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July 12, 2025

Jennifer E. Merrill, PhD
Associate Editor, *Psychology of Addictive Behaviors*

Dear Dr. Merrill:

Thank you for the opportunity to revise and resubmit our manuscript, **Common and Unique Latent Transition Analysis (CULTA) as a Way to Examine the Trait-State Dynamics of Alcohol Intoxication**, for consideration in *Psychology of Addictive Behaviors*. We greatly appreciate your thoughtful editorial guidance and the reviewers' detailed feedback, which helped us clarify key concepts, improve transparency, and strengthen the methodological contribution of the manuscript.

This revision presents CULTA, a novel statistical framework that combines the Common and Unique Trait-State (CUTS) model with Latent Transition Analysis (LTA) to examine both stable (trait-like) and fluctuating (state-like) components of alcohol intoxication. Using transdermal alcohol concentration (TAC) data collected from young adults over six consecutive days, we identified two latent intoxication profiles: *chronic HED*, reflecting persistently elevated intoxication, and *inertia driven drinking*, characterized by episodic intoxication with autoregressive carryover. We modeled transitions between these profiles and tested how they are shaped by baseline alcohol use risk, as indexed by AUDIT scores.

In response to reviewer concerns, we made several substantive revisions:

- Clarified the distinction between day-level (state) and person-level (trait) variability, and how these relate to profile definitions.
- Renamed latent profiles to better reflect observed intoxication patterns and avoid interpretive ambiguity.
- Added formal equations for the CULTA model, including measurement, dynamic, and transition components.
- Tempered all conclusions to reflect the six-day observation window and emphasized the short-term scope of transitions.
- Expanded discussion of sensor validity, generalizability across populations, and the conceptual meaning of profile-specific means.
- Conducted a Monte Carlo simulation study to assess parameter recovery, convergence, and effective sample size—supporting the feasibility of the CULTA model given our data.

We believe the revised manuscript now more clearly articulates how CULTA advances existing modeling approaches by decomposing shared and unique intoxication dynamics, introducing autoregressive structure, and explicitly capturing transitions between profiles. These features may be particularly relevant for prevention science, early screening, and intervention development in young adult populations.

The data reported in this manuscript were previously used in Russell et al. (2025) and Richards et al. (2025). Russell et al. (2025) used multilevel latent profile analysis (MLPA) to identify day-level intoxication profiles based on transdermal alcohol concentration (TAC) features (peak, rise rate, fall rate, and duration) and tested their associations with drinking behaviors, contexts, and AUDIT scores. Richards et al. (2025) extended the MLPA framework to predict the co-occurrence of negative and positive alcohol-related consequences from these profiles. The present manuscript introduces a novel statistical framework—Common and Unique Latent Transition Analysis (CULTA)—to model both between- and within-person trait- and state-level TAC dynamics and their transitions across days. Unlike prior studies, we model autoregressive inertia, separate common vs. unique variance components, and examine transitions across latent intoxication profiles over time. Thus, the present manuscript addresses different research questions and employs a distinct analytic approach.

This manuscript has not been published elsewhere and is not under consideration by any other journal. All authors have approved the final version and consent to its submission to *Psychology of Addictive Behaviors*.

Thank you for your time and consideration. We look forward to your feedback.

Sincerely,

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