A Super Cool Study - Take 2

John J. Curtin[aff-1]

[aff-1]Department of Psychology, University of Wisconsin-Madison

Author note

Correspondence concerning this article should be addressed to .

Abstract

Preliminary analyses of machine learning models that leverage ecological momentary assessments (EMA; 4x daily for three months) to predict future alcohol lapses among individuals in recovery for alcohol use disorder have demonstrated excellent performance overall, with areas under the receiver operating curves (auROCs) > .90 (Wyant et al, 2023). These models were trained and evaluated with 151 participants who were diverse with respect to sex (51% male), age (range=21-72), and income (range=0-200,000), but not race/ethnicity (87% White; 97% Non-Hispanic). Before implementing these models clinically, careful analyses of model performance in sub-groups that have been historically marginalized/under-served are necessary to avoid potentially exacerbating existing mental health disparities. The current study evaluated demographic subgroup heterogeneity in these models that predict future lapses with high temporal precision ranging from the next week to the next hour. Subgroup analyses were conducted using different performance metrics from 3 repeats of 10-fold nested, grouped, cross validation. We used Bayesian generalized mixed effect models to estimate and compare posterior probability distributions and 95% Bayesian confidence intervals (CIs) for auROCs, auPRs, specificities, sensitivities and ppvs of the models by race/ethnicity, sex, income, and age. Substantially poorer model performance was observed for participants of color, who were underrepresented in the training data. Clinically important reductions in model performance were also observed for women, individuals with lower income and people aged 55 and higher, despite adequate sample diversity on these characteristics. Potential implications of these algorithmic

biases on mental health disparities and possible solutions to mitigate these problems in future real-world applications are discussed.

Keywords: Substance use disordersPrecision mental health

Bibliography