

Predicting Emotional Dysregulation Using Machine Learning: The Role of Digital Rumination, Sleep Variability, Cognitive Load Reactivity, and Social Micro-Withdrawal

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1. Round 1

1.1. Reviewer 1

Reviewer:

In the Introduction (second paragraph), the sentence “Digital rumination...extends traditional models of rumination into digitally mediated contexts” introduces a novel construct but does not sufficiently operationalize its distinction from classical rumination. Please clarify whether this construct is trait-like, state-like, or context-dependent to enhance construct validity .

In the Methods – Measures section, the statement “a newly developed scale capturing repetitive negative thinking triggered by online interactions” raises concerns about psychometric rigor. Please report reliability indices (e.g., Cronbach’s α) and validation procedures for this new instrument .

In the Methods – Measures, the operationalization of cognitive load reactivity via “a laboratory-based dual-task paradigm and self-reported perceived mental effort” lacks detail regarding task design and standardization. Specify task parameters to ensure reproducibility .

In the Methods – Data Analysis, the phrase “missing value imputation using multiple imputation techniques” is insufficiently precise. Please indicate the specific algorithm (e.g., MICE) and number of imputations performed .

In the Methods – Data Analysis, the description of the 70-15-15 split does not mention whether stratification or temporal ordering was preserved. Given EMA data, temporal leakage is a potential concern that must be addressed .

In the Results (first paragraph), the statement “emotional dysregulation scores were normally distributed” requires supporting statistics (e.g., skewness, kurtosis, Shapiro–Wilk test). This is particularly important given the use of ML models .

Authors revised and uploaded the document.

1.2. Reviewer 2

Reviewer:

In the Introduction (third paragraph), the discussion of sleep variability would benefit from methodological precision. The phrase “fluctuations in sleep timing and quality” should be linked to specific metrics (e.g., standard deviation of sleep onset latency, WASO) to align with the later actigraphy-based measurement approach .

In the Introduction (fourth paragraph), the construct of “cognitive load reactivity” is introduced without a clear theoretical lineage. Please specify whether it derives from cognitive load theory, attentional control theory, or stress reactivity frameworks, as this ambiguity weakens conceptual coherence .

In the Introduction (fifth paragraph), the definition of social micro-withdrawal (“small-scale, often transient reductions in social engagement”) is conceptually interesting but lacks boundary conditions. Please clarify how it differs empirically from constructs such as social avoidance or passive disengagement .

In the Introduction (sixth paragraph), the sentence “Recent developments in machine learning offer promising avenues” is overly generic. It would strengthen the manuscript to briefly compare ML approaches with traditional SEM or regression to justify methodological selection .

In the Methods – Study Design and Participants, the sampling strategy is described as “stratified random sampling from universities and urban community networks,” yet no strata are specified. Please detail stratification variables (e.g., gender, academic level) to support claims of representativeness .

In the Methods – Participants paragraph, the exclusion criterion “no current diagnosis of severe psychiatric disorders” requires clarification regarding assessment method (self-report vs. clinical screening). This affects internal validity and sample characterization .

Authors revised and uploaded the document.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.