

Supplementary material 1. Peer-review process.

LETTER OF REVIEWERS

Reviewer B

Recommendation: Revisions Required

Relevance: High

Novelty: High

Presentation and writing: Moderate

Comments for authors:

The manuscript addresses a relevant topic and presents a valuable effort to develop and evaluate the initial psychometric properties of the LGBT Moral Injury Scale in an adult LGBTQ+ population. However, several improvements could strengthen the conceptual clarity, methodological transparency, and interpretation of the results.

First, in the final paragraphs of the Introduction, the authors should more clearly articulate the distinctive contribution of the proposed instrument relative to existing measures of moral injury, particularly those developed in military or clinical contexts. Specifically, it would be useful to clarify which new conceptual dimensions the scale incorporates and its added value for understanding moral injury in LGBTQ+ populations.

Second, in the Instruments section describing the LGBT Moral Injury Scale, the authors should expand the explanation of the item-generation process. In particular, they should indicate whether this process relied solely on theoretical review or also incorporated qualitative procedures, such as interviews or analyses of reported experiences from LGBTQ+ individuals. This clarification would strengthen the conceptual justification of the item content.

Additionally, in the content validity subsection, more detailed information about the eight expert judges should be provided, including their areas of expertise, experience in psychometrics or LGBTQ+ research, and academic background. This information would allow for a more precise evaluation of the robustness of the content validation process.

In the Participants section, the authors should include a brief justification of the sample size used for confirmatory factor analyses, citing commonly accepted methodological criteria in psychometric research to support its adequacy.

In the Results section, where the reduction of the instrument from 30 to 15 items is described, the authors should provide a more detailed explanation of the criteria used for item elimination. Specifically, they should clarify whether the decisions were based solely on statistical criteria or also on conceptual considerations related to the representation of each theoretical dimension.

Similarly, in the section addressing discriminant validity, the manuscript notes that some factors do not fully meet the criterion based on MSV. The authors should expand the discussion of this limitation and consider including additional indicators of factorial discrimination or providing a more detailed explanation of the conceptual proximity between the factors involved.

Finally, in the Discussion section, the authors could further elaborate on the sociocultural context of Puerto Rico, particularly with respect to religiosity and social norms related to sexual identity, as this context may help interpret the relevance of the religious struggle dimension identified in the results. Additionally, the authors should revise lengthy paragraphs in the Introduction and Discussion to improve clarity and, if possible, include the complete final version of the scale (items and administration instructions) as supplementary material to facilitate its use by other researchers.

Reviewer C

Recommendation: Revisions Required

Relevance: High

Novelty: High

Presentation and writing: High

Comments for authors:

The manuscript addresses an emerging and relevant topic by proposing a specific measure to assess moral injury in LGBT populations. However, the conceptual framework would benefit from a more in-depth discussion of how moral injury is defined and operates in the context of sexual and gender minorities. Although the Introduction presents general definitions of the construct, it does not sufficiently delineate how experiences such as structural discrimination, stigmatization, or identity conflict may function as specific mechanisms of moral injury in this population. Expanding the literature review to include recent studies on minority stress, moral injury, and mental health in LGBT populations would help better justify the need for a specialized instrument and clarify its conceptual distinction from existing measures of moral injury or psychological trauma.

Although the manuscript describes the initial item-generation process, it should provide a more detailed account of the methodological stages involved. In particular, the authors should specify whether the items were derived from qualitative interviews, systematic literature review, or consultation with experts in LGBT mental health. The absence of this information limits the evaluation of the instrument's content validity. The authors should also report formal content validation procedures, such as expert panel review and the calculation of content validity indices. This information would improve methodological transparency and provide additional evidence that the items adequately capture the proposed theoretical construct.

Factor analysis constitutes the core psychometric component of the study; however, the description of the analytical procedures should be expanded. The manuscript should explicitly justify the estimation method used based on the type of data analyzed, particularly if Likert-type ordinal scales were employed. In such cases, the use of polychoric correlation matrices and robust estimation methods appropriate for ordinal variables is recommended. Additionally, the authors should report model fit indices more comprehensively, including confidence intervals for RMSEA, as well as standardized factor loadings for all items. This information is fundamental for evaluating the robustness of the proposed factor structure and the psychometric quality of the instrument.

The study presents initial evidence of validity based on internal structure; however, the analysis could be strengthened by incorporating additional sources of validity evidence. In particular, the authors should examine convergent and discriminant validity through correlations with related constructs, such as minority stress, psychological well-being, or moral injury. Furthermore, they may consider evaluating validity based on relationships with relevant external variables, which would allow assessment of whether the scale behaves in accordance with theoretical expectations. Including such evidence would substantially strengthen the psychometric argument of the study.

The manuscript reports indicators of internal consistency, which represent an important first step in the psychometric evaluation of the instrument. However, this information should be complemented with additional reliability indices, such as composite reliability derived from the factor model or hierarchical omega coefficients, when appropriate.

The Discussion provides a general interpretation of the findings; however, it would benefit from a more critical reflection on the study's methodological limitations. In particular, the authors should discuss the implications of the sample size, the representativeness of the sample, and the preliminary nature of the validation process. It should also be emphasized that the findings provide initial evidence of validity and that future studies should replicate the factor structure in independent samples and across diverse cultural contexts. Finally, the authors could outline potential clinical and research applications of the scale, as well as its contribution to the study of mental health in LGBT populations.

RESPONSE LETTER

Dr. David Villarreal
Editor de Interacciones

Response to Reviewers

Manuscript ID: ID-519

Title: *LGBT Moral Injury Scale: Initial Validation and Preliminary Psychometric Properties*

Dear Editor and Reviewers,

We sincerely thank you for the careful evaluation of our manuscript and for the constructive comments and recommendations. We found the feedback extremely helpful and used it to improve the conceptual clarity, methodological transparency, and overall presentation of the manuscript.

In response to the reviewers' comments, we revised the manuscript extensively. Specifically, we strengthened the conceptual framework of moral injury in LGBTQ+ populations; clarified the distinctive contribution of the LGBT Moral Injury Scale (LGBT-MIS) relative to existing moral injury measures; expanded the description of item development and content validation procedures; provided additional detail on the expert judges; justified the sample size used for confirmatory factor analysis; clarified the criteria used for item reduction; expanded the discussion of discriminant validity; strengthened the discussion of the Puerto Rican sociocultural context; clarified the rationale for the estimation approach used in the CFA models; added composite reliability coefficients; expanded the discussion of limitations and future directions; and included the complete final 15-item version of the instrument in Appendix A.

All changes have been incorporated into the revised manuscript and marked accordingly. Below we provide a point-by-point response to each reviewer comment.

Reviewer B

Comment 1

The manuscript addresses a relevant topic and presents a valuable effort to develop and evaluate the initial psychometric properties of the LGBT Moral Injury Scale in an adult LGBTQ+ population. However, several improvements could strengthen the conceptual clarity, methodological transparency, and interpretation of the results. First, in the final paragraphs of the Introduction, the authors should more clearly articulate the distinctive contribution of the proposed instrument relative to existing measures of moral injury, particularly those developed in military or clinical contexts. Specifically, it would be useful to clarify which new conceptual dimensions the scale incorporates and its added value for understanding moral injury in LGBTQ+ populations.

Response:

Thank you for this helpful suggestion. We revised the final paragraphs of the Introduction to more clearly articulate the distinctive contribution of the LGBT-MIS relative to existing moral injury measures developed primarily in military, veteran, and healthcare contexts. Specifically, we now clarify that the LGBT-MIS extends prior approaches by assessing not only guilt and shame, but also identity-related moral conflicts, religious/spiritual struggle linked to sexual and gender identity, and self-condemnation associated with internalized stigma and social invalidation in LGBTQ+ populations. This revision was made in the final paragraphs of the Introduction.

Comment 2

In the Instruments section describing the LGBT Moral Injury Scale, the authors should expand the explanation of the item-generation process. In particular, they should indicate whether this process relied solely on theoretical review or also incorporated qualitative procedures, such as interviews or analyses of reported experiences from LGBTQ+ individuals. This clarification would strengthen the conceptual justification of the item content.

Response:

Thank you for this important observation. We revised the Methods section to provide a more detailed account of the item-development process. Specifically, we now clarify that item generation followed a theory-driven approach based on a targeted review of the literature on moral injury, minority stress, internalized stigma, shame, guilt, religious/spiritual struggle, and identity-related conflict in LGBTQ+ populations. We also clarified that the initial item pool was organized into five provisional domains before expert review. To avoid suggesting a separate qualitative phase that was not formally conducted, we revised wording in the Introduction and Methods accordingly. These revisions were made in the Introduction and in the "Development and content validity" subsection of the Methods section.

Comment 3

Additionally, in the content validity subsection, more detailed information about the eight expert judges should be provided, including their areas of expertise, experience in psychometrics or LGBTQ+ research, and academic background. This information would allow for a more precise evaluation of the robustness of the content validation process.

Response:

Thank you for this suggestion. We expanded the content validity subsection to provide a fuller description of the eight expert judges. Specifically, we now indicate that all judges held doctoral degrees and had expertise in clinical psychology, psychometrics, LGBTQ+ mental health, and trauma. We also clarified that three judges had prior experience in research and scale development, whereas five had extensive clinical, academic, and research experience focused on LGBTQ+ populations. This revision was made in the “Development and content validity” subsection of the Methods section.

Comment 4

In the Participants section, the authors should include a brief justification of the sample size used for confirmatory factor analyses, citing commonly accepted methodological criteria in psychometric research to support its adequacy.

Response:

Thank you for this recommendation. We added a brief justification of the sample size in the Participants section. Specifically, we now note that the final analytic sample of 242 participants is consistent with methodological guidance indicating that sample-size adequacy in CFA depends on model characteristics, while samples around 200 participants are often considered acceptable starting points for initial CFA applications. We further clarify that the sample was considered adequate for the initial evaluation of the proposed models, particularly the final 15-item, five-factor solution, while also emphasizing the preliminary nature of the validation and the need for replication in independent samples.

Comment 5

In the Results section, where the reduction of the instrument from 30 to 15 items is described, the authors should provide a more detailed explanation of the criteria used for item elimination. Specifically, they should clarify whether the decisions were based solely on statistical criteria or also on conceptual considerations related to the representation of each theoretical dimension.

Response:

Thank you for this important observation. We revised the Confirmatory Factor Analysis subsection to clarify that item reduction from 30 to 15 items was guided by both statistical and conceptual criteria. Specifically, item retention decisions considered standardized factor loadings, corrected item discrimination, global model fit, and parsimony, while also preserving conceptual coverage across the five proposed domains: guilt, shame, moral conflicts, religious struggle, and self-condemnation. We now explicitly state that items were not eliminated solely on the basis of lower loadings, but also with attention to the theoretical representation of each dimension. In addition, we corrected the note in Table 2 so that it accurately identifies M4 as the final model.

Comment 6

Similarly, in the section addressing discriminant validity, the manuscript notes that some factors do not fully meet the criterion based on MSV. The authors should expand the discussion of this limitation and consider including additional indicators of factorial discrimination or providing a more detailed explanation of the conceptual proximity between the factors involved.

Response:

Thank you for this important observation. We revised the Results section to clarify that Guilt, Shame, and Moral Conflicts did not fully meet the stricter $MSV < AVE$ criterion, indicating partial overlap among these three dimensions. In Results, we kept the interpretation concise and focused on the psychometric meaning of this finding. We then expanded the Discussion to provide a more detailed theoretical explanation of the conceptual proximity among these factors in LGBTQ+ populations, particularly in relation to minority stress, internalized stigma, identity concealment, and conflict with heteronormative or cisnormative expectations. We also added that future studies should examine complementary indicators of factorial discrimination, such as HTMT, and test higher-order or bifactor models.

Comment 7

Finally, in the Discussion section, the authors could further elaborate on the sociocultural context of Puerto Rico, particularly with respect to religiosity and social norms related to sexual identity, as this context may help interpret

the relevance of the religious struggle dimension identified in the results. Additionally, the authors should revise lengthy paragraphs in the Introduction and Discussion to improve clarity and, if possible, include the complete final version of the scale (items and administration instructions) as supplementary material to facilitate its use by other researchers.

Response:

Thank you for this thoughtful recommendation. We revised the Discussion section to further elaborate on the sociocultural context of Puerto Rico, particularly with respect to the role of religious traditions, family expectations, and community norms in shaping identity-related moral suffering and the relevance of the Religious Struggle dimension. Specifically, we expanded the paragraph discussing Religious Struggle in the Puerto Rican sample to clarify that spiritual pain may remain salient even outside formal religious participation, given the continued influence of religiously informed moral discourses on sexual and gender identity. In addition, we revised lengthy paragraphs in the Introduction and Discussion to improve clarity and readability. Finally, we included the complete final 15-item version of the LGBT-MIS, along with administration instructions, in Appendix A to facilitate future use by other researchers.

Reviewer C

Comment 1

The manuscript addresses an emerging and relevant topic by proposing a specific measure to assess moral injury in LGBT populations. However, the conceptual framework would benefit from a more in-depth discussion of how moral injury is defined and operates in the context of sexual and gender minorities. Although the Introduction presents general definitions of the construct, it does not sufficiently delineate how experiences such as structural discrimination, stigmatization, or identity conflict may function as specific mechanisms of moral injury in this population. Expanding the literature review to include recent studies on minority stress, moral injury, and mental health in LGBT populations would help better justify the need for a specialized instrument and clarify its conceptual distinction from existing measures of moral injury or psychological trauma.

Response:

Thank you for this insightful recommendation. We strengthened the conceptual framework in the Introduction by expanding the discussion of how moral injury may operate in sexual and gender minority populations. Specifically, we added a paragraph clarifying that, in LGBTQ+ contexts, morally injurious experiences may arise not only from discrete events, but also from chronic exposure to structural discrimination, stigmatization, identity concealment, family or community rejection, and conflict with heteronormative or cisnormative norms. We also clarified the conceptual distinction between minority stress, psychological trauma, and moral injury, emphasizing that moral injury highlights the moral-emotional and existential consequences of these experiences, such as guilt, shame, self-condemnation, spiritual struggle, and moral disorientation. To support this revision, we incorporated additional literature on minority stress, sexual stigma, and moral injury in sexual and gender minorities (e.g., Herek, 2007; Meyer, 2003; Nicholson et al., 2025). These revisions were made in the Introduction.

Comment 2

Although the manuscript describes the initial item-generation process, it should provide a more detailed account of the methodological stages involved. In particular, the authors should specify whether the items were derived from qualitative interviews, systematic literature review, or consultation with experts in LGBT mental health. The absence of this information limits the evaluation of the instrument's content validity. The authors should also report formal content validation procedures, such as expert panel review and the calculation of content validity indices. This information would improve methodological transparency and provide additional evidence that the items adequately capture the proposed theoretical construct.

Response:

Thank you for this valuable suggestion. We revised the Methods section to provide a more detailed account of the methodological stages involved in item development and content validation. Specifically, we now clarify that item generation followed a theory-driven approach based on a targeted review of the literature on moral injury, minority stress, internalized stigma, shame, guilt, religious/spiritual struggle, and identity-related conflict in LGBTQ+ populations. We also specify that the initial pool of 35 items was organized into five provisional domains and subsequently evaluated through a formal expert-panel review. In addition, we now report the content-validation procedure more explicitly, including the use of the Lawshe method, the calculation of the Content Validity Ratio (CVR), the characteristics of the eight expert judges, and the decision rule used to retain or remove items. These revisions were made in the "Development and content validity" subsection of the Methods section.

Comment 3

Factor analysis constitutes the core psychometric component of the study; however, the description of the analytical procedures should be expanded. The manuscript should explicitly justify the estimation method used based on the type of data analyzed, particularly if Likert-type ordinal scales were employed. In such cases, the use of polychoric correlation matrices and robust estimation methods appropriate for ordinal variables is recommended. Additionally, the authors should report model fit indices more comprehensively, including confidence intervals for RMSEA, as well as standardized factor loadings for all items. This information is fundamental for evaluating the robustness of the proposed factor structure and the psychometric quality of the instrument.

Response:

Thank you for this important methodological observation. We revised the Data Analysis Procedures section to more clearly justify the estimation method used in the CFA models. Specifically, we now clarify that the LGBT-MIS items were ordinal, but that robust maximum likelihood estimation with Satorra–Bentler corrections was used as a pragmatic approach for this initial validation study, given the 6-point response format and the need to obtain robust model-based estimates under non-normality. We supported this decision with methodological literature indicating that variables with five or more ordered response categories can often be treated as approximately continuous in SEM/CFA under certain conditions, and that robust maximum likelihood may perform adequately in several ordinal-data scenarios involving six response categories and moderate sample sizes. We also clarified the fit indices used for model evaluation and confirmed that standardized factor loadings for the final model are reported in Table 3. Because the robust Satorra–Bentler-corrected RMSEA in our software output is reported as a point estimate without a corresponding adjusted confidence interval, we revised the manuscript to report RMSEA consistently as a robust point estimate.

Comment 4

The study presents initial evidence of validity based on internal structure; however, the analysis could be strengthened by incorporating additional sources of validity evidence. In particular, the authors should examine convergent and discriminant validity through correlations with related constructs, such as minority stress, psychological well-being, or moral injury. Furthermore, they may consider evaluating validity based on relationships with relevant external variables, which would allow assessment of whether the scale behaves in accordance with theoretical expectations. Including such evidence would substantially strengthen the psychometric argument of the study.

Response:

Thank you for this valuable recommendation. We agree that additional sources of validity evidence would further strengthen the psychometric argument for the LGBT-MIS. In the present study, the available external criteria were PTSD symptom severity and Negative Religious Coping, which were selected because of their strong theoretical relevance to moral injury in LGBTQ+ populations. We revised the manuscript to more clearly frame these associations as initial convergent validity evidence rather than as a comprehensive test of the construct's broader nomological network. We also expanded the Discussion and limitations/future directions sections to note that future studies should examine associations with additional constructs, such as minority stress, internalized stigma, psychological well-being, and other moral injury measures.

Comment 5

The manuscript reports indicators of internal consistency, which represent an important first step in the psychometric evaluation of the instrument. However, this information should be complemented with additional reliability indices, such as composite reliability derived from the factor model or hierarchical omega coefficients, when appropriate.

Response:

Thank you for this helpful recommendation. In response, we complemented the internal consistency evidence with composite reliability (CR) coefficients derived from the final factor model. These coefficients were satisfactory across the five dimensions and are now reported in the manuscript as additional model-based evidence of score reliability. We also clarified that hierarchical omega was not estimated because the present analyses did not specify a higher-order or bifactor structure.

Comment 6

The Discussion provides a general interpretation of the findings; however, it would benefit from a more critical reflection on the study's methodological limitations. In particular, the authors should discuss the implications of the

sample size, the representativeness of the sample, and the preliminary nature of the validation process. It should also be emphasized that the findings provide initial evidence of validity and that future studies should replicate the factor structure in independent samples and across diverse cultural contexts. Finally, the authors could outline potential clinical and research applications of the scale, as well as its contribution to the study of mental health in LGBT populations.

Response:

Thank you for this thoughtful recommendation. We revised the Discussion to more explicitly emphasize the preliminary nature of the present validation effort and the methodological limitations associated with the sample and design. Specifically, we clarified that the findings should be interpreted as initial evidence of validity rather than as definitive confirmation of the scale's psychometric properties. We also expanded the limitations section to note that the sample was non-probabilistic and restricted to Puerto Rico, and that the generalizability of the factor structure to other LGBTQ+ populations and cultural contexts remains to be established. In addition, we note the need for replication in independent samples, further invariance testing, and broader external validation. The manuscript already included, and now more clearly emphasizes, the potential clinical and research applications of the LGBT-MIS in the assessment of moral injury and mental health in LGBTQ+ populations.

We again thank the Editor and the Reviewers for their thoughtful and constructive feedback. We believe that the revisions have substantially strengthened the manuscript, and we hope that the revised version is now suitable for consideration in *Interacciones*.

Sincerely,

Juan Aníbal González-Rivera

Adam Rosario-Rodríguez