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Driving Decisions when Leaving Electronic Music Dance Events: Driver, Passenger, and Group Effects

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Abstract

Objectives—The goal of this paper was to identify characteristics of drivers and passengers that predicted peer-groups whose drivers exit dance clubs with alcohol levels indicative of impairment (BAC ≥ .05 grams per deciliter ([g/dL]).

Methods—We used the portal survey methodology to randomly sample groups of EMDE patrons as they entered and exited a club. From May through November 2010, data were collected from 38 EMDEs hosted by 8 clubs in the San Francisco Bay area. Data included in these analyses are results from breath samples for measuring blood alcohol concentration (BAC) and self-report data on demographics, recent drinking history drinking, drinking intentions, travel to and from the clubs, and the familiarity/experience with other group members. These data were collected from a subset of 175 drivers and 272 passengers.

Results—Although drivers drank less than passengers, one driver in five groups had a BAC indicative of elevated crash risk (BAC ≥ .05 g/dL). Groups of drivers and/or passengers with a recent history of binge drinking were more likely to have drivers with BACs ≥ .05 g/dL. One unanticipated finding was that drivers who knew more group members relatively well were more likely to exit the club with a BAC ≥ .05 g/dL. Additionally, we found that groups with all female passengers were at greater risk for having a driver whose BAC was ≥ .05 g/dL.

Conclusions—Some group characteristics predicted drivers who exit clubs with BACs ≥ .05 g/dL. One intervention strategy to promote safety might be to encourage group members to reconsider who is sober enough to drive away from the club; for some groups, a change of drivers would be a safer choice, as a passenger may have a relatively safe BAC. Groups of females appear to have a particularly elevated risk of having a driver whose BAC exceeds .05 g/dL, and new intervention efforts should be particularly directed to these at-risk groups.

Keywords

Drinking and driving; DWI; driving decisions; drinking groups; riding with a drinking driver

INTRODUCTION

The National Highway Traffic Safety Administration (NHTSA) reported annual averages of more than 13,000 alcohol-related crash fatalities - fatalities in crashes involving a driver

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with a blood alcohol concentration (BAC) of .08 grams per deciliter (g/dL) or higher between 2005 and 2009 (National Center for Statistics and Analysis 2009; NHTSA 2010, 2007). A growing literature, however, has determined that significant driving impairment occurs at lower BACs (e.g., Moskowitz et al. 2000; Zador et al., 2000), and many prevention efforts emphasize avoiding driving after drinking without special mention of the BAC illegal limit.

Efforts to translate the concern with impaired driving into safer personal driving decisions have included campaigns designed to employ peer group members to influence driving-after-drinking decisions, for example, the concept that “Friends don’t let friends drive drunk” and the concept of using a designated driver. Considerable resources were committed to promoting the designated-driver concept in the early 1990s (Winsten 1994) with some success, as indicated by the national telephone surveys conducted by the Roper Organization that reported an increased use of the designated-driver concept by adults, from 27% in 1989 to 35% in 1991 to 53% in 1998 (Roper Organization 1991; Roper Starch Worldwide Inc. 1998). Further, some indicators showed that the concept was being appropriately adopted.

The designated-driver concept, when used properly, should be effective in that it requires drinking groups to decide ahead of time who will stay sober and ensure that all group members get home safely. Unfortunately, the concept often is not executed as intended, and its effectiveness is limited by the willingness of passengers to accept some drinking by the designated drivers and by the failure to designate the driver before drinking begins (Lange et al. 1998).

The significance of planning for the proper execution of designated drivers was demonstrated in a study of high-BAC drivers byMcKnight et al. (1995). These authors found that drinking drivers recognized the risk of driving after consuming alcohol. They would drive to events with the intention of not drinking alcohol so they would be sober when returning home. During the evening, however, these individuals were generally unable to resist the environmental and peer pressure to drink, so they were “forced” to drive home impaired. In another study that focused explicitly on the passengers’ influence on driver behavior, Lange and colleagues (2006b) contacted groups of young adults crossing the border to drink in Mexico and tested several brief interventions designed to reduce the BACs of drivers returning from the cross-border bars. They found that having a passenger read a statement covering the responsibilities of a designated driver resulted in drivers returning with lower BACs. The role of passengers in promoting the use of the designated-driver concept and in facilitating safe driving in general is understudied.

Electronic Music Dance Events

Electronic music dance events (EMDEs) developed as bar and club owners brought rave-like events from underground venues and hosted them in licensed alcohol establishments. Like other nightclub and bar environments, EMDEs offer a good opportunity to study peer-group decisionmaking regarding driving after drinking and riding with a drinking driver because they appeal to young adults who are heavy drinkers and who travel in groups to the drinking events (Miller et al. 2005). Because the attendee groups are generally formed in advance of arriving at the event, there is an opportunity for members to influence who will do the driving. How often this process results in the selection of drivers less likely to be drinking is unknown. In an earlier study of drivers leaving EMDEs, however, Furr-Holden et al. (2006) found that only 36% of the drivers, compared to 56% of the nondrivers, leaving EMDEs had been drinking (had positive BACs), and only 13% of the drivers, compared to 25% of the nondrivers, had illegal BACs ≥ .08 g/dL.

Thus, some evidence indicates that, at least within the context of bar and nightclub attendees, the national concern with impaired driving is influencing driving decisions. In this paper, we further examine the characteristics of both drivers and passengers that predict incidences of risky drinking and driving. Herein, we define a "risky-drinking driver" as one exiting the club with a BAC of .05 g/dL or higher. Although the *nationwide* illegal per se driving limit for people aged 21 and older is .08 g/dL BAC, substantial evidence from both laboratory studies (e.g., Moskowitz et al. 2000; Moskowitz and Fiorentino 2000) and relative crash risk studies (e.g., Zador et al. 2000) demonstrates significant and striking increases in skill impairment and risk of crash involvement at BACs as low as .05 g/dL. Very few countries, in fact, have established *per se* limits higher than .05 g/dL (NHTSA, 2000). We have used a .05 g/dL BAC as an indicator of risky-drinking drivers in prior work (e.g., Johnson and Clapp 2011).

The objective of our research was to identify characteristics that predicted groups containing a drinking driver (i.e., one whose BAC was at or exceeded .05 g/dL) relative to groups where the driver's BAC was lower than .05 g/dL). Given the importance of peers in drinking-and-driving decisions (as articulated by the designated-driver concept), we wanted to examine not only the features of those drivers who left the bars and clubs impaired, but also features of passengers that might be predictive of these drivers. Being able to identify passengers who ride with, and perhaps tolerate, impaired drivers might present opportunities for developing targeted intervention.

METHODS AND PROCEDURES

This research used the portal survey methodology (Voas et al. 2006) that consists of randomly sampling groups of attendees at entry and re-interviewing them upon exit from a drinking environment (e.g., a specific club or bar). We focused on clubs that featured EMDEs in the San Francisco Bay area. From May through November 2010, we collected data from 38 EMDEs hosted by 8 clubs. For clarity, clubs reflect the physical venues, and EMDEs describe the entertainment. EMDEs may be reoccurring, feature a specific disc jockey, or promote a specific theme. In this study, each club hosted between three and six EMDEs at which data were collected.

We approached potential participants as they reached a specified location near the entrance to the club and recruited them by describing the survey and assuring anonymity. Both the entry and the followup exit surveys required approximately 10 to 15 minutes during which the participants responded to the interviewer's questions and filled out brief questionnaires regarding their personal characteristics, their familiarity with group members, their perceptions and concern for safety, their recent history of alcohol and use, and their drinking intentions for the evening. Upon exit from the club, participants also described their experiences that evening. All data collection was anonymous.

In addition to these self-reported measures, participants provided breath samples for alcohol and oral fluid samples for drug and alcohol analyses upon entrance to and exit from the clubs. In this paper, we focus on the alcohol assessments for attendees. A $30 incentive was offered for participation in both elements of the survey. Following the completion of the entry survey, we attached a hospital-style wristband with an identification sequence number to each participant's wrist in order to match the entry and exit data. Wristbands had to be cut or torn to be removed, and thus, they could not be removed and given to another person. A fuller description of this survey procedure is provided byVoas et al. (2006).

Participants

Participants were recruited in natural peer groups because most attendees arrive in groups, and individual group members often are unwilling to stay behind to participate in a survey (see Voas et al. 2006). Street recruitment is difficult, and 40% of the group members approached by our research staff neither stopped nor listened to the recruitment script or message. Of the groups that were verbally informed about the study by the research staff, approximately two-thirds (63%) agreed to participate. Thus, a total of 24% of groups with whom the research staff attempted contact agreed. Groups were not excluded if individual members did not wish to participate, and of the successfully recruited groups, 92.8% of the members participated. The practice of recruiting groups allowed us to examine intragroup characteristics and how these characteristics related to the behaviors of individual group members. By collecting information on whole groups, we ascertained the self-reported driver and passenger status of group members as they entered and exited the clubs.

A total of 1,148 participants from 489 peer groups participated in the research. These analyses, however, involved only a subset of individuals (N=467) from 175 groups who either drove (n=195) or rode in a vehicle with another participant (n=272) to and from the club. Participants who arrived at the clubs via public transportation, taxicab, or walking were not included in these analyses. Twenty groups included more than one driver at exit, which posed an analytic problem. To resolve this problem, we selected only one driver from each of these 20 groups, reducing the final sample to N=447. Wherever possible, we selected the driver with the highest BAC (as that was the focus of our research), but when all the BACs of all drivers in a group were tied (e.g., at 0), we selected drivers randomly.

MEASURES

Biological Measures of Alcohol Consumption

Participants provided breath samples (using calibrated Intoxilyzer® 400 preliminary breath-test instruments) and oral fluid samples (using Quantisal™ saliva collection devices) both at entry to and exit from the EMDEs. Of the 447 drivers and passengers included in the data set, 18 did not provide a valid breath sample at entry, and 14 did not provide a valid sample at exit (typically due to equipment issues or interviewer error). However, each of these participants did provide an oral fluid sample that was assayed for alcohol use. From the subset of cases that included both oral fluid and breath-test results, we used linear regression to ascertain the relationship between oral fluid results and breath tests. This was done separately for entry and exit and included all cases where the oral fluid result was greater than zero (i.e., no evidence of alcohol). At entry, the relationship between oral fluid and breath-test alcohol levels was identified by BAC’ = (.014) + (oral fluid BAC * .582) at entry and BAC’ = (.020) + (oral fluid BAC * .584) at exit. In both cases, the relationships were highly significant and strong (R=.83 and .76, respectively). These regression equations were used to compute estimated BACs from oral fluid results for cases where breath samples were missing (and where oral fluid results were positive). When the breath-based BAC results were missing and the oral fluid test result was zero, we assigned these cases a BAC of zero.

In this research, we established a meaningful BAC cutoff for drivers at .05 g/dL. Although the illegal *per se* DWI BAC limit in the United States is .08 g/dL, evidence strongly suggests the driver’s experience significantly elevated impairment and the risk of a crash at BACs as low as .05 g/dL (e.g., Moskowitz et al. 2000; Moskowitz and Fiorentino 2000; Zador et al. 2000). In fact, some countermeasures that focus too explicitly on the per se limit, rather than on impairment itself, have been found to increase the risk (e.g., Johnson and Voas 2004; Johnson et al. 2008). There are good reasons for examining drinking and driving at levels lower than the illegal limit, as we have done in previous studies (Johnson and Clapp 2011), as such information may inform strategies that target the broader population of impaired drivers.

Self-Report Surveys and Interview

In addition to collecting biological specimens, we interviewed the participants and had them complete a pencil-and-paper questionnaire. Interviews and surveys were administered during both the entry portion and the exit portion of the study. Interviews were used to collect less sensitive information (e.g., demographics, means of transportation), and surveys were used to collect more sensitive information (e.g., self-reported drinking and drug use, experiences while at the club). Generally, the questions were grouped into three broad categories: participant demographics, group familiarity and safety perceptions, and participant's recent drinking history and drinking perceptions.

Demographic and personal characteristics—Participants were asked to provide basic demographic information, including age, sex (male or female), race (White, Black, Asian, and Other), Hispanic ethnicity (yes or no), level of education (no college, some college, college graduate, and at least some graduate school), employment status (full-time, part-time, and unemployed), income category ($0–$20,000, $20,001–$40,000, $40,001–$60,000, $60,001–$80,000, and more than $80,000 annually), sexual orientation (straight or gay/lesbian/bisexual), and relationship status (cohabitating, relationship but not cohabitating, dating but no relationship, and not dating). Additional questions regarded how each participant arrived at the club (e.g., as a driver or as a passenger), and upon exit, how each participant planned to return home. These data were used to determine the driver and passenger status in the sample. Given the sample size of the study, we aggregated some variable categories. Race was re-computed as dichotomous (white versus racial minority), as was education (no college versus some college) and employment (unemployment/part-time versus full-time). Income was aggregated into three response categories (less $20,000, $20,001–$60,000, and more than $60,000).

Group familiarity and safety perception variables—Participants then answered questions about their familiarity with other members of the group and about their safety concerns. Specifically, participants were asked how many group members they knew well (0 to 5+), how many group members they had clubbed with before (0 to 5+), whether someone in the group was responsible for the group's safety (no one or someone), whether they were concerned about their safety (not concerned, a little concerned, moderately concerned, very concerned), and whether they felt that the club they were at was a safe location (very safe, somewhat safe, somewhat unsafe, not safe). The *concerned* variable was dichotomized (not concerned versus at least a little concerned), as was the safe location variable (very safe versus not very safe).

Drinking pattern and drinking perception variables—Participants completed several survey items related to their recent history of alcohol consumption, drinking perceptions, and plans for the evening. Before entering the club, participants indicated how much drinking they expected most of their group members to do (not drinking, drinking but not get buzzed, get buzzed but not drunk, get drunk or very drunk). We have used similar qualitative measures of alcohol consumption in past research (e.g., Johnson and Clapp 2011; Johnson et al. 2008; Lange et al. 2006a, 2006b). Regarding recent drinking history, participants indicated on how many days in the past 30 days they had consumed an alcoholic drink (never, once, 2–4 times per week, 2–3 times per week, and 4+ times per week), the number of alcoholic drinks *typically* consumed in one episode when they did drink (1–2, 3–4, 5–6, and 7+), and how many days in the past 30 (raw score) they had a binge-drinking episode (i.e., 5+ alcoholic drinks for men or 4+ alcoholic drinks for women). Drinking variables were treated as score variables (not categorical) in the analyses.

Driver Variables and Passenger Variables

Our research involved predicting drinking drivers from the characteristics of the passengers who rode with the drivers. This required associating each group's data on passengers' characteristics with the data on the characteristics of the group's driver (including BAC). We accomplished this by computing the passenger means of each group for each demographic, safety perception, and drinking variable, then merging the results into the same data row as the group's driver. When the original variable was dichotomous (e.g., sex, Hispanic ethnicity), it was recoded with 0s and 1s so that the group mean reflected a proportion. For variables that were clearly nominal but with multiple response categories (e.g., race), we dichotomized and computed the proportion. For example, the race variable was changed from a four-level variable to having binomial white (0) or race/ethnicity minority (1) categories. For variables that were ordinal and with multiple response categories (e.g., level of education, income category), we simply computed means of the ordinal score, using the unaggregated version of the variable. For example, the original income variable included five response categories, and the mean of the response scores (1–5) was computed for each group passenger, although for drivers that variable was reduced to three response categories (described previously). Passenger groups with higher means reflected higher levels of that variable (e.g., a group of passengers with higher incomes would have a higher income-score mean than would a group of passengers who earned less).

Analytic Strategy

In the Measures section, we describe nine demographic variables, five group familiarity/safety perception variables, and four drinking-related variables. In addition, we measured whether participants planned to drive or ride home, and their BACs upon entry to and exit from the club. As described previously in the Driver versus Passenger Data section, we averaged the passenger data for each group (although in many groups, there was only one passenger). Thus, for each variable of interest, our data set included a driver score and a passenger (mean) score.

Our sample included 36 groups (20.6%) where the driver had a BAC ≥ .05 g/dL. The dichotomous outcome (whether or not the driver's BAC was .05 g/dL or higher) was regressed onto the predictor variables using *generalized linear mixed model* (GLMM; specifically, with PROC GLIMMIX in SAS). Portal survey data typically are nested (because individual participants are sampled within peer-groups), and our analyses needed to accommodate the lack of independence among observations by modeling peer-group as a random factor. For the research described herein, however, with only one outcome score per group (the BAC category of the group's driver), there was no need to model a random factor. We still used PROC GLIMMIX but did not specify a random effect. With a dichotomous outcome and no random effect, the analysis defaults to multiple logistic regression.

The analyses were conducted separately for *sets* of variables—demographics, familiarity and safety, and drinking items—for each driver and each passenger, with a focus on building a parsimonious final model predicting risky-drinking drivers (e.g., Applebaum and Cramer 1974). Thus, for the first analysis, we included *driver* data for all nine variables in the demographic category. We then removed nonsignificant effects, in order of highest p-value, and reran the analysis after each step, so only the statistically significant variables remained in the final model (and thus were not biased by nonsignificant effects). If removal of one nonsignificant variable had a dramatic effect on the significance level of another variable, we planned to interchange those variables and retest the model to determine whether the two were redundant (e.g., proxies for one another). However, this was never found to be the case.

We then repeated the process with the set of driver familiarity/safety perception variables, and then with the set of driver drinking-related variables. The process was repeated again with the three sets of passenger variables. Finally, all of the retained statistically significant variables from across the six sets were tested simultaneously.

RESULTS

Sample Descriptives

Of the 175 groups, the majority (63.4%) were dyads. Nearly one-quarter (24.0%) contained three people, with groups of four, five, and six occurring in considerably smaller frequencies (7.4%, 4.0%, and 1.1%, respectively). Of the dyads, 45.0% were mixed sex (male-female), with the remainder evenly split among all-male and all-female dyads.

The sample was 50.3% male with a median age of 28 (only 4.9% were aged 20 and younger). The majority of drivers exiting the club were male (57.2%), and the majority of passengers (54.3%) were female. A plurality of the sample was White and non-Hispanic (33.7%) drivers, followed by White and Hispanic (24.2%) and Asian (21.2%) participants. Black participants and those who identified their race as other comprised the rest of the sample (20.9%). A slight majority of the sample was college graduates (55.2%), and 61.0% of the sample had full-time jobs. Approximately one-third (32.8%) were currently college students. Most of the sample reported not being in a current relationship (55.7%). Approximately one-fifth (19.7%) identified themselves as gay, lesbian, or bisexual.

Most participants (82.7%) said that at least one group member took responsibility for the safety of the group, and although 59.3% indicated feeling at least a little concerned about their safety, almost all participants (97.1%) reported feeling that the club was at least a somewhat safe environment. Nearly all participants (99.1%) reported knowing another group member well, and 94.8% reported having gone clubbing with at least one group member previously. However, the *number* of members in the group who knew one another well and the *number* of members in the group with clubbing experience varied.

A plurality (43.7%) of participants perceived that most of their group members would also drink to get buzzed (43.7%). Approximately one-quarter of participants (22.3%) thought that most group members would drink but not get buzzed, and a roughly equal percentage (19.4%) of participants thought that most group members would get drunk or very drunk. Only a few participants (14.7%) thought that group members would not drink.

Recent drinking frequency scores were roughly normally distributed, with a plurality (31.8%) indicating drinking alcohol two to four times per month. Most participants (66.4%) indicated consuming one or two drinks on average, and less than a quarter (23.7%) indicated consuming three or four drinks, on average, when they drank. Participants had an average (mean) of 2.8 binge-drinking episodes per month (73.2% had three or fewer episodes). Participants who drove to the club had a mean entry BAC of .012 g/dL, whereas nondrivers arriving at the club had a mean entry BAC of .021 g/dL. Participants who were indicated as drivers when they left the club had a mean BAC of .025 g/dL at exit, and passengers at exit had a mean BAC of .054 g/dL.

Predicting Groups with Drivers whose BACs ≥ .05 g/dL

Using the analytic strategy previously described, driver BAC category (< .05 g/dL versus ≥ .05) was regressed onto sets of driver and passenger predictors. The separate models were pared down to include only those effects that were statistically significant, and the significant effects across models were tested simultaneously in a final model. The results of the analyses, including significance levels of odds ratios for all effects, are presented in Table 1. Note that the parameter estimates for nonsignificant effects are based on the *initial* models tested (where all the variables within a set were included), and the parameter estimates for the statistically significant effects were based on the test of the final model.

In summary, the results revealed that drivers who knew more of the group's members well were associated with an increased risk of driving with a BAC of .05 g/dL or higher. Similarly, drivers who drank more frequently and who binge drank more often in the past 30 days were more likely to drive with a BAC of .05 g/dL or higher. Further, groups that had a higher proportion of female passengers were more likely to have a driver with a BAC exceeding .05 g/dL. Groups with passengers who had a higher number of recent binge-drinking episodes also were more likely to have drivers with BACs of .05 g/dL or higher.

These effects can be described in greater detail. The driver knowing-group-members variable was significantly related to drivers with BACs ≥ .05 g/dL, $F(1,161) = 4.78$, $p < .05$, even when controlling for group size. From these analyses, we can compute model-estimated proportions according to $[1 / 1 + e(-B)]$, where B represents the parameter estimate associated with a given combination of values of the predictor variables. Thus, for example, in groups where the driver knowns no one (value = 0), we would expect 11.5% to have drivers with BACs ≥ .05 g/dL. In groups were the driver knowns more people (e.g., value = 3), we would expect 23.5% to have a driver whose BAC ≥ .05 g/dL.

The 30-day-drinking-frequency variable was statistically significant, $F(1,161) = 5.70$, $p < .05$. Scores ranged from 0 to 4. For groups where the driver had only 1 drinking occasion in the past 30 days (score = 1), we would expect 10.6% to have drivers with BACs ≥ .05. Among groups where the driver had two to three drinking occasions per week (score = 3), we would expect 30.9% to have drivers with BACs ≥ .05 g/dL. The 30-day-binge-drinking frequency variable was significant, $F(1,161) = 4.83$, $p < .05$. The variable was scaled 0 to 30, although only 5% of participants reported more than 12 episodes. In groups where the driver had one binge-drinking episode (the median), we would be expect 17.1% to have drivers with BACs ≥ .05 g/dL. In groups where the driver had four binge-drinking episodes (the 75th percentile), we would expect 23.1% to have drivers with BACs ≥ .05 g/dL.

The results concerning sexual composition of passengers was significant, $F(1,161) = 5.40$, $p < .05$, even after controlling for group size and independent of the driver's sex. The results were unexpected, particularly because the odds ratio suggests that female passengers were associated with a greater likelihood of having a driver with a BAC ≥ .05. Sex composition scores were proportions (ranging from .00 to 1.00). Using the previously described method, we estimated that for a group of three with two female passengers (score = 0.00), we would expect 27.8% of the groups to have drivers with BAC ≥ .05 g/dL. In a group of three with no female passengers (score = 1.00), only 12.8% of drivers would be expected to have BACs ≥ .05 g/dL.

Given the unanticipated results, we decided to show the passenger gender data more descriptively. Table 2 reveals the proportion of drivers with BACs ≥ .05 g/dL by passenger composition, driver sex, and whether the group was a dyad or included 3+ individuals.

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With the exception of dyads with female drivers, groups with all female passengers were more likely to have drivers with BACs ≥ .05 g/dL than were groups with mixed or all male passengers. One explanation for the observed statistically significant relationship between the sex of the passenger and the driver's BAC could have been that the effect was driven by male-female dyads, with males both more likely to drive and more likely to drink. However, the results in Table 2 suggest that this is not the case. The highest observed rate of drivers with BACs ≥ .05 g/dL was found in all-female groups (with a female driver and 2+ female passengers).

Finally, our analysis revealed a statistically significant relationship between passengers with a 30-day frequency of binge drinking and drivers with BACs ≥ .05 g/dL, $F(1, 161) = 6.41$, $p < .05$. For groups where the passenger average was one binge-drinking episode, we would expect 15.8% of drivers to have BACs ≥ .05, compared to 21.9% when the passenger average was four binge-drinking episodes.

Our sample included only 19 groups (10.9%) where the drivers' BAC was equal to or greater than the per se illegal DWI limit of .08 g/dL. We attempted to replicate the previous findings, but due to reduced power, only passengers' 30-day binge drinking episodes were statistically significant. However, the drivers' 30-day drinking frequency and the driver's knowledge of group members were marginally significant ($p < .07$), and driver binge drinking and passenger sex effects were in the consistent direction as observed previously.

DISCUSSION

One major finding of this research was that drivers who knew more of the passengers well were more likely to drive with BACs of .05 g/dL or higher. Because group cohesion and familiarity have been found to be a protective factor in prior research of risky-drinking environments, this finding may be contrary to expectations. One interpretation is that experience with one another leads to overconfidence that their group will remain safe despite the driver's drinking behavior. Presumably, passengers had previously ridden with the same drinking driver without consequence and, thus, felt safe to ride with that driver again. Alternatively, groups with members who were less familiar with one another may have been more cautious about and resistant to riding with a drinking driver. Another explanation may be that norms for heavy alcohol consumption were shared within the group, and the heavy drinking behavior of the driver was considered normative.

A second major finding is that groups of all female passengers were more likely to ride with a high-BAC driver, compared with groups of mixed gender or male-only passengers, whose drivers had statistically significant lower BACs. This unexpected finding certainly deserves further study. Though it might be expected that women, particularly in dyads, would be more accustomed to riding with men, who typically consume more alcohol, this pattern emerged for larger groups, even when the driver was female. Except for dyads with a female driver, all-female passenger groups were associated with relatively higher percentages of impaired driving.

This study of driving decisions among EMDE attendees has a number of limitations. Recruiting individuals on a city sidewalk was difficult, and the overall participation rate (i.e., the proportion of individuals who were contacted and who agreed to take part in the study) was relatively low. These results also only include groups that arrived by vehicle; thus, individuals who used public transportation and other modes of transport were not included. We have no information on individuals who might have left the group and sought alternative transportation due to a driver's drinking.

It also is possible that the patrons of EMDEs is somehow fundamentally different from the patrons of other types of drinking environments, and thus our results may have limited generalizability. However, the level of alcohol consumption observed in this research was comparable to that observed in other bar and club settings (e.g., Johnson et al., 2008; Johnson & Clapp, 2011), and the lack of significant findings regarding demographic variables suggests that settings which draw a different demography would produce similar patterns of results. However, issues regarding the availability of public transportation, parking, and crime at different locations logically might influence the prevalence of driving to the club in general. Finally, patrons of EMDEs have the reputation of using illegal and potentially impairing drugs, but this paper focuses exclusively on drinking drivers. We intend to explore the characteristics of drugged drivers in a separate paper, and we speculate that the drugged drivers and drinking drivers are separate populations.

Despite these limitations, these findings illustrate that concern with drunk driving does appear to influence decisions about driving to and from alcohol environments. Evidence suggests that drivers are conforming to the population’s normative belief that driving after drinking is risky, or at least unacceptable. In this study, we found substantial evidence for this conformity. The average club exit BAC for drivers (.025 g/dL) is barely higher than the level required for detection, whereas the mean passenger BAC level (.054 g/dL) was more than twice as high. This evidence suggests that most drivers are influenced by safety considerations, and groups are making drinking decisions that may partly reflect a concern about traveling safely to and from the club setting.

Nevertheless, there remained a segment of the sample that included drivers with sufficiently high BACs that would cause impairment and elevated crash risk. Twenty percent of our sample involved drivers with BACs of .05 g/dL or higher, and more than half of those drivers were in groups where a lower-BAC passenger was available. From the portal survey technique, it appears that drivers likely to exit with BACs ≥ .05 g/dL can be identified by their general quantity and frequency of drinking. Additionally, club regulars—seasoned groups of clubgoers who trust (perhaps too much) their safety to other group members—and groups that include mostly female passengers may be at elevated risk. If high-risk groups can be comfortably assessed at entry to the club, the driver or the accompanying group members could be targeted for a special informational program.

Such an informational program could target groups (passengers, specifically), emphasizing the risks that members face while riding with an impaired driver. Public information could be used to help foster space where passengers who are concerned about their safety feel comfortable intervening with their driver if he or she is impaired. In groups where driver selection is largely routine, efforts that encourage group members to consider issues of safe driving (including selecting alternative drivers) may reduce the risk. This approach, however, is inconsistent with the formal definition of the designated-driver concept, in which drivers are selected in advance and do not drink at all.

In summary, this study provides encouraging news regarding the driving decisions being made by groups. These are drinking drivers coming from an alcohol establishment where other members of their group (passengers) are drinking one or two drinks more during the evening. This appears to demonstrate general acceptance by both drivers and passengers that drinking and driving is dangerous. A minority of groups, however, included drivers with relatively high BACs, but roughly half of those also included passengers with lower BACs that might serve as potential alternatives. There may be opportunities for intervention at those sites that could further reduce high-risk drinking and driving.

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Table 1

Driver and Passenger Predictors of Groups where Drivers Have BACs ≥ .05 g/dL

Effect	*Driver Variables* Significance, Odds Ratio	*Passenger Variables*† Significance, Odds Ratio
DEMOGRAPHICS:		
Age	p = .94, OR = 1.00	p = .67, OR (mean age) = 0.97
Sex (female vs. male)	p = .47, OR (male) = 0.74	**p < .05, OR (% male) = 0.29***
Race (white vs. racial minority)	p = .82, OR (minority) = 1.13	p = .55, OR (% minority) = 1.38
Ethnicity (non-Hispanic vs. Hispanic)	p = .08, OR (Hispanic) = 2.41	p = .62, OR (% Hispanic) = 1.32
Sexual Orientation (Straight vs. LGBT)	p = .52, OR (LGBT) = 1.44	p = .97, OR (% LGBT) = 0.98
Income (under $20k vs. $20k–$60k)	p = .36, OR = ($20k–$60k) = 1.41	p = .10, OR (mean score) = 1.38
Income (under $20k vs. $60k+)	p = .54, OR = ($60k+) 1.95	--
Education (no college vs. at least some college)	p = .13, OR (college) = 0.50	p = .63, OR (mean score) = 0.88
Employment (not full-time vs. full-time)	p = .43, OR (full-time) = 0.61	p = .76, OR (mean score) = 0.89
Student Status (nonstudent vs. student)	p = .52, OR (student) = 0.54	p = .84, OR (% students) = 0.92
Relationsip (no relationship vs. a relationship)	p = .23, OR (relationship)= 0.57	p = .79, OR (% in relation) = 0.95
Transportation to…(nondriver vs. driver)	p = .80, OR (driver) = 1.15	--
FAMILIARITY & SAFETY PERCEPTIONS:		
Knowing group members (# known well)	**p < .05, OR = 1.44***	p = .22, OR (mean score) = 1.42
Clubbing with group members (# clubbed with)	p = .25, OR = 0.75	p = .90, OR (mean score) = 0.97
Is there a group leader? (No vs. Yes)	p = .15, OR (Yes) = 0.43	p = .72, OR (% Yes) = 1.22
Concerned about safety (No vs. Yes)	p = .29, OR (Yes) = 0.63	p = .13, OR (% Yes) = 2.08
Is the club a safe environment (No vs. Yes)	p = .68, OR (Yes) = 1.19	p = .46, OR (% Yes) = 1.31
DRINKING & DRINKING PERCEPTIONS:		
Perceived of group drinking (Scale 1 – 4)	p = .21, OR = 1.34	P = .12, OR (mean score) = 1.57
30-day drinking frequency (Scale 0 – 4)	**p < .05, OR = 1.75***	P = .30, OR (mean score) =0.72
Typical drinking quantity (Scale 0 – 4)	p = .89, OR = 1.04	P = .64, OR (mean score) = .87
30-day binge drinking (Scale 0 – 30)	**p < .05, OR = 1.10***	**p < .05, OR (mean score) = 1.13***

Statistical significant effects are in **bold**.

†Passenger variables are means or proportions of the original driver variables.

*Parameters for statistically significant effects were computed after removing the nonsignificant effects from the model.

Table 2

Percentage of Male and Female Drivers with BACs ≥ .05 among All Female, Mixed, and All Male Passenger Groups

	Male Drivers		Female Drivers	
	Dyads	**Groups 3+**	**Dyads**	**Groups 3+**
All female passengers	27.6% (n = 29)	30.0% (n = 10)	15.4% (n = 26)	40.0% (n = 15)
Mixed passengers	—	12.5% (n = 16)	—	25.0% (n = 12)
All male passengers	16.7% (n = 25)	10.0% (n = 20)	18.8% (n = 16)	0.00% (n = 5)