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Measuring College Students' Alcohol Consumption in Natural Drinking Environments

Field Methodologies for Bars and Parties

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In recent years researchers have paid substantial attention to the issue of college students' alcohol use. One limitation to the current literature is an over reliance on retrospective, self-report survey data. This article presents field methodologies for measuring college students' alcohol consumption in natural drinking environments. Specifically, we present the methodology from a large field study of student drinking environments along with some illustrative data from the same study. Field surveys, observational methods, sampling issues, and breath alcohol concentration sample collection are detailed.

Keywords: *alcohol; college students; methods; environment*

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In recent years researchers have paid substantial attention to the issue of college students' alcohol use. Such attention is warranted because more than 40% of college students participating in several national studies reported engaging in heavy episodic drinking in the past year (Johnson, O'Malley, and Bachman 1998; Wechsler et al. 1998; Presley, Meilman, and Lyerla 1995; Wechsler et al. 1994). Such heavy alcohol use is associated with a range of problems with mild physical symptoms being most common (Wechsler and Wuethrich 2002). However, at the most serious end of the problem spectrum, alcohol use among college students results in an estimated 1700 deaths and another 600,000 alcohol-related traumas each year (Hignson et al., 2005).

Much of the extant literature on college alcohol use and resultant problems relies on retrospective, self-report survey data. Although useful for monitoring epidemiological trends, such survey and self-report data have important limitations for guiding prevention efforts and understanding the complex etiology of alcohol use and alcohol-related problems. First, measuring environments retrospectively is somewhat complex as each potential domain of the environment must be specified and measured using survey items. For instance, to measure the "alcohol domain" of an environment takes multiple items on a survey (e.g., what types of alcohol were available and consumed, rate of consumption, number and size of drinks, types of consumption, drinking games, etc.). Second, respondents must retrospectively recall a myriad of environmental characteristics. Often, such characteristics are distal from their own personal experience at the drinking event and thus the likelihood of the accurate recall of such features is diminished. For instance, a respondent may forget having been at a drinking event where drinking games were being played because he or she did not play or observe the games. Moreover, a respondent's level of intoxication at the event being recalled may itself adversely influence the ability to provide accurate self-reports. Thus, retrospective, self-report data may have limited utility for measuring drinking environments and estimating blood alcohol concentrations (Lange and Voas 2000).

To address the multiple limitations resulting from individual reports of drinking environments, this article presents field methodologies for measuring college students' alcohol consumption in natural drinking environments. Specifically, we present the methodology from a large field study of student drinking environments. Field surveys, observational methods, sampling issues, and breath alcohol concentration sample collection are detailed.

Conceptualizing Drinking Environments

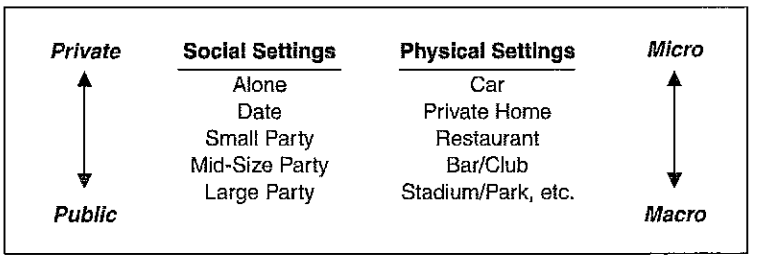
Straus and Bacon (1953) were the first to examine where college students drank and they found that students drank frequently in both public (bars) and private (apartments) settings. More than a half-century later, student drinking events are still almost evenly distributed between bars and private parties (Clapp, Shillington, and Segars 2000; Demers et al. 2002).

Cahalan, Cisin, and Crossley (1969) conceptualized drinking contexts as: (a) where one drinks, (b) with whom one is drinking, and (c) when one drinks. Underlying this conceptualization is the notion that individuals interact with their environment, and this interaction influences drinking behavior (Harford 1979). As individuals interact with each other and the physical environment over time, they generate new stimuli and alter extant stimuli. Furthermore, individuals will seek out environments that are consistent with their expectancies, motivations, and goals (Lange and Voas 2000; Gaines 1982). Such person–environment interactions generate both protective and risk attributes within contexts that vary in duration and magnitude (Stokols 2000). Consistent with this conceptual approach, Jessor (1982) identified five measurable aspects of drinking contexts: (1) location of the drinking event, (2) demographic/descriptive characteristics of the event and its participants, (3) the meanings associated with drinking contexts, (4) abstract dimensions of events such as social controls and norms, and (5) personal perceptions associated with the context. Thus, conceptually, these smaller settings represent the nexus of individual and environmental factors related to behavior and therefore represent "leverage points" that remain critical to prevention and health promotion (Stokols 2000). As Stokols noted:

> Most situations are characterized by a mixture of positive and negative environmental circumstances and health outcomes. Thus an important challenge for future research is to assess the overall health promotive capacity of environments on the basis of cumulative analysis and weighting of their positive and negative features as they affect occupants' well-being. (Stokols 2000, 140)

Students often seek out bars and private settings with weak implementation of formal alcohol controls (i.e., laws and responsible beverage service [RBS] policies) (Lange and Voas 2000). As such, formal alcohol laws and policy controls are somewhat distal to actual student drinking behavior. Thus, environments such as irresponsible bars and private parties can be conceptualized as situations in which other stimuli that are more proximal to actual student drinking operate to influence student behavior (Stokols 2000).

Figure 1
Types of Drinking Situations



Bars and parties are conceptually nested within larger community subsystems and represent the actual drinking situations and environments in which students drink and experience alcohol-related problems (Clapp, Voas, and Segars 2001). Similar to the larger environments and social systems within which they are nested (see Holder and Blose 1986), actual student drinking situations are complex and dynamic. Private and public student-drinking settings have both physical and social characteristics (see Figure 1) that vary conceptually along public/private and micro/macro dimensions.

Social settings and physical settings are nested, and may be dynamic, within any particular drinking occasion. For instance, students might be on a date (private social setting) in a bar (public physical setting). As the date progresses, they might drink with friends (a more public social setting—small party), then return to a private home at the conclusion of the date. Drinking might occur within each of these settings and be influenced by environmental factors at each level. For instance, low alcohol prices at the bar might increase the likelihood of heavy drinking, whereas the availability of food at the bar might represent a protective factor against heavy drinking.

Within each context, a myriad of variables might influence alcohol consumption, acting as controls against intoxication or its attendant problems (protective factors) or, conversely, encouraging heavy drinking or facilitating problems (risk factors). A number of variables have been found to be associated with drinking behavior. These include the availability of food, the type of alcohol available, the presence of illicit drugs, the presence of friends, the presence of numerous intoxicated people and the playing of drinking games

(Clapp, Shillington, and Segars 2000; Clapp and Shillington 2001), whether a bartender is present (Geller and Kalsher 1990), group size and composition (Hennessy and Saltz 1993), and the price of alcohol (Babor et al. 1979; Coate and Grossman 1988; Chaloupka and Wechsler 1996). Despite all we know regarding such environmental variables, it is likely that other variables contribute to drinking behavior and problems as well.

Environmental variables have also been studied among non-college age peers. In non-college studies, the physical layout of drinking locations has been found to be an important contextual variable related to drinking behavior (Cavan 1966). Additionally, event duration (Aitken and Jahoda 1983), location of the drinking event (Clark 1984), and having music at the event (Bach and Schaefer 1979) have also been reported to be related to alcohol consumption in general population studies.

The "College Bar and Party" Project

The methodologies presented below are part of a National Institute for Alcohol and Alcoholism (NIAAA)-funded study examining college students' drinking environments which included the development of a typology of drinking environments and the development and testing of environmental interventions in natural drinking settings (e.g., bars and parties). The methodologies presented below were developed during the pilot phase of the study and drew from the scant research available detailing such methodologies. The purpose of this paper is to present and describe methodologies that might be of use to researchers studying college students' drinking habits and environments.

Method

Measuring Bar Environments

The nature of field research typically necessitates deviations from ideal or laboratory conditions and methodologies. The setting, research purpose, as well as logistical considerations (e.g., access, resources, etc.) must be carefully considered relative to the need to collect valid and reliable data. Several methodological issues must be considered when attempting to assess college bar environments which include: (1) identification of college oriented bars, (2) gaining access to bars, (3) observing and documenting the physical environment, (4) sampling and surveying patrons, and (5) observation of serving and security practices.

Selecting college-oriented bars. The type and number of on-premise drinking establishments catering to college students will vary in any community. Drinking establishments frequented by college students might include: (1) on-campus bars and restaurants, (2) restaurants, and (3) bars and nightclubs. The mix of college to non-college student patrons also varies by establishment, with on-campus pubs likely to be exclusively patronized by college students and community restaurants having a larger proportion of non-students. The owners and managers of community on-sale establishments may target college students to varying degrees through promotions (e.g., college nights) or advertisements in college papers.

Students are the best source of information when identifying establishments. In our project, for example, we used survey data (see Clapp et al. 2003) collected via telephone interviews to identify potential college bars. In addition to surveys, we monitored alcohol advertisements on campus similar to the methods used by Clapp, Whitney, and Shillington (2002), and employed a local RBS expert to help identify bars.

Gaining access to bars. In addition to helping identify college-oriented bars, the RBS expert worked with bar owners and managers to gain access to their establishments for the study. The relationship between our RBS expert and the bar owner/management was critical because bar owners are often reluctant to work with individuals outside of the alcohol and hospitality industries. Our RBS expert has maintained longstanding trusted relationships with numerous bar owners in the community. Such relationships were enhanced because of careful data collection procedures that ensured the anonymity of the establishment and patrons while minimizing intrusions on bar operations.

We used the following procedure to gain access to community bars: (1) The RBS expert contacted the management of the identified bar and explained the study; (2) the principal investigator (PI) provided a written overview of the study and offered to meet with the bar owners (about 20% requested such a meeting); (3) bar owners were offered a $500 incentive to allow access; (4) the PI and RBS expert offered to share a summary of the data collected at the establishment with the owner; (5) on the night of the survey, the RBS expert introduced the survey team to the bar security and management.

Bar pre-observation. During the week preceding our survey, we conducted a pre-observation of each bar. During this observation, we drew a map of the

physical layout of the establishment and selected an area outside the main entrance to set up our survey table. Our bar maps (see Figure 2 for an example) have two purposes. First, they provide data concerning the physical layout of each bar in the study. Such data can be coded and used in multilevel analyses because they reflect the environment. Second, the bar maps helped our research staff determine the optimal place to make observations on the night of the survey.

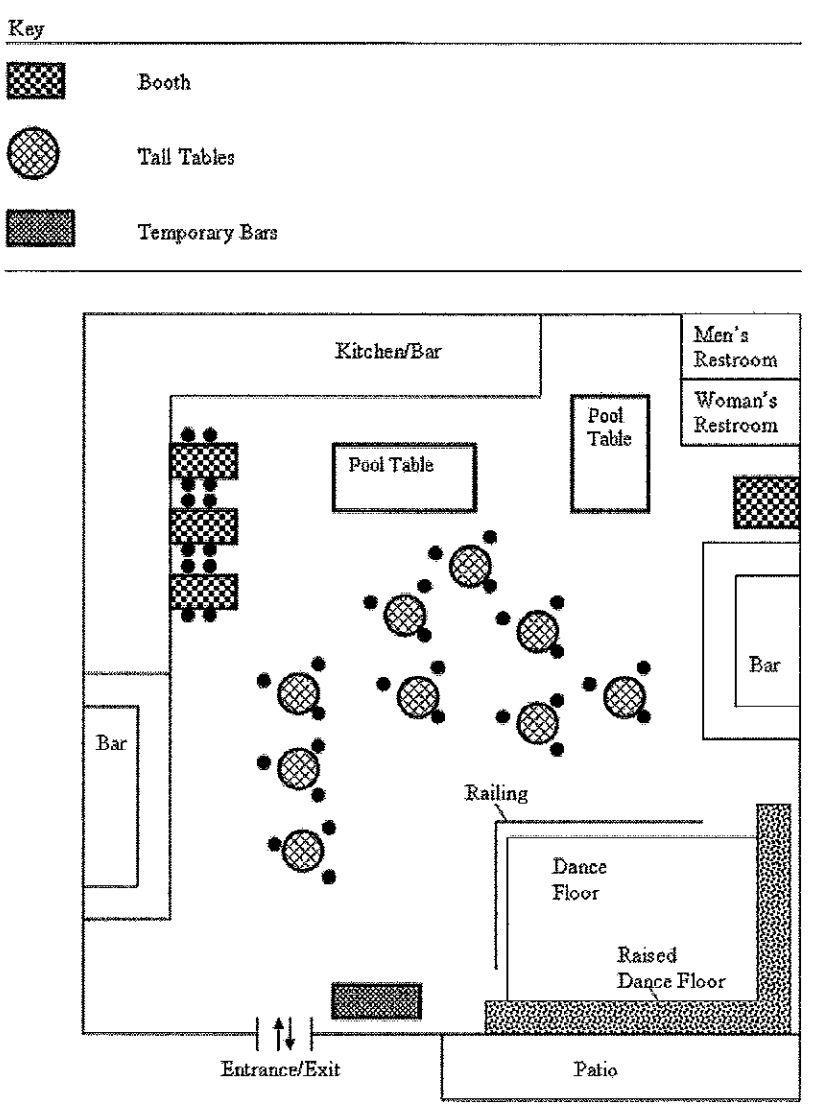
Patron surveys. The field interviews began at 9:00 p.m. and typically concluded at 2:00 a.m. (bar closing time in California). Surveys were conducted on Thursday, Friday, and Saturday nights. Two types of patron surveys were conducted: (1) an Entrance/Exit Survey in which the participants completed a brief survey and breath test before they entered the bar and again when they exited the bar, and (2) an Exit Only Survey in which the participants completed the brief survey and breath test only on exiting the bar. Because it is possible that patrons in the entrance/exit survey may change their drinking behavior as a result of completing the entrance survey, we developed the exit only survey to control for the possibility of a testing effect among these patrons.

Field staff included a manager, six interviewers, and a counter. The manager was primarily in charge of overseeing the interviews and following sampling procedures while tracking time intervals. The time interval was defined as the amount of time between when a patron entered and then exited the establishment. The interviewers recruited randomly selected patrons, conducted the brief survey, and collected breath alcohol concentration (BrAC) samples using a handheld BrAC test unit (CMI Intoxilyzer SD-400; CMI, Inc., Owensboro, KY). The counter conducted hourly counts of both the number of patrons entering and exiting the bar.

Patrons were randomly sampled in groups, or occasionally, as individuals (in cases where a randomly selected patron was alone). We used a systematic sampling procedure with a random start. A number was randomly selected, and this number was used to sample the first group and then every second group was sampled. In the case of refusals, the next group entering the bar was approached. We began counting patrons for the next interval after each member of the selected group was surveyed. We had a refusal rate of 44.57% for groups ($n = 402$ groups) entering the bar. Sampling continued until the bar no longer allowed patrons to enter. Of those participating in the entrance survey, 18.73% did not complete the exit survey.

Once a group or individual had agreed to participate, they were given a brief field interview that assessed: (1) demographics, (2) drinking intentions

Figure 2
Sample Map of Bar



for the night, and (3) drinking behavior earlier in the day. The patrons were also read an informed consent statement. Consent was obtained through patron verbal confirmation to ensure the anonymity of the patron's survey responses. Each respondent was given a hospital style bracelet with unique identifying numbers and asked for a BrAC sample. Respondents were asked to check back in at the survey table on leaving the bar to finish the interview and pick up their incentive (a $10 gift card). An interviewer was also stationed at the exit(s) to identify exiting respondents (those wearing our bracelets).

When respondents exited the bar, they were given a second field interview that assessed: (1) their transportation to and from the bar, (2) whom they were drinking with in the bar, (3) the amount of money they spent in the bar, (4) the number of drinks they consumed, (5) the type of drinks they consumed, (6) whether they had any bad experiences at the bar, and (7) whether they could obtain illicit drugs if they so desired. A second BrAC sample was also collected.

Our Exit Only Surveys began once the first Entrance/Exit participant had exited the bar. We used a combined version of the Exit/Entrance Survey for this survey. Respondents were randomly selected using a random individual interval and a non-random time interval. That is, we randomly selected an interval (1-5), then every 10 minutes we approach the randomly selected kth individual. This procedure continued until $n = 15$ patrons have been surveyed. A BrAC sample was collected from each respondent. To eliminate mouth alcohol, interviewers asked bar patrons participating in the exit portion of the survey to rinse their mouth with water. These Exit-Only respondents received a $10 gift card as an incentive as well. We had a refusal rate of 54.29% ($n = 320$) for the Exit Only Survey.

Bar observations. On the night of the survey, research assistants posing as customers assessed the serving and security practices at the bar being surveyed. Our pseudo-patrons ($n = 2$) followed a protocol designed to assess serving practices, rate of service, and drink pricing. Our pseudo-patrons entered the bar between 8:30 p.m. and 9:30 p.m. When entering the bar, they independently observed whether their ID was checked at the door, if there was a cover charge, and they assessed the overall environment of the bar (i.e., if bar was crowded, if there was loud music, if people were dancing, and if there were temporary bars).

If the bar had servers, the pseudo-patrons secured a single table noting the time they were seated and the time a server arrived. Intervals between all

server visits to the table were timed to determine rate of service. Pseudo-patrons observed servers on the following practices: (1) whether the server asked to see their ID, (2) offered any non-alcoholic drinks, (3) offered drink specials, and (4) offered a menu for food. If the server did not offer drink specials or a menu, the pseudo-patrons requested to see a menu and inquired what the drink specials were for the night.

The pseudo-patrons followed a specific protocol for ordering drinks designed to assess service practices including: (1) the rate of service (i.e., time between drinks), and (2) whether servers allow, prohibit, or discourage ordering multiple drinks (including high-alcohol-content Long Island Iced Teas) in a short time interval. First, they ordered a bottled beer each and an appetizer (if available). When the server left the table, the pseudo-patrons each took turns going to the restroom to dump their beers. On the way back to the table, each pseudo-patron independently stopped at the bar, ordered a glass of water from the bartender, and observed if the bartender was over-pouring or free-pouring shots and mixed drinks. When the server returned, the pseudo-patrons each ordered a shot of vodka. These drinks were dumped as well. Finally, each pseudo-patron ordered two Long Island Iced Teas (two for each). They each observed whether the server allowed them to order or tried to dissuade or even prohibited them from ordering these multiple high-alcohol content drinks. These drinks were also dumped by the pseudo-patrons prior to leaving the bar. Pseudo-patrons had their BrACs checked by the research staff immediately after they exited the bar to ensure they did not consume any alcohol during the bar observation.

Some of the bars in our study had no servers or wait staff. In such cases, we followed a protocol that approximates the above protocol and measured the same constructs (i.e., rate of service, pricing, and responsible beverage service). In such cases, one pseudo-patron approached the bar, ordered one bottled beer, and noted the time he/she approached the bar, the time he/she received the beer, whether the bartender offered non-alcoholic drinks, drink specials, or a menu. Once ten minutes had passed from the point the pseudo-patron received the beer, the same pseudo-patron approached the same bartender and ordered a shot of vodka while also observing if the bartender was over-pouring or free-pouring shots and mixed drinks. After an additional ten minutes passed, the same pseudo-patron approached the same bartender and ordered two Long Island Iced Teas while also noting whether the bartender allowed or tried to dissuade him/her from ordering two drinks at one time. The second pseudo-patron followed the same protocol starting five minutes after the first one received his/her beer and approached the same bartender. Bar staff and management were unaware of these observations.

Table 1
Bar Observation: Inter-rater Agreement

	Kappa	% Agreed
Identification checked at door	0.934	96.7
Identification checked by server	0.800	90.0
Cover charge before 9:00 p.m.	1.000	100.0
Crowded bar	0.600	80.0
Loud music	0.600	80.0
Type of music played	1.524	83.3
Dancing	0.734	86.7
Over-pouring of drinks by bartender	0.334	66.7
Free-pouring of drinks by bartender	0.800	90.0
Offer of non-alcoholic drinks by server	0.934	96.7
Offer of drink specials by server or bartender	0.800	90.0
Offer of food specials by server or bartender	0.800	90.0
Food available	1.000	100.0
Server or bartender allows pseudo-patron to order two Long Island Iced Teas	1.000	100.0
Server or bartender dissuades pseudo-patron from ordering two Long Island Iced Teas	0.934	96.7
Temporary bars present	1.000	100.0

As presented in Tables 1 and 2, the Kappas for agreement between the two pseudo-patrons was high at 0.80 to 1.00 for 12 of the 16 items measured and reported on. Perfect agreement was found for cover charge, food availability, server allowing two Long Island Iced Teas to be ordered, and temporary bars present. Other high agreement rated items were things such as IDs being checked at the door and/or by the server, free-pouring by the bartender, and offers of non-alcoholic drinks. The lowest Kappa was for the over-pouring of drinks ($\kappa = 0.33$).

Measuring Party Environments

In addition to bars, student parties also represent an important context of student alcohol use; however, little research has been conducted examining college drinking environments. Gellar and Kalsher (1990) observed a fraternity party to determine the effect of having bartender service on drinking behavior. They found that, as opposed to self-service, a bartender slowed the rate of alcohol service. Gellar, Kalsher, and Clarke (1991) examined the relationship between alcohol type and BrAC at fraternity parties and found that students attending parties serving low-alcohol beverages had significantly

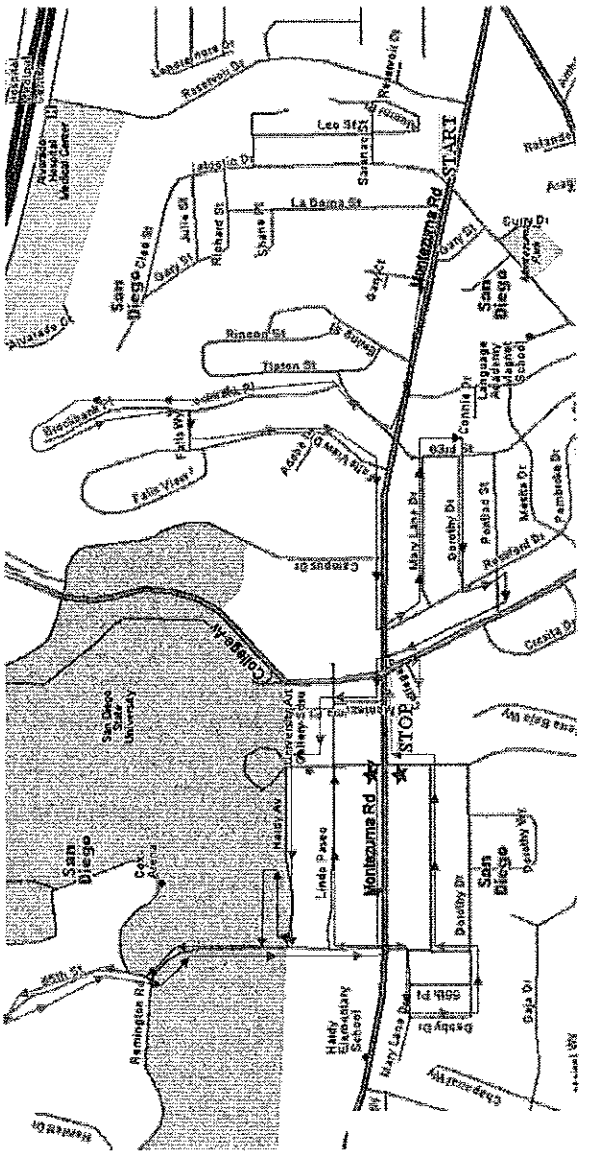
lower BrACs than their counterparts attending parties where spirits and mixed drinks were served.

Identifying parties. For the purposes of our project, a party was operationalized as five or more students gathered together where alcohol consumption was present. To locate parties we developed a driving route (6.2 miles) that runs through the neighborhoods adjacent to our campus. We developed the driving route over the course of a one semester pilot phase. To do so, the investigators and student research assistants drove and walked through the campus area on several weekend nights to determine student housing areas. The final route included several streets with single family homes (student rentals), three apartment complexes, and fraternity row (see Figure 3). Party surveys were conducted on Thursday, Friday, and Saturday nights as well as some holiday nights.

During our pilot phase we learned that parties started and ended at various times over the course of the night. As such, we made two sweeps of our driving route (between 8:30-9:30 p.m. and again between 10:30-11:30 p.m.). During these sweeps, a field supervisor and four research assistants slowly drove the route and noted the addresses of the parties. In cases where individual apartments within complexes could not be viewed easily from the road, research assistants did a walking sweep. On an average survey night, we located 7.96 (sd = 6.21) parties per night (range: 0-27). In addition to these nights, we also conducted party counts on nights we were not conducting surveys. Over the course of our data collection, on average we located 6.11 (sd = 5.64) parties per night (range: 0-27) indicating that the nights of data collection were similar to other weekend and holiday nights.

Sampling parties. Through the sweep, the research team was able to identify the census of parties along this route each night data were collected. After each sweep, we assigned each identified party a number and randomly selected the order in which we would observe the parties. We randomly selected parties on each survey night for two reasons. First, the random selection of parties reduced the likelihood that we would select the same residences to survey on each survey night. Second, randomly selecting the order of the party observation also reduced the probability that the location of parties along the driving route would be confounded by the time in which the survey occurred (i.e., houses located at the beginning of the driving route always being surveyed at the same time of the evening). During each sweep, we surveyed up to four parties (depending on size, etc.). In instances where the party host refused to let the survey team enter

Figure 3
Party Observation Driving Route



the party (8.41%, $n = 17$ parties) or the party was disbanded once we arrived (32.67%, $n = 66$ parties), we went to the next party in the random sequence. On average we observed 2.4 (range 1-5) parties per night.

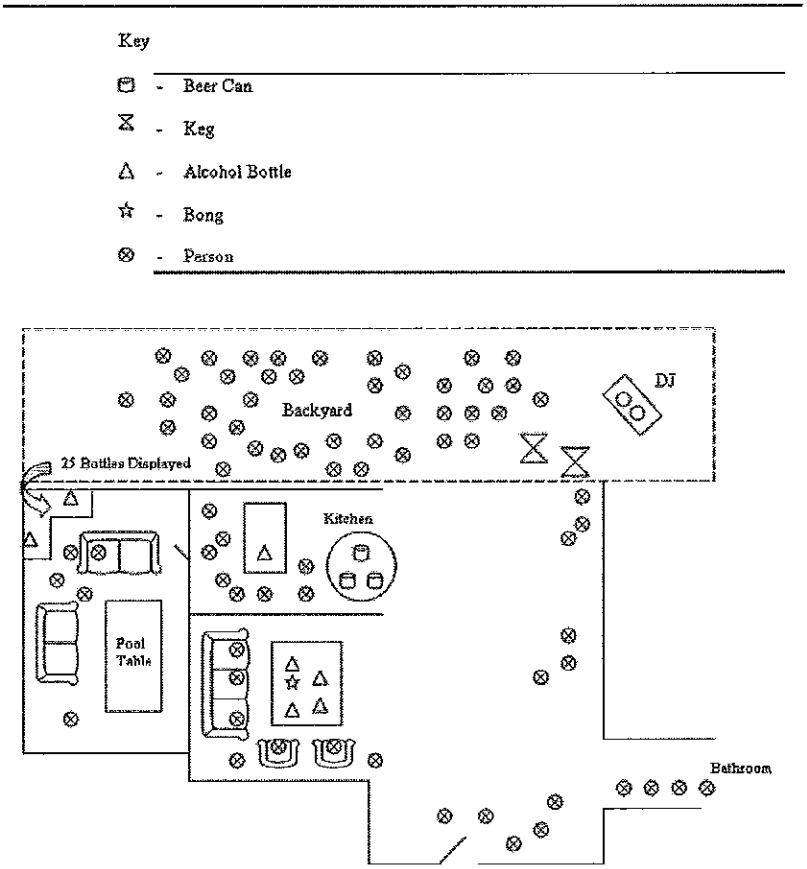
Gaining access to parties. Our survey team consisted of seven people: a field survey manager, a field survey supervisor, a security person, an observer, and three interviewers. Once we arrived at a party, the field survey supervisor and one interviewer approached the party and asked to speak to the host. The supervisor explained the study to the host including an informed consent statement. Hosts were offered a $20 gift card as an incentive for granting access to the party. To facilitate entry into the college parties, all of our staff who came in contact with partygoers was in their early twenties. We found the gender composition of the interviewer group does not seem to matter in terms of access to parties.

The party survey process. Once access to the party was granted, our interviewers, observer, and field supervisor entered the party and began the survey. We observed a total of 113 parties. In small parties, we attempted to conduct a census of partygoers (response rate of 89.33%; refusal rate = 6.81%). However, in larger parties, we interviewed as many partygoers as possible during a one-hour period (based on our head counts or crowd estimates as the denominator, 40.49% of partygoers were surveyed; refusal rate = 13.84%). For the party survey, partygoers were asked to complete a brief survey and to provide a breath sample. Partygoers completed the questionnaire with the assistance of the interviewer. Interviewers carried small water bottles and several clipboards with surveys. Prior to collecting breath samples, interviewers asked partygoers to rinse their mouth with water to eliminate mouth alcohol. Partygoers received a $5.00 gift card as an incentive for their participation.

The partygoer survey included items that assessed: (1) demographics, (2) length of stay at the party, (3) transportation to and from the party, (4) whom the respondent was with at the party, (5) drinking plans for the evening, (6) places alcohol had been consumed prior to the party, (7) drinks consumed at the party, (8) how alcohol was obtained, (9) whether drinking games were played, and (10) whether any problems had occurred at the party.

While the survey was being conducted, our observer drew a map of the physical layout of the party (see Figure 4). He or she also completed a checklist that assessed: (1) the number of males and females at the party (a head count at small parties and a grid-density estimate at larger parties [see Swank and Clapp 1999]), (2) whether the party had a theme (e.g., toga, etc.), (3) whether there was rowdy behavior such as pushing or shoving, (4) whether

Figure 4
Sample Map of Party



there was loud music, (5) whether drinking games were being played, (6) whether illicit drugs were present, (7) the type of alcohol that was present, and (8) evidence of any problems. The field supervisor completed the same form independently once she or he exited the party.

The Kappas for inter-rater agreement (between observer and field supervisor) for the observer data collected at student parties are presented in Table 2. Half of the items measured had Kappas of .80 or above and included items such as size of party, themed event, rowdy behavior, and drinking games.

Table 2
Party Observation: Inter-rater Agreement

	Kappa	% Agreed
Time spent in party	0.700	85.0
Size of party	0.946	97.3
Themed party	1.000	100.0
Standing room only	0.716	85.8
Loud music	0.646	82.3
Rowdy behavior	0.840	92.0
Hard alcohol available	0.416	70.8
Beer available	0.754	87.7
Keg(s) present	0.806	90.3
Partygoers intoxicated	0.664	83.2
Drinking games being played	0.894	94.7
Illicit drugs available	0.806	90.3
Food available	0.716	85.8
Problems	0.858	92.9

Most other items were in the acceptable range of .70 or higher and included items such as food available, beer available, and people intoxicated.

Safety Issues. Safety was a primary concern for our research staff while in the field during data collection at student parties. Our field manager remained in close contact with the team while the team conducted the survey in the party via two-way radios. We employed a security person who remained outside each party being surveyed. Our team was trained in a security protocol with various levels of risk and the appropriate responses. We did not encounter any serious incidents. The survey team also wore sweatshirts with "College Alcohol Research Survey" printed on them. These sweatshirts served as a way for our security person to easily identify the team members should they needed to be escorted from a party.

Limitations to External Validity

Although the sampling plans detailed above appear complex, they are technically not random multistage cluster samples. Thus, both the bar and party samples have limited external validity when considering both the person and environmental levels. It is critical to note, however, much like

using students from an introductory psychology course to study human behavior, the intent of the studies described above is to develop conceptual models to guide prevention efforts not to estimate population parameters.

Bars. The bars participating in our study were not randomly selected. Given that we needed bars oriented toward college students and young adults, bar owners are generally reluctant to participate in research, and we had a limited universe to draw from, random selection of establishments was not feasible in this study. We were, however, as noted above, able to randomly sample patrons at the establishments. Thirty-two bars surveyed represent a series of clusters, with patrons embedded in bars. Clustered observations do not ensure independent observations, and do result in some level of dependence of observations within each cluster, a bar in our case. As such, we assessed intra-class correlation to examine any between-cluster variation with regard to post-BrAC level, using one-way analysis of variance (ANOVA) model (Raudenbush and Bryk 2002) based on a two-level hierarchical linear model (HLM), using HLM 6.02. Results from the HLM analysis showed only 6.7% of intra-class correlation, indicating no evidence of significant dependence of observations at the bar level. Given this, estimates of parameters are externally valid at the patron level to a known and purposively selected universe of establishments.

Parties. Our party study had similar external validity issues. In contrast to the bars, our parties were randomly selected within a purposively constructed universe (the 6.2-mile driving route near the university where this study took place). Partygoers, given the dynamic nature of the parties, could not be randomly sampled. Thus, our observational data are externally valid to this small identified universe of parties near our university. Thus, it is not possible to generalize these results beyond the universe of parties sampled. Our partygoer data (person level) are accidentally sampled, thereby precluding an estimation of sampling error.

Similar to the bar studies, we assessed the independence of observations using an HLM approach. Unlike the bars, we found a significant inter-class correlation in our nested party data (10.5% inter-class correlation). Thus, it will be necessary to conduct multilevel analyses to estimate the influences of both individual- and party-characteristics (Raudenbush and Bryk 2002) and to disentangling effects of individual- and party-characteristics on BrAC.

Ecological Validity

Although our methods have limited external validity they arguably have a good deal of ecological validity. In theory, as noted above, environments are more distal to organisms than are individual-level factors. Brunswik (1956) argued experimental research has an inherent distal aim of generalizing findings (either conceptual tests or intervention outcomes) from a laboratory setting to broader and less contrived contexts. Similarly, survey research often seeks to develop conceptual models that will transfer across settings. Although arguably less contrived than experimental studies, the retrospective self-report nature of many surveys represents a distal element that might preclude or inhibit the ecological validity or models derived from such data. By placing the data collection within natural settings, minimizing the duration of recall asked of respondents, collecting biological and observational data, the likelihood of enhancing ecological validity is improved. That is, although we may not be able to estimate the population parameters at the person-level using the methods described above, the data generated using these methods should generalize to similar settings in other communities.

Conclusions

This article presented field methodology to assess student drinking behaviors in natural settings. Based on two academic years' worth of experience, we have been able to gain access to two natural drinking settings—bars and parties—that have traditionally been thought to be difficult to access by many alcohol researchers. As noted earlier, the advantages of such efforts are several and include event specific data, observational data, and biological measures. One unexpected aspect of our work has been the excellent cooperation we have had with study participants (i.e., low refusal rates). These rates are substantially better than those typically reported in the college alcohol survey literature.

Although such data collection methods have some advantages over self-report surveys conducted online, by telephone, or in the classroom, they do have some limitations. First, such efforts are expensive and labor intensive. A well-trained research team and adequate incentives are critical to gain access to parties. Similarly, a RBS expert is critical to gaining access to bars. Second, the amount of information that can be collected quickly in the field is limited. Surveys must be kept brief to ensure participation of respondents who are voluntarily completing the survey. Therefore, these methods are best

used in conjunction with other survey methods that allow more detailed data to be collected.

Over time we expect our project and others like it to provide a better understanding of how students drink and the environmental influences that contribute to excessive alcohol consumption and its attendant problems. In turn, such insights should facilitate the development of individual, group, and environmentally oriented prevention approaches.

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