Dear Dr. Chambers,

Thank you very much for providing us with critical and constructive comments on our manuscript from two very dedicated peer-reviewers, Dr. Castro and Dr. Pasion. We highly appreciate and value all the important comments and suggestions.

We have composed a revised manuscript draft with tracked changes, with response to the reviewers' comments.

We believe by attending to your comments and suggestions our manuscript has been improved substantially. We sincerely hope that the revised version is worth an in-principle acceptance for progression to stage 2.

Best,

Tommy

Responses to Reviewers' comments

Reviewed by Ariana Castro

The authors proposed to conduct a longitudinal study to investigate the relation between interpretation biases, rumination, and psychological symptoms.

1. My greatest concern of the study is regarding how rumination is conceptualized and measured. The authors provide an excellent distinction between negative automatic thoughts (i.e., short appraisals of loss and guilt) and rumination (i.e., long chains of self-focused, repetitive negative thinking that occur as a response to the initial negative thoughts). However, the authors do not make a distinction between rumination and other types of repetitive thinking such as worry, reflection, and positive rumination. Recent evidence suggests that different types of repetitive thinking such as worry, rumination, and reflection are highly correlated, but unique constructs (Castro et al., 2022).

2. Moreover, research suggests that worry, rumination, and reflection may differ not in only in content, but in associations with different personality traits, emotion regulation tendencies, and behavioral tendencies. It appears that what the authors are measuring and referring to as rumination is in fact repetitive negative thinking, not rumination. I would encourage the authors to think about substituting the term repetitive negative thinking for rumination in their study. I would especially encourage this change since the authors chose to use the Perseverative Thinking Questionnaire, which is a great measure for perseverative/repetitive thinking, as one of their measures.

   Alternatively, the authors can measure different types of repetitive thinking such as worry (using the Penn State Questionnaire), rumination (using the Rumination-Reflection Questionnaire; RRQ), and reflection (RRQ). Measuring different types of repetitive thinking would help the authors clarify whether rumination specifically predicts psychological symptoms over and above other types of repetitive thinking and negative interpretation biases. I hope the questions/comments below (the order of which does not necessarily reflect their relative importance) will be helpful to the authors.

   Response: Thank you for your fruitful suggestions. We have made appropriate amendments replacing rumination with repetitive thinking. Replication study conducted by Castro and colleagues (2022) discovered the dysfunctional aspect of both rumination and worry loaded on a general factor of repetitive thinking, which we believe is a good support to our hypotheses.

3. The authors pose the following research question: "Do interpretation biases predict more psychological symptoms across time?" However, it is unclear what they are comparing the predictability of interpretation biases to. For example, are the authors investigating if interpretation biases predict more psychological symptoms across time than negative repetitive thinking?

Response: Thank you for your comments. Appropriate amendments have been made to clarify our research questions. We attempt to study whether negative interpretation biases at time point 1 predicts psychological symptoms at time point 3. Given the RI-CLPM model consists of repetitive thinking as a mediator, we will also be able to see whether interpretation biases predict more psychological symptoms over time than repetitive thinking as well.

4. I think the authors should provide a clearer definition of interpretation than, "a semantic process to resolve ambiguous content by constructing and adopting mental representations." Specifically, it is unclear to me what "constructing and adopting mental representations" adds to the definition. It would be useful to distinguish interpretations from beliefs.

   Response: Thank you for your comments. Appropriate amendments have been made to clarify our definition of interpretation bias in introduction. We argue interpretation bias is essentially an asymmetric Bayesian prior probability distribution that favors positive or negative contents. Herein, beliefs are our priors to determine the likelihood distribution of how ambiguous scenario will proceed

5. Given that the authors will be assessing suicidality using the Inventory of Depression and Anxiety Symptoms (IDAS) questionnaire, it is important to provide participants with a mental health resource list that contains phone numbers to suicide hotlines. In fact, it would be unethical to have participants rate items such as, "I had thoughts of suicide," and "I thought the world would be better off without me," which are two of the six suicidality items of the IDAS without access to information of local and national resources. It would be unethical because people with elevated symptoms of depression or schizophrenia may had experienced passing suicidal thoughts prior to rating suicidality items, but may not had thought about them as clearly as when rating suicidality items (especially given the concentrations symptoms present in depression and the disorganized symptoms present in schizophrenia). This could be quite concerning if participants rate the suicidality items high.

   Response: Thank you for your comments. We follow the reviewer's comment and choose not to administer the IDAS items on suicidality (item 7, 9, 14, 15, 41, 43). The remaining items still gives a comprehensive assessment for almost all aspects of internalizing symptoms.

Reviewed by Rita Pasion

I would like to thank the opportunity to review this manuscript. Overall, I feel it is a good example of how pre-registered reports should be done. The core information is provided, but I leave some additional suggestions.

1. General comment on introduction: It is hard to follow the main argument of the introduction because the study has too many variables and is testing too different things (which is what makes the study really interesting at the same time). Before creating subheadings, I would recommend authors provide a brief overview of the study and the topics that will be addressed– it would also be a good opportunity to (briefly) present from the begging the main goals and contributes of the study. Authors can also try to relate the different sections to make the argument more fluid.

   Response: Thank you for your comments. We have edited most of the sections to provide a clearer and more fluid argument. We hope the new version can clarify most of our points.

2. I think authors can make clearer the rationale beyond random intercept cross-lagged panel mediation (not only by focusing on how it overcomes "common" cross-lagged procedures). There are a lot of advantages in this approach.

   Response: Thank you for your comments. We follow the reviewer's comment and highlight why and how we would want to control stable trait factors while evaluating the potentially reciprocal influences over time in the RI-CLPMs.

3. The authors did a great job estimating the sample size but I'm wondering if it is not possible to increase the power a bit (90/95%) to avoid being on the exact threshold of adequate power. I know sometimes it is hard to find the right balance between time/human/funding resources and adequate sample size, so it is just a suggestion.

   Response: Thank you for your suggestion. We have tried our best to strike for a higher power with limited resources. Unfortunately, Prolific has recently raised their minimum pay for participants, which makes us even harder to increase our sample size. We chose not to administer the whole IDAS to reduce the number of items and maximize our sample size.

   Right now, the best we can do is to achieve a 95% power, as follows:

   Assuming 95% power, α=0.05, to detect a total mediating effect is 0.021, the sample size for three-wave longitudinal mediation analysis will potentially be 550 (Sedory, 2020).

   Assuming the average retention rate is 75%, the targeted sample size will be 860.

$$550 \times (1 + 25\%) \times (1 + 25\%)$$
$$= 859$$
$$\cong 860$$

4. I think CBQp is better explained than AST-D. The main goal of AST-D should be better clarified, so readers can link immediately the instrument with the hypothesis. It is a self-report measure of interpretation bias assessing how individuals process negative information in ambiguous scenarios.

   Response: Thank you for your comments. We have amended and explained AST-D better in the Measurement Section. We hope the amendments help with the clarification

5. I would recommend authors include a Figure to illustrate model paths.

   Response: Thank you for your comments. We have included three figures (two RI-CLPMs and one pathway model) to illustrate our analyses better.

6. I found it interesting that in the introduction the negative bias was presented as preceding symptoms (path – interpretation bias predicting symptoms) but as far I can understand the opposite can also be tested in this longitudinal design (e.g., symptoms in T1 predicting negative bias in T2). It would be an important topic in the literature because it remains unclear if symptoms affect the way we see the world or if, alternatively, a negative bias is one of the main mechanisms (since the beginning) contributing to the etiology of internalizing disorders. There seems to be a genetic factor for internalizing, but also for cognitive styles associated with biased processing. Moreover, a study by Liu and colleagues (2019) shows that anxiety-induced states increase attention bias to negative stimuli and, simultaneously, the modification of attentional bias seems to influence anxiety under stressful conditions. It is likely a bidirectional association exists between both, but this study could advance our knowledge on this topic, increasing its impact. I leave this decision to the authors because I recognize it can increase the complexity of the manuscript.

   Response: Thank you for your comments. We very much agree with you and we have decided to examine the cross-lagged paths to see whether their association is bi-directional.

7. Finally, I'm wondering if it would be advisable to use some p-correction for multiple comparisons (I anticipate a lot of p-values being analyzed). I had some good experiences with the false discovery rate. It is a less conservative approach than traditional methods (e.g., Bonferroni corrections). Furthermore, FDR adjusts for the actual p-value distribution of the data, while balancing type II versus type I error.

Response: Thank you for your comments. We have three main hypotheses: 1) hypotheses on the bidirectional associations between cognitive vulnerability and psychological symptoms (8 sub-hypotheses), 2)hypotheses on repetitive thinking as a mediator through which cognitive biases and psychological symptoms are linked (2 sub-hypotheses), 3) hypotheses on repetitive thinking as a transdiagnostic mediator (2 sub-hypotheses). An FDR adjusted p-value will be used according to the number of hypotheses.