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Explainable Boosting Machine Prediction of Emotional Numbness from Trauma Exposure, Dissociation, and Alexithymia

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1. Round 1

1.1. Reviewer 1

Reviewer:

In the Introduction paragraph beginning “Trauma exposure is one of the most important antecedents of emotional numbness,” the manuscript appropriately frames trauma as a distal risk factor, but the causal language should be moderated. Phrases such as “trauma may impair positive affective engagement” and “trauma can alter the way individuals interact with positive stimuli” are theoretically defensible, but in the context of the present cross-sectional design, the authors should consistently use associational language when linking this literature to the current study. This will prevent overextension from prior mechanistic studies to the present predictive model.

In the Methods section, the phrase “Participants were recruited through online research panels, university announcement systems, community mental health networks, and social media advertisements” is too broad for replication. The authors should specify whether recruitment sources differed in eligibility criteria, compensation, demographic composition, or trauma exposure characteristics. If multiple recruitment channels were used, the manuscript should report whether source of

recruitment was recorded and whether participants recruited from clinical or community channels differed meaningfully on emotional numbness, dissociation, or alexithymia.

The Methods section states that "all respondents received information about the purpose of the study, voluntary participation, anonymity, confidentiality, and their right to withdraw." This is appropriate, but the manuscript should include a formal ethics approval statement, including the name of the institutional review board or ethics committee and the approval code if available. Because the study involves trauma exposure, dissociation, and emotional numbness, the ethical procedures should also describe risk management, debriefing, crisis-resource presentation, and procedures for participants who experienced distress during questionnaire completion.

In the Data Collection Tools section, the description of the demographic form states that it included "history of psychological treatment" and "history of psychiatric medication use." The authors should clarify whether these variables were used only descriptively or were considered potential covariates. Given that treatment history and medication use may affect emotional numbness, dissociation, and alexithymia, the decision not to include them in the predictive model requires justification. At minimum, the authors should report whether sensitivity analyses were performed with these variables included.

Authors revised and uploaded the document.

1.2. Reviewer 2

Reviewer:

The Introduction paragraph discussing emotional differentiation and emotional clarity is relevant, but the transition from trauma-related emotional clarity to the specific outcome of emotional numbness should be strengthened. The manuscript states that "poorly differentiated affective states may be experienced as diffuse, overwhelming, and difficult to regulate," yet it does not fully explain why poor differentiation would result specifically in emotional blunting rather than emotional intensification. The authors should add a bridging explanation that emotional numbness may represent a defensive or secondary outcome when undifferentiated affect becomes persistently overwhelming or inaccessible.

In the Introduction paragraph beginning "Dissociation is one of the most theoretically and clinically relevant mechanisms," the discussion is well aligned with the study variables; however, the manuscript should clarify whether dissociation is conceptualized as a predictor, mediator, moderator, or psychological mechanism. The current study models dissociation as a predictor in an EBM regression framework, but several sentences imply mediation or mechanism. The authors should revise the wording to state that the study evaluates the predictive contribution of dissociation, while theoretical interpretation may suggest a mechanistic pathway that requires longitudinal confirmation.

The paragraph beginning "Alexithymia is another central construct in understanding emotional numbness" is conceptually important, but the manuscript should more carefully distinguish alexithymia from emotional numbness. The sentence "these two constructs may overlap clinically" is useful, yet the authors should explicitly state how the selected emotional numbness instrument avoids redundancy with alexithymia items. This is particularly important because both constructs involve reduced access to emotional experience, and shared item content could inflate correlations and predictor importance in the machine learning model.

In the Introduction paragraph beginning "Recent studies increasingly show that alexithymia is not a peripheral symptom," the literature synthesis is extensive, but the paragraph would benefit from a more explicit rationale for including alexithymia together with dissociation. Several cited studies address alexithymia in different clinical contexts, but the manuscript should more clearly articulate why alexithymia is expected to interact with dissociation in predicting emotional numbness. A concise theoretical statement that dissociation reduces integration of emotional experience while alexithymia reduces conscious identification and verbal representation would sharpen the hypothesis.

In the final Introduction paragraph, the sentence "traditional linear models may not fully capture the structure of risk" provides a useful justification for EBM, but the manuscript should provide a stronger methodological rationale for choosing EBM specifically rather than other interpretable machine learning methods. The authors should briefly explain why EBM is

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suitable for small-to-moderate psychological datasets, how it preserves interpretability through additive shape functions, and why this is preferable to black-box algorithms when the clinical goal is explanation as well as prediction.

In the Methods section under Study Design and Participants, the sentence “The final analytic sample consisted of 426 Canadian adults aged 18 to 65 years” should be accompanied by more detailed information about recruitment flow. The authors should report how many individuals initially accessed the survey, how many were excluded for incomplete data, failed attention checks, ineligible trauma exposure, duplicate entries, or implausible completion time, and how the final sample of 426 was obtained. A participant flow description would strengthen transparency and reproducibility.

Authors revised and uploaded the document.

2. Revised

Editor’s decision after revisions: Accepted.
Editor in Chief’s decision: Accepted.

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