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A Deep Neural Network Analysis of Youth Psychological Distress Based on Cybervictimization, Loneliness, Academic Pressure, Screen-Time Fragmentation, and Family Emotional Climate

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1. Round 1

1.1. Reviewer 1

Reviewer:

The sentence “Recent evidence suggests that symptoms such as anxiety, emotional exhaustion, depressive mood, social withdrawal, irritability, hopelessness, and cognitive dysregulation have significantly increased among adolescents during the last decade” requires stronger epidemiological support and operational clarification. The authors should specify whether “psychological distress” is conceptualized as a transdiagnostic construct, a general psychopathology factor, or a symptom cluster. Additionally, prevalence data from Georgia or comparable regional contexts should be included because the current introduction relies almost entirely on global literature without contextualizing the local significance of the problem.

The paragraph discussing cybervictimization extensively reviews prior literature; however, the manuscript fails to distinguish between cybervictimization frequency, severity, duration, and platform-specific experiences. Since digital aggression differs substantially across gaming platforms, messaging applications, and social media ecosystems, the authors should clarify whether the utilized instrument captures generalized exposure or differentiated forms of online victimization. This issue is particularly important because different cybervictimization modalities may have distinct predictive relationships with distress outcomes.

The "Measures" section requires stronger psychometric reporting. For example, the paragraph describing the Kessler Psychological Distress Scale states that previous studies confirmed "high internal consistency and construct validity," yet the manuscript does not report Cronbach's alpha, McDonald's omega, confirmatory factor analysis indices, or measurement invariance for the present sample. Given the cultural adaptation to Georgian youth populations, psychometric validation within the current dataset is necessary rather than reliance on previous international studies.

The use of the "researcher-adapted version of the Digital Media Multitasking and Fragmentation Index" constitutes a major methodological weakness. The manuscript states that the instrument "underwent preliminary pilot validation," but no evidence is provided regarding factor structure, convergent validity, discriminant validity, item examples, or adaptation procedures. Because this variable plays a central role in the predictive model, insufficient validation substantially threatens construct validity and interpretability of findings.

Authors uploaded the revised manuscript.

1.2. Reviewer 2

Reviewer:

The discussion of loneliness in the paragraph beginning "Loneliness represents another critical psychological construct strongly associated with youth mental health difficulties" would benefit from greater conceptual precision. The manuscript treats loneliness as a unidimensional construct despite substantial literature differentiating emotional loneliness, social loneliness, and existential loneliness. The authors should clarify which dimension is most theoretically relevant to the present study and whether the UCLA Loneliness Scale was analyzed globally or by subdimensions.

The construct "screen-time fragmentation" is introduced as a central predictor, yet its conceptualization remains insufficiently rigorous throughout the manuscript. The sentence "Screen-time fragmentation refers to repeated shifts between digital tasks, rapid switching across applications, interrupted online engagement cycles, and highly fragmented attentional patterns during media consumption" appears theoretically plausible but operationally vague. The authors should provide a clearer distinction between fragmentation, multitasking, compulsive checking behavior, and overall screen exposure. At present, the construct risks conceptual overlap with digital addiction and attentional dysregulation.

The rationale for applying deep neural networks is underdeveloped in the paragraph beginning "Although previous studies have significantly advanced understanding of youth psychological distress." The authors repeatedly argue that traditional regression approaches cannot capture nonlinear interactions, yet no empirical demonstration is provided to justify why nonlinear modeling is necessary for the current dataset. The manuscript would be substantially strengthened if the authors explicitly identified hypothesized nonlinear relationships or interaction effects before model implementation rather than retrospectively asserting methodological superiority.

The statement "The statistical population consisted of adolescents and emerging adults aged 16 to 24 years enrolled in secondary schools and universities in Georgia during the 2025–2026 academic year" raises developmental concerns because adolescents and emerging adults differ substantially in emotional regulation, academic stress exposure, social identity formation, and digital behavior patterns. The authors should justify combining these age groups into a single predictive model and ideally conduct subgroup analyses comparing adolescents versus university-aged participants.

The sampling strategy described in the sentence "Using multistage cluster sampling, 842 participants were initially recruited" lacks sufficient methodological detail. The manuscript does not explain how institutions were selected, whether sampling weights were applied, how cluster effects were controlled statistically, or whether recruitment proportions differed between urban regions. Because machine learning performance can be biased by uneven sampling distributions, greater transparency regarding recruitment procedures is essential.

The description of participant exclusion criteria is insufficiently rigorous. The sentence "Participants with incomplete responses exceeding 10% of questionnaire items or with response patterns indicative of random answering were excluded" requires operational clarification. The authors should explain how random responding was detected, whether attention checks

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were used, and how many participants were removed for each specific reason. Reporting only the final retained sample reduces methodological transparency.

Authors uploaded the revised manuscript.

2. Revised

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

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