response to the initial review, as well as for addressing all relevant concerns. Principally, the authors did a good job with this revision. However, there are still two issues that I do not understand. Issue 1: Theoretical foundation, description, application and results / interpretation of the mediation analyses. Issue 2: The role of age as a covariate in the mediation analyses. My

concerns

are

detailed

below.

R2.R1. We appreciate the rigorous and thoughtful review, as well as the inputs provided that we think have greatly helped us to improve this manuscript.

R2.C2. Ad issue 1: Theoretical foundation, description, application and results/interpretation of the mediation analyses.

From my perspective, the authors' handling of the mediation approach is not consistent and sometimes it is confusing. Here are some paragraphs from the response to the reviewer, as well as from the revised manuscript. Response R2C3 from authors to the reviewers' comments: ".... Our main objective tries to explain how self-care equips people with tools that allow them to face stressful situations in order to obtain the greatest experimentation of well-being. This would try to justify the mediating role of self-care in the well-known relationship between stress and well-being. In line with the above, the aim of this preliminary work is not to check how the effect of the independent variable changes on the dependent variable, but to explain the role of self-care in the relationship between stress and well-being."

In this argumentation, self-care activities are presented as an independent factor that affects both perceived stress and wellbeing. If I am not mistaken, there is no statement concerning an effect of the independent variable x, here stress, on the mediator, here self-care activities. However, the argumentation of the authors might be the basis for a mediation model examining the effect of self-care activities (X) on well-being (Y) through stress (M).

Revised introduction, page 6, lines 24 ff:

"Therefore, this study seeks to address knowledge gaps that may positively benefit understanding the role of self-care in a general population during the COVID-19 pandemic and across four different countries. Understanding the contribution of adopting self-care activities may clarify how far promoting healthy behaviours can serve as a worldwide critical strategy to reduce people's stress perception and increase their psychological well-being for the present COVID-19 wave and future pandemics."

If I am not mistaken, the rationale is the same as in the answer to the reviewer (please see above).

R2.R2. According to the reviewer, the argumentation provided in different parts of the last manuscript and in the answer to the reviewer, rather than explaining the role of self-care as a mediator, drives to a misinterpretation of the statement aimed in this study and also of the results. We agree that in those parts where we stressed the role of self-care as a mediator mechanism between stress and wellbeing, we did not explain well the role of stress as the independent variable and its relationship with the mediator. Now we have tried to better justify the role of stress as a contextual variable that influences self-care activities, and in turn on wellbeing in the introduction, results, and discussion (see the corresponding changes marked with R2.C2 in the modified manuscript).

Firstly, the relationship between stress and wellbeing is explained by a third variable (that is, self-care) that absorbs part of wellbeing's variance explained by stress. The main reason to consider self-care activities as a mediator (rather than the independent variable) lies in the theories which have argued that it can play a key role as a coping mechanism to reduce the negative effects of inevitable stressful situations on people's well-being. However, as shown in this study, a high perception of stress can also drive to lower levels of self-care activities implementation, and thus, would not have those beneficial effects on wellbeing.

In other words, the way that stress is influencing psychological wellbeing is due, in part, to the implementation of self-care activities, but the higher the level of stress, the lower the level of self-care activities implementation and the lower the level of psychological well-being. Thus, the most important claim to do here is that people in this stressful situation are not simply at risk of decreasing their levels of psychological well-being, but also their ability to implement self-care activities (that would be helpful to maintain their optimal levels of well-being).

To sum up, our main proposal is addressed to emphasize the role of self-care as a mechanism that explains why people's stress perception may reduce, in part, their psychological well-being (given that self-care activities cannot be effectively implemented). So, it is not about how much a person can adopt self-care activities to improve his or her well-being, but how the stress perception can compromise these activities and then lose its beneficial effect on wellbeing.

R2.C3. Revised introduction, page 6, lines 38 ff:

"Purpose of the Present Study

Firstly, this study is aimed to investigate whether psychological well-being can be predicted by people's stress perception, which other socio-demographics variables can be implied in this relationship and are common in four Ibero-American countries: Chile, Colombia, Ecuador and Spain. Secondly, it seeks to

determine whether the adoption of self-care activities mediates the relationship between stress and well-being and lastly, if this mediation role remains similar across these four countries."

Here, the mediating role of self- care activities are reported in the sequence of X-M-Y.

R2.R3. As it is explained in R2.R2, the introduction tries now to respond coherently to the aim of the study being settled.

R2.C4. Revised statistics, page 10, lines 24 ff:

"Lastly, mediation analyses were performed for each country and for the total sample in order to examine the mediation role of self-care in the relationship between perceived stress and psychological well-being, where stress was included as the dependent variable (X), wellbeing as the independent variable (Y), and self-care was added between them as a mediating variable (M). Additionally, the covariates that significantly alter this relationship were considered in this model to account for confounding effects"

Here, X and Y, as well as dependent and independent variables are confused; this might be typos.

R2.R4. You are right, they were typos errors that have been accordingly corrected.

R2.C5. Revised results, page 15, lines 25 ff:

"Mediating role of self-care activities between stress and well-being

Results from the mediation model assessing the effect of self-care on the relationship between perceived stress and psychological well-being with age as a covariate showed that a lower level of perceived stress is significantly associated with a greater level of self-care, which in turn is significantly associated with higher levels of well-being [F(3,1078)=370.01, p<0.001, R2=0.507]. The indirect effect of perceived stress on well-being through self-care is negative and statistically different from zero (a*b = -0.144, p<0.001, with a 95% bootstrap confidence interval of -0.20 to -0.095). The direct effect is weaker than it was prior to this control in the negative direction (c=-0.672), but remained statistically significant (c'=-0.626, p<0.001). These results indicate that self-care partially mediates the effect of perceived stress on well-being (see Figure 1)."

In the first part of the first sentence, self-care is presented as an independent variable that has an effect on the relationship between stress and well-being. From my perspective, this might be a rationale for a moderation analysis but not for self-care as a mediator.

R2.R5. Regarding the first part of the sentence, we disagree with the reviewer seeing self-care as a moderator, since in that case, the sentence should be more like "the relationship between stress and well-being is weaker or stronger depending on the level of self-care activities reported". However, we

agree that maybe the expression "assessing the effect" could be misunderstood, so we replaced it with "assessing the explanatory role of self-care in the relationship between stress and well-being".

R2.C6. In the second part of the sentence, the line of reasoning seems to be 'the lower the stress, the better the self-care activities, resulting in increased well-being'. However, why is the stress lower in the context of the COVID-19 pandemic?

From my perspective, a more convincing description would be: The stressful context of the pandemic leads to higher perceived stress that has a negative effect on self-care activities, resulting in lower well-being because self-care and wellbeing are positively associated.

R2.R6. We agree with the reviewer that this reasoning misleads to an interpretation of the results. In accordance with his interpretation, it is the stressful context of the pandemic which leads to higher perceived stress, and as consequence, the adoption of self-care activities is compromised -which turns on lower levels of well-being-. We have made sure that this rationale is now clearer along with the whole manuscript, and the changes have been marked on the main text.

R2.C7. Revised discussion, page 17, lines 44 ff:

"Therefore, our results suggest that the more a person engages in self-care activities, the lower their level of perceived stress and the greater their sense of well-being. The present results are in line with those studies conducted in psychology students (16) or professionals (13), which have shown the relationship between personal care and well-being. In the same way, in the context of COVID-19 pandemic, the improvement in personal resources seems to be relevant to overcome stress and its associated health problems (45). Thus, these results highlight the essential role of people in creating their own health and well-being, since self-care can be considered as an important individual health asset for the maintenance of one's own health and that of society in general (46-48)."

This interpretation is similar to the lines of reasoning in the response R2C3 and in the revised introduction. It presents self-care activities as an independent variable, with a negative association with perceived stress, and a positive association with well-being. It is far from clear whether a mediation model is necessary at all to understand these results and their interpretation.

R2.R7. Agreeing with the reviewer, this interpretation will be far from the results provided in the study and leads to a misunderstanding of the pertinence and relevance of the mediation model presented. We really appreciate the opportunity to amend this important mistake and as in the same line that previous comments, now we consider that the rationale along the manuscript has been precisely corrected.

R2.C8. Ad issue 2: The role of age as a covariate in the mediation analyses

Revised results, page 15, lines 48 ff, and Figure 1:

"Regarding age, the mediation analysis showed a significant effect only on stress (p < 0.001), but not on self-care and well-being, reflecting an association between high stress with lower age, and vice versa. Thus, stress, self-care and age variables predict 50.7% of well-being variability (see standardized coefficients in Figure 1 and non-standardized coefficients in Table 4)."

As far as I remember, the PROCESS mediation model 4 analyses the effect of X on Y through M. In the first regression analyses of the current model, the dependent variable would be self-care, and in the second regression, the dependent variable would be well-being. Stress would be an independent variable in both models. The model also examines the relations of the covariate age with self-care and well-being. But how can the meditation model show a relation of the covariate age with the independent variable stress? Was there an additional model with stress as a dependent variable?

R2.R8. We appreciate the reviewer's comment. We agree and apologize for that. We get confused when interpreting in Process's output the weight of the covariate (age) on the independent variable (stress) since it cannot be obtained from Process model 4. Therefore, we have eliminated the covariate in Figure 1, we have included its effect on the corresponding variables in Table 4, and we have modified the interpretation of the covariate effect in the mediation model (in the discussion).

VERSION 3 - REVIEW

REVIEWER	Krampe, Henning Humboldt-Universitat zu Berlin
REVIEW RETURNED	08-Nov-2021

GENERAL COMMENTS	I would like to thank the authors for the thorough response to the second review, as well as for addressing all relevant concerns. The authors did a very good job with the second revision, so that the manuscript has improved very much. I think the revisions add much clarity to the paper, which will be of much interest and use for readers. If I am not mistaken, there are little typos in the results section. It would be advisable to check this section once more for errors, e.g.:
	Page 13: 'genre'. Should this be 'gender'?Table 3: It seems that some lines got out of place, so that the
	correlation between age and stress is lacking the minus sign; in the current version, it looks like r=0.182.