Testing a Smartphone Breathalyzer and BAC Estimator in Young Adult Heavy Drinkers, National Institutes of Health/National Institute on Alcohol Abuse and Alcoholism, R21AA023368 (R. F. Leeman, PI), $262,500 direct costs (372,487 total costs), 02/01/2016 – 01/31/2018.

Protective behavioral strategies (PBS) are techniques used to limit alcohol use and/or curtail related negative consequences. While PBS use is generally associated with more moderate drinking, some strategies may have stronger protective effects than others. These findings along with mixed results from studies of PBS-focused interventions suggest there may be limitations in the ways counselors have taught PBS and/or ways young adults implement them. Limited use of concrete tools to facilitate PBS use may be one such limitation.

Technology-based tools (TBTs) have 2 advantages for PBS use: 1) young adults are interested in technology for health purposes; 2) they are skilled at technology use. Smartphone applications (apps) are promising but under-researched. Apps that facilitate lowering of blood alcohol content (BAC) would be particularly valuable.

We will compare 2 BAC monitoring apps with a phone-based drink counting control condition as adjuncts to BAC-focused counseling for efficacy in reducing alcohol self-administration. One app is a breathalyzer that produces accurate readings using a device that snaps onto a smartphone. A second app yields BAC estimates based on sex, weight, time elapsed and number of drinks. While the breathalyzer app provides high accuracy, some young adults could be self-conscious about blowing into a device. Between-subjects, we will randomize heavy drinking young adults ($N = 99$) to brief counseling plus 1 of 3 TBTs (breathalyzer, BAC estimator, control condition), which they will use during a 3-hour laboratory alcohol self-administration period. Pay reductions based on poor performance on cognitive/psychomotor tasks sensitive to alcohol effects provide a disincentive for excessive drinking during the drinking session. Participants may avoid pay reductions with help of a TBT.

Peak estimated BAC and number of drinks consumed during the 3 hours will be the primary outcomes. After the drinking session, participants will be given all 3 TBTs to use on their own in the field for 2 weeks to assess alcohol drinking while each TBT is used; preference for and acceptability of each TBT as exploratory aims.

Laboratory alcohol self-administration paradigms, while used often to test medications, have been under-utilized in testing behavioral interventions. Lab paradigms offer advantages in the study of PBS, including direct measurement of PBS use and its relation to alcohol consumption with reduced emphasis on self-report.

We hypothesize that participants randomized to either BAC-related app condition will administer significantly fewer beers and reach lower peak estimated BAC in an alcohol drinking session, compared to a drink counting control condition. We will also compare the 3 TBTs on participants’ ratings of acceptability and likelihood of future use between-subjects, based on their experiences during the session and within-subjects, based on their experiences during the 2-week field use period. We will also test for interactions by sex for all outcomes.

BAC-related apps could lead to large decreases in drinking with minimal effort. Potential public health impact is substantial due to prevalence of alcohol use disorders and infrequent treatment seeking in this population.