An Effective Incentive/Reward Intervention to Reduce Intoxication at University Fraternity Parties

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Background

One of the most serious problems facing society today is alcohol abuse and its many negative side effects, from impaired decision making and physical disease to driving under the influence of alcohol (DUI). In 2000 alone, 33% of all traffic fatalities in the U.S. occurred in crashes with at least one legally intoxicated driver. Individuals at particular risk for problems with alcohol use and misuse are traditional college students. High-risk drinking with this population is a major health problem as it contributes to a variety of negative consequences, ranging from getting behind in schoolwork to victimization and death. Reports indicate that 42.7% of college students are high-risk drinkers on occasion, and 20.7% are frequent high-risk drinkers.

Among the college population, Greek-life students consume more alcoholic beverages per week, engage in more heavy drinking, and suffer more negative consequences than their non-Greek-life peers. Moreover, research assessing partygoers’ actual blood alcohol concentration (BAC) levels found students at fraternity parties to get significantly more intoxicated than students at private parties, regardless of their Greek-life affiliation. Whether heavy drinkers are created by fraternities, drawn to fraternity membership, or attracted to fraternity parties, fraternities are a popular drinking environment and a socially valid setting for studying the efficacy of an innovative intervention approach.

Drinking cultures on college campuses appear to be strong and resistant to change. Thus far, legislation, education, and behavioral intervention have been unsuccessful in ameliorating this problem. Research suggests an innovative and creative solution is needed. The primary aim of the proposed research was to determine whether an innovative incentive/reward intervention, feasible for large-scale application, could change the alcohol consumption of college students at fraternity parties, and eventually change social norms and subcultures with regard to drinking at parties. The harm reduction approach, in combination with differential reinforcement, was used to reduce alcohol consumption and its outcome - BAC. More specifically, partygoers were rewarded for limiting their intoxication to a BAC considerably below the limit of legal intoxication.

The key component of the intervention evaluated in the research presented here was an incentive/reward contingency. An incentive is a verbal announcement (written or oral) of the availability of a positive consequence (reward), contingent on the occurrence of one or more behaviors. At intervention parties, participants were informed of the availability of a monetary reward upon meeting a particular BAC criterion. An immediate reward, in the form of a lottery ticket, was given to all participants meeting the criterion. Upon entering an intervention party, partygoers were told they could enter a cash raffle for $100 if their BAC at the end of the party was below .05. The .05 BAC criterion was chosen because of the dose-specific effects of alcohol neighboring this specific level of intoxication. Feelings of relaxation, lower inhibitions, and slight euphoria are characteristic of BACs ranging from

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and are the effects students report desirable and motivating for alcohol consumption.\textsuperscript{7} Once BACs of .05 or more are attained, impairment of psychomotor performance becomes likely.\textsuperscript{8}

Initial applications of this incentive/reward intervention have yielded encouraging results. In a pilot study to the research presented here, Fournier, Ehrhart, Glindemann, and Geller\textsuperscript{9} used the incentive/reward intervention to reduce the blood alcohol level of college students attending fraternity parties. Intoxication levels were objectively measured at two different (baseline) parties with a hand-held breathalyzer. Then, at the next two (intervention) parties with the same fraternity, a raffle for a $100 cash prize was the incentive for partygoers to have a BAC < .05. Late night BAC levels decreased significantly at the incentive/reward parties, from a mean BAC of .097 at the two baseline parties to .060 at the two intervention parties. Additionally, more than twice as many partygoers were legally intoxicated (i.e., BAC \geq .08) at the two baseline parties than at the two intervention parties, indicating a clinically significant impact of the incentive/reward intervention.

Building on these research findings, the impact of the intervention on students’ intoxication from alcohol consumption at fraternity parties was explored with a group-randomized trial. Six separate fraternities were randomly assigned to a Control or Intervention condition. Each of these fraternities hosted two parties. The three fraternities in the Intervention condition first hosted a baseline party and then hosted an intervention party, while the three fraternities in the Control condition hosted two control (non-intervention) parties. The dependent measures used to assess the efficacy and external validity of this approach were actual BAC, percent of participants below target BAC levels, and number of self-reported negative outcomes due to alcohol consumption. It was hypothesized that a) the incentive/reward intervention would significantly reduce students’ BAC levels at fraternity parties; b) the incentive/reward intervention would significantly lower the percentage of students who were legally intoxicated (BAC of .08 or greater); and c) the incentive/reward intervention would significantly reduce the number of student-reported negative outcomes due to alcohol consumption.

\textbf{Methodology}

\textbf{Subjects and Setting}
Participants included 702 (447 men, 225 women) university students attending one of twelve fraternity parties. These parties were held by six fraternities hosting two parties each. All parties were held at the participating fraternities’ chapter houses.

\textbf{Materials and Apparatus}
Participants’ BAC levels were assessed using hand-held Lifeloc FC-20 breathalyzers (Lifeloc Technologies, Inc., Wheat Ridge, CO; accuracy +/- .005). Each data collection team used two breathalyzers, and rotated use of these units to ensure adequate time for reset and to prevent alcohol saturation. Prior to each BAC assessment, participants rinsed their mouth with 2 oz. of water to remove any residual alcohol. A standardized sampling procedure was used to ensure alveolar (i.e., deep lung) air was collected. All breathalyzers were calibrated immediately prior to the field measurements.

Upon arrival at the intervention parties, participants were given flyers and nomograms as part of the incentive/reward intervention. The flyer was 8.5” x 5.5” with black typewritten ink, informing students of the incentive/reward contingency. It specified the following: a) researchers will give free BAC assessments at the end of the party; b) those with a BAC below .05 will be entered in a $100 cash raffle; and c) low intoxication can be maintained by snacking on food, consuming water between alcoholic beverages, and using the
nomogram printed on the back of the flyer. The nomograms were 6” x 3” white cards with black typewritten ink. In addition to information necessary to calculate approximate BAC, the nomograms included instructions on how to use them, as well as information for interpreting BAC levels (i.e., at a BAC of .08 you are legally intoxicated).

**Procedure**

A systematic time-sampling procedure was used to assess individual partygoer’s BACs. Specifically, the research team arrived at each party (baseline and intervention) at 12:00 am and collected BACs from participants for exactly one hour. The data collection interval (12:00 am to 1:00 am) was chosen because previous research in this environment indicated this time interval allows for a representative sample of the partygoers’ intoxication while maximizing the number of participants in the sample.10

Once at a party, four teams of three research assistants each dispersed throughout the setting and stationed themselves in four distinct areas of the party. One researcher recruited participants and obtained informed consent. Participant recruitment was systematic and involved research assistants indiscriminately approaching students near their designated areas of the party and requesting their participation. Researchers attempted to recruit all students in their vicinity of the party. Refusals to participate were recorded, and the number of students who refused was less than 10% per party.

After signing an informed consent form, a second researcher asked the participant questions from a short survey form. The third researcher assessed the participant’s BAC and confidentially informed them of their intoxication level. After receiving BAC feedback, participants were warned not to drive if their BAC was ≥ .05, encouraged not to consume any more alcohol if their BAC was ≥ .08, and told they may experience serious negative consequences if they continued to drink when their BAC was ≥ .15. As per fraternity policy, any students who appeared to be intoxicated and at-risk for dangerous alcohol-related problems were reported to the fraternity’s “sober crew” - a group of selected fraternity members who remain sober throughout the party and monitor the party for at-risk behavior, including dangerous levels of intoxication.

After receiving BAC feedback, participants’ hands were marked in order to avoid them being approached by a different research team in another area of the party. Hence, each partygoer only had one BAC assessment. These methods were approved by the human subjects review board and have proven effective for collecting relevant and representative data in previous studies.4,10,11

For the Intervention condition, two research assistants arrived at the fraternity house at the start of the party (10:00 pm), and remained at the entrance to the fraternity house, handing a flyer and nomogram to each attendant. As in the Baseline condition, the four research teams arrived at 12:00 am and collected data for one hour. Participants meeting the raffle criterion signed a raffle ticket and placed it in a sealed box. At 1:00 am, one ticket was drawn, the winner was announced at the party, and the winner was immediately given $100 cash. Researchers left the party at that time.

**Results and Analysis**

The impact of the intervention on college students’ intoxication from alcohol consumption at fraternity parties was explored with a group-randomized trial. Dependent measures included BAC, percentage of participants below target BAC levels, accuracy of self-BAC estimation, and number of self-reported negative outcomes due to alcohol consumption.
To test whether the intervention would significantly reduce students’ BACs at fraternity parties, individual BACs were compared between baseline and intervention parties. A nested analysis of covariance (ANCOVA) was performed, with BACs the dependent variable and mean BAC for the party as the covariate. A 2 Condition (control vs. intervention) x 2 Gender x 2 Party x 3 Fraternity within Condition ANCOVA revealed a significant Condition X Party interaction, $F(1, 693) = 14.4, p < .01$. Simple effects tests indicated the mean BAC was significantly lower for the Intervention condition, $F(1, 391) = 8.1, p < .01$, and mean BAC was significantly higher for the Control condition, $F(1, 307) = 7.0, p < .01$. In addition, main effects were found for Condition, $F(1, 693) = 41.7, p < .01$, Gender, $F(1, 693) = 11.3, p < .01$, and Fraternity, $F(1, 693) = 92.5, p < .01$. Mean BACs as a function of Party, Condition, and Fraternity are presented in Figure 1.

![Figure 1: Mean BAC for All Fraternities (3 Control and 3 Intervention Conditions)](image)

Next we examined the percentage of students who were legally intoxicated as a function of Condition. The percentage of participants below a BAC of .08 was compared across baseline and intervention parties with the Chi Square statistic. Comparisons were made within the same fraternities (i.e., Baseline vs. Intervention conditions for the Intervention fraternities and the first vs. second Baseline parties for the Control fraternities) and across different fraternities (i.e., second party of the three intervention fraternities vs. second party of the three control fraternities). For the Intervention condition, significantly more participants were below a BAC of .08 at the intervention parties, $X^2 (1) = 3.9, p < .05$. The mean percentage of partygoers revealing a BAC below .08 was 30.6% at Party 1 and 40.1% at Party 2.

Finally, we examined whether the intervention significantly reduced the number of student-reported negative outcomes due to alcohol consumption. For this analysis, negative outcomes recorded on follow-up surveys were compared between baseline and intervention parties with the nested ANCOVA and factorial defined above. Results indicated a significant main effect for Fraternity, $F(1, 94) = 7.6, p < .05$. No other main effects nor interactions reached significance, all $p$'s > .10, indicating the intervention had no effect on the self-report of negative outcomes from alcohol consumption.
Discussion
This research replicated the findings of our preliminary research\textsuperscript{5} across three separate fraternities using a group-randomized trial design, thereby supporting the efficacy of the incentive/reward intervention to reduce intoxication levels at university-sanctioned fraternity parties. Specifically, for the Intervention fraternities, mean BAC levels were significantly lower at the intervention parties than the baseline parties, and the percentage of partygoers with a BAC below .08 was significantly higher at the intervention parties than at the baseline parties. However, the intervention did not impact the number of negative outcomes reported due to alcohol consumption. This latter dependent variable may require more than one application of the intervention, and this possibility is under investigation.

One potential confound in this study was the possibility of a selection bias due to possible differential participation of the heavier-drinking partygoers. These students may not have been motivated to participate in the BAC assessments during the intervention parties because they would not qualify for the raffle drawing. We feel the extent of this potential bias is low, however, since the research teams indiscriminately approached students at each party and did not note a substantial number of refusals at any of the parties. More importantly, in our past research we have found those with relatively high BAC levels rarely refuse a BAC assessment.\textsuperscript{10,11,12}

The impact of the intervention program on students’ drinking behaviors was significant, not only because BAC levels and the percentage of at-risk alcohol users were markedly reduced, but also because the intervention approach is feasible for a number of real-world applications. For example, partygoers could be offered the opportunity to contribute $1 to enter a DRL/BAC .05 raffle at the end of a party. Or, a cover charge could be required of everyone, with raffle winners splitting a portion of the total. In this way, the incentive/reward intervention could be self-supporting.

Thus, an incentive to lower one’s level of intoxication motivated a significant number of students to consume less alcohol at these fraternity parties. Moreover, it’s possible this intervention approach could also contribute to changing campus norms with regard to alcohol consumption. The incentive/reward contingency gives partygoers an excuse for consuming less alcohol, allowing them an opportunity to experience the natural reinforcers accompanying lower intoxication levels. Multiple exposures to the incentive/reward contingency could influence a significant percentage of partygoers to consume less alcohol at future parties that don’t apply the intervention. We are currently investigating this possibility.

Conclusions
In summary, our incentive/reward intervention was a simple, socially-valid approach to reducing college alcohol abuse that is potentially effective for large-scale application. This field study lends greater support for the efficacy of differential reinforcement in controlling student intoxication at party settings, and the potential for the incentive/reward intervention to be self-supporting makes it feasible for large-scale adoption. The intervention approach could also be incorporated in other areas of the college community, such as local bars and taverns. Future research will demonstrate whether the findings of this field experiment warrant communitywide application.
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