

Using ecological momentary assessment to examine social and environmental contextual factors on alcohol use

Chair: Megan Strowger

Chair's email: mstrowge@buffalo.edu

Authors: [Megan Strowger](#)¹, [Kristin Naragon-Gainey](#)², [Dan Anderson-Luxford](#)^{3,4}, [Benjamin Riordan](#)³, Emalee Kerr¹, Clara Roth¹, Juliette Bichon¹, Matthew J. Perry¹, Jennifer P. Read¹, Cassandra Wright^{3,5,6}, Megan Cook³, Sandra Kuntsche⁷, Emmanuel Kuntsche³, Jack Delmenico³, Samantha Salim³, Moheb Sherbaz³, Taylor Winter⁸, Rose Marie Ward¹⁰, Zhen He⁹, Jennifer E. Merrill¹¹, Erin Santamaria³, Kaitlyn M. Biehler¹², Wei Liu¹³, Jared Aldstadt¹⁴, Erim Buyuk¹, & Craig Colder¹

¹*Department of Psychology, University at Buffalo, The State University of New York, Buffalo, New York, United States of America*

²*School of Psychological Science, University of Western Australia, Perth, Western Territory, Australia*

³*Centre for Alcohol Policy Research, La Trobe University, Melbourne, Victoria, Australia*

⁴*Melbourne Law School, The University of Melbourne, Melbourne, Victoria, Australia*

⁵*Menzies School of Health Research, Charles Darwin University, Darwin, Northern Territory, Australia*

⁶*Burnet Institute, Melbourne, Victoria, Australia*

⁷*The Bouverie Centre, La Trobe University, Melbourne, Victoria, Australia*

⁸*Department of Maths and Statistics, University of Canterbury, Christchurch, Aotearoa New Zealand*

⁹*Computer Science and Information Technology, La Trobe University, Melbourne, Victoria, Australia*

¹⁰*Northwest Missouri State, Maryville, Missouri, United States of America*

¹¹*Center for Alcohol and Addiction Studies, Brown University, Providence, Rhode Island, United States of America*

¹²*U.S. Department of Veterans Affairs, Pittsburgh, Pennsylvania, United States of America*

¹³*Department of City Planning at the City of Atlanta, Atlanta, Georgia, United States of America*

¹⁴*Department of Geography, University at Buffalo, The State University of New York, Buffalo, New York, United States of America*

Presenter's emails: mstrowge@buffalo.edu, kristin.gainey@uwa.edu.au, d.anderson-luxford@latrobe.edu.au, B.Riordan@latrobe.edu.au

Aim: Social and environmental factors serve as alcohol cues that exert powerful effects on personal cravings for alcohol as well as drinking behaviour. However, to date many studies have only broadly assessed these factors, only assessed them via self-report measures, failed to account for exposure alcohol cues from new media sources such as social media, or only measured them at one timepoint. It is important to understand in a nuanced manner the relative effects of different cues on drinking outcomes to develop interventions that are tailored to individual risk patterns. The primary aim of this symposium is to highlight how ecological momentary assessment methods (i.e., multiple surveys per day) can be used to better understand the impact of social and environmental factors on alcohol outcomes. We will report on findings from three separate projects that examined exposure to alcohol cues (e.g., people drinking, media) using ecological momentary assessment and passive mobile sensing methods (e.g., geospatial, weather).

Disclosure of Interest Statement:

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PRESENTATION 1: Beyond Cue Exposure: Examining Event-level Interactions Between Cues, Alcohol Availability, and Alcohol Use Outcomes

Presenting Authors:

Megan Strowger

Background: Laboratory studies establish robust links between alcohol cues and craving, yet real-world dynamics and contexts remain underexamined. Ecological momentary assessment (EMA) research often aggregates cues, overlooking how specific cue types interact, either reinforcing or overshadowing one another, or how alcohol availability moderates their impact. This study evaluated how specific cues, cue-to-cue interactions, and availability are associated with event-level alcohol outcomes.

Method: Community-residing adults ($N=178$; $M_{age}=29.89$; 55.1% female) completed a 14-day EMA (6 surveys/day) assessing exposure to nine social/environmental cues, alcohol availability, and drinking outcomes (urges, seeking, quantity). Within-and between-person associations were examined with multilevel models.

Results: Most participants reported daily cue exposure, including people drinking (social; 92%), places with drinking (environmental; 95%), physical (bottles/glassware; 89%), and symbolic cues (advertisements/media; 59%). Within-person main effects showed that social, environmental, and physical cues were associated with all outcomes ($ps < .001$), while symbolic cues were associated with urges and seeking ($ps < .05$). In within-person interactions, social drinking context was a dual moderator, blunting the association between advertisements and seeking ($p=.020$) but amplifying the effect of environmental drinking contexts on quantity ($p=.012$). Alcohol availability strengthened the associations between social, physical, and environmental cues and all outcomes ($ps < .05$), while overshadowing the associations between symbolic cues, urges ($p=.021$), and seeking ($p=.023$).

Discussions and Conclusions: Alcohol risk in daily life is driven by specific cue combinations and availability. Although social and environmental contexts are associated with greater consumption, symbolic cue effects may be overshadowed by more immediate social contexts and alcohol availability.

Implications on communities, practice, policy and/or First Nations communities:

Interventions should empower individuals to identify how converging cue combinations and alcohol availability affect their daily alcohol outcomes. Policy efforts targeting alcohol advertising may be most effective in non-drinking contexts, where symbolic cues exert their strongest influence before being overshadowed by physical drinking environments.

PRESENTATION 2: Geospatial Characterization of Alcohol Cues and Affective Drinking Risk in Daily Life: Feasibility and Intervention Implications

Presenting Authors:

Kristin Gainey

Background: Treatment barriers for harmful drinking may be reduced with mobile interventions, which provide scalable, real-time support when needed (i.e., during increased negative affect, presence of alcohol cues). The present study investigates a proof-of-concept geospatial tracking (for drinking cues) and ecological momentary assessment (EMA; for negative affect) application that highlights patterns of real-time drinking risk.

Method: Participants were 183 community members who drink alcohol at least twice/week aged 21-55 ($n=101$, 44.5% women, mean age=29.9). All participants participated in a baseline assessment (including an assessment of frequent drinking locations), followed by a 14-day EMA protocol (up to 7 reports per day, including participant-initiated reports following a strong emotion). EMA reports assessed current affect, emotion regulation, and drinking outcomes, with continuous GPS assessment. A subset of participants also completed a post-EMA feedback session and post-feedback follow-up visit. Mixed methods were used to examine feasibility and acceptability of the protocol.

Results: Compliance with the EMA protocol was good, with an average of 4.5 reports daily (out of 4-6 expected). Ratings of ease of use of the app were high ($>8/10$ on average), and participants were comfortable with GPS tracking (6.95/10 on average), with minimal impact on battery life/phone function. Qualitative analyses indicated that receiving personalized feedback from app data was associated with new insights into drinking patterns and prompted positive behavioral changes, consistent with quantitative analyses of drinking behaviors post-feedback.

Discussions and Conclusions: Our findings offer preliminary support for both EMA and geospatial tracking as a way of gathering high resolution information about daily drinking patterns within the context of daily spatial movements, with good feasibility, acceptability, and engagement.

Implications on communities, practice, policy and/or First Nations communities:

Though further study is needed, our findings suggest that personalized feedback from daily life environments and experiences may have promise for integration into existing interventions, such as motivational interventions.

PRESENTATION 3: “When it rains, it pours?” An Examination of the Impact of Weather on Women’s Alcohol Use in Australia

Presenting Authors:

Dan Anderson-Luxford

Background: Climate change is rapidly altering weather patterns yet impacts of weather on alcohol use remains poorly understood. This study examines how daily-, monthly- and climate-level differences in temperature and rainfall impact on the probability of drinking and the amount of alcohol consumed on drinking days.

Method: 35,868 daily alcohol use reports were obtained from weekly-administered ecological momentary assessment surveys of 349 women in Australia (mean age = 45.3) between May 2020 and February 2021. Daily temperature and rainfall were derived from postcode-level interpolated estimates and were decomposed into person-month mean centred daily-, monthly-, and person-level estimates. Multilevel hurdle models estimated associations with drinking likelihood and quantity, adjusting for age, baseline drinks consumed, day and COVID-19 restrictions.

Results: Hotter-than-usual days were associated with an increased rate of drinking (+5% per 3.2°C; IRR = 0.95) but did not affect the amount consumed. There was no evidence of seasonal (within-person monthly) effects. Between-person analyses indicated that individuals in warmer climates consumed less per occasion (-7% per 3.4°C; IRR = 0.93), while higher average rainfall was associated with an increased likelihood of drinking (+17% per 0.93; IRR = 0.83).

Discussions and Conclusions: Temperature influenced daily drinking likelihood but not quantity consumed. No within-person seasonal effects were observed. Climate differences were evident, with lower consumption in warmer climates and higher drinking likelihood in higher rainfall areas.

Implications on communities, practice, policy and/or First Nations communities: This study provides a first glimpse into how EMA can be combined with postcode-level meteorological data to better understand the environmental drivers of alcohol use. The findings also show that as global temperatures rise and climatic conditions become more variable, it is important to attend to the broader health impacts of climate change.

PRESENTATION 4: Social Media and Alcohol Use: Do Young People Drink More on Days When They Use More Social Media?

Presenting Authors:

Benjamin Riordan

Background: Australia recently banned social media for those under 16 partially to protect them from exposure to adult-related content (like alcohol use). This is based on evidence reporting a link between time spent on social media and alcohol use. Most studies, however, have used self-reported time on social media, which is extremely inaccurate. We aimed to use objective measures of social media use to determine whether there was a relationship between daily time on social media and alcohol use.

Method: We tracked 218 18-29-year-olds over 28-days using ecological momentary assessment. Every morning, participants reported their alcohol use from the night before and uploaded a screenshot of their previous day's phone screentime. To estimate time on social media, we extracted the text from the screenshots and summed their time on social media apps.

Results: Participants spent a mean of 205 minutes on social media per day and had 4.25 drinks per drinking day. Using zero-inflated negative binomial regression, we found that participants did not drink more on days when they used more social media, but that they were *less* likely to drink any alcohol (OR = 1.17, $p < 0.001$). We tested multiple lags (i.e., predicting alcohol from yesterday's social media use) and still found no association.

Discussions and Conclusions: Based on objective measures, the findings contradict previous evidence that used on self-report. Time on social media alone may be less important than the amount of alcohol people see and future research should aim to estimate alcohol exposure objectively.

Implications on communities, practice, policy and/or First Nations communities: Social media bans are predominantly informed by research using self-report, which is inaccurate. We provide a protocol that other researchers can use to assess the impact of social media on wellbeing more accurately.

Discussion Section:

An in-depth discussion of when, how, and why ecological momentary assessment and passive mobile sensing methods should be used to study social and environmental influences on individual craving and drinking behaviour. Further, how these data can be used to deliver interventions in the moment when individuals are at their highest risk for drinking will be discussed. Likewise, how this rich and complex data is managed and analysed using multilevel modelling will be discussed. Attendees will come away from this symposium with an understanding of how mobile technology can be leveraged to reduce drinking risk at the individual level.

Discussant: Emmanuel Kuntsche

Discussant's email: e.kuntsche@latrobe.edu.au