Research Article

Social Norms vs. Risk Reduction Approaches to 21st Birthday Celebrations

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ABSTRACT

Background: *Celebratory drinking among college students on their 21st birthday often involves dangerous levels of alcohol consumption.* ***Purpose:*** *This study utilized an experimental design to assess the efficacy of social norm and risk reduction strategies developed to reduce high-risk drinking and alcohol related consequences among college students on their 21st birthday.* ***Methods:*** *Students were randomly assigned to one of four cohorts including a control group, a social norms group, a risk reduction group and a combination of both social norms and risk reduction. Each group received an electronic birthday card with intervention specific information. Students were sent an electronic survey three days after their birthday to assess alcohol consumption levels and related behaviors (n=702).* ***Results:*** *No significant differences existed among the four cohorts in students' drinking behavior, negative consequences, or protective behaviors employed.* ***Discussion:*** *This inquiry revealed that social norm, risk reduction messages or combination of the two strategies, delivered electronically, failed to influence celebratory drinking patterns.* ***Translation to Health Education Practice:*** *Interventions addressing 21st birthday celebrations may need to extend beyond targeting the individual to yield significant behavioral changes.*

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BACKGROUND

Heavy episodic drinking among college students continues to receive attention from the media, practitioners and researchers. Given that approximately 40% of college students report engaging in this behavior, intervention appears warranted.[1] Heavy episodic drinking is defined as the consumption of at least five or more drinks in a row for men or four more alcoholic drinks for women, at least once in the past two weeks.[1] Unintentional injury (e.g., motor vehicle crashes, falls and drowning), sexually transmitted diseases, unintended pregnancy, sexual assault, violence and poor academic performance are associated with this behavior.[1] Additionally, when using current criteria for alcohol abuse and dependence set forth in the *Diagnostic and Statistical Manual of Mental Disorders*, approximately one-third of all college students fall into the category of alcohol abuse and dependence.[1] Furthermore, certain points on the academic calendar (i.e. spring break), school events (i.e. football games), and specific life occasions such as one's 21st birthday, are associated with higher-than-normal alcohol consumption[2,3] or heavy episodic drinking. Previous research indicates that three out of four students visit a bar as part of their 21st birthday celebration[4] and 72% of these students consumed at least four or five standard alcoholic beverages resulting in an estimated average blood alcohol concentra-

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tion level of .17 mg/dl.[4] Often these episodes of inebriation are riddled with negative, and sometimes fatal, consequences for both participants and bystanders. This type of drinking can be referred to as Extreme Ritualistic Alcohol Consumption, defined as consuming 10 or more drinks for a male and eight or more drinks for a female on one occasion.[5]

Tragic outcomes associated with 21st birthday celebrations are frequently reported by the media, and often result in various interventions designed to reduce excessive drinking and alcohol related consequences related to 21st birthday celebrations.[6] One such intervention involves the use of the B.R.A.D. (Be Responsible About Drinking) birthday card. The B.R.A.D. campaign was created by the parents of Bradley McCue in response to his premature death from complications related to excessive alcohol consumption. This card tells Bradley McCue's story and includes educational information on the hazards of excessive alcohol use.[2] As of 2008, over 130 institutes of higher education had distributed the B.R.A.D birthday card for students turning 21.[7]

Despite the popularity of this intervention, rigorous evaluations to determine program efficacy have been few and the results mixed.[8] For example, findings from one study indicated lower alcohol consumption among participants who had read and could recall the content of the B.R.A.D. card[8], while another study reported no significant effect of the birthday card campaign on reducing alcohol consumption or alcohol-related problems.[2] Well-controlled evaluations of 21st birthday card interventions are essential for establishing effectiveness. Major methodological limitations including low response rates, samples which under-represent high-risk drinkers and weak research designs have compromised the validity of previous research in this area.[2,8]

Among most college students the 21st birthday celebration remains steeped in oral history and tradition; students describe in detail certain expectations or norms (perceived) that are firmly attached to this event. A national study by Perkins and colleagues[9] confirmed previous research indicating that one's *perception* of the campus drinking norm is a significant predictor of personal alcohol use. These alcohol-related misperceptions remain one of the major contributors to the norm of heavy episodic drinking among college students; students consistently overestimate their peers frequency and amount of alcohol consumption. Therefore, correcting misperceptions through the use of social norms campaigns may help reduce heavy episodic drinking.[10,11] Typically, social norm campaigns use non-confrontational messages to lessen resistance from those who may be opposed to policies and actions perceived to interfere with one's right to engage in risky behaviors.[9,10] Social norm messages are designed to highlight healthy drinking patterns (abstinence and/or moderation) without referencing the negative alcohol related consequences–extreme or minor.[9,10] However, successful outcomes of previous social norms interventions remains mixed.[12,13]

Among young adults college students are most likely to be heavy drinkers and, as a result, are highly susceptible to alcohol-related accidents and injuries.[14,15] To lessen the costly personal outcomes attached to this high-risk behavior some colleges and universities have utilized harm or risk reduction approach.[16] The risk reduction approach includes educating students about both the physical and social effects of alcohol, as well as skills training and self-monitoring techniques.[17] The goal of risk reduction and protective factors (specific behavioral strategies) is not abstinence but to make the behavior safer.[18] Both the Alcohol Skills Training Program (ASTP) and the Brief Alcohol Screening and Intervention for College Students (BASICS) exemplify programs utilizing the harm or risk- reduction approach and by promoting protective factors such as, setting a limit to the number of drinks consumed, drinking slowly, minimizing the number of hours drinking, drinking water, eating before drinking, avoiding drinking games, designating a friend to tell them when they have had enough to drink and utilizing safe transportation. Results from both of these programs yielded significant reductions in negative consequences associated with high-risk drinking among participants.[19, 20]

PURPOSE

This study compares three types of electronic based interventions, each of which aim to reduce the number of drinks college students report consuming on their 21st birthday, namely social norms, risk reduction, or a combination approach. In addition, alcohol related consequences, as well as the use of protective strategies were assessed.

METHODS

To determine the effectiveness of the interventions researchers employed an experimental design. Following approval of the research protocol by the University Institutional Review Board (protocol #2008-U-0004), the registrar's office supplied researchers with contact and birthday information for 2,302 students having 21st birthdays during the spring 2008 semester. Students were randomly assigned into one of four cohorts (average of 575 students per cohort). Cohort one (control) received an electronic 21st birthday card including alcohol education information and alcohol consumption alternatives, specifically coupons for free pizza, a movie and ice-cream. Cohort two or the social norms cohort received the same birthday card as cohort one plus a social norms message stating that "Most [insert school mascot here] have 0 to 4 Drinks on their 21st Birthday." Cohort three or the risk reduction cohort received the same birthday card and a risk reduction message offering tips for responsible 21st birthday behavior. The risk reduction and protective messages included: setting a limit to the number of drinks consumed, drinking slowly, minimizing the number of hours drinking, drinking water, eating before drinking, avoiding drinking games, designating a friend to tell them when they have had enough to drink and identifying a designated driver before drinking. Cohort four or the combo intervention cohort received the following combination approach:

birthday card (cohort 1), social norm message (cohort 2) and risk reduction tips (Cohort 3).

Participants

Study participants included students from a large public university in the southeast. The Registrar's office supplied researchers with student contact and birthday information. Inclusion criteria included all students turning 21 years of age during the spring 2008 semester (January through April). The students were randomly assigned to one of four cohorts. No incentives for participation, other than the alcohol alternative coupons, included in the Birthday Card, were provided to students.

Table 1 provides participant demographic information. Seven-hundred-and-two students completed the 21st birthday survey generating an overall response rate of approximately 30.5%. The majority of survey respondents were female (63.7%) and approximately 17.3% of the participants were part of a Greek fraternity or sorority. Additionally, nearly three quarters of the respondents described their ethnicity as Caucasian (74.1%), 10.6% Hispanic, 6.7% African American, 6.3% were Asian or Pacific Islander, and the remaining 2.3% indicated others.

Procedures

Representatives from the Student Health Care Center, in collaboration with the Dean of Students Office, created four versions of an electronic 21st birthday card. One week prior to their 21st birthday each student received a cohort-specific electronic birthday card. The automated e-mail was sent from the dean of students and included a colorful and customized e-card with the student's name. Depending on the cohort, the students were assigned so they received visually appealing attachment(s) with either, a social norms message, risk reduction strategies, a combination of the two or no attachment (control group). The subject line was customized with the students name and stated "Happy 21st Birthday!" Following their 21st birthday, participants received an automated invitation to participate in a web-based survey from a representative from the Student Health Care Center. Students were ensured of their anonymity within the e-mail. The survey was sent out three days after their 21st birthday to allow participants to reflect on their celebrations without allowing too much time to pass; thus minimizing the risk of recall bias. The web survey assessed students' utilization of the coupons, alcohol consumption patterns on their birthday, negative consequences and any protective or risk reduction behaviors utilized.

Materials

Materials consisted of the standard electronic birthday card received by study participants, as well as social norms and risk reduction messages designed to augment the standard card. A description of the cards and survey are presented below.

Birthday Cards

As previously described, four versions of electronic birthday cards were used in this study. The first card, designated as the control card, included a congratulatory e-mail message from the dean of students, in the body of the e-mail, encouraging students to celebrate their 21st birthday in a safe and responsible fashion. The birthday card, designed to be health promoting and non-threatening contained educational information on health risks associated with excessive alcohol use; as well as how to prevent and respond to an alcohol overdose. Included with the card were coupons for a free movie,

Table 1. Demographics by Cohort

	Cohort 1-Control		Cohort 2-Social Norms		Cohort 3-Risk Reduction		Cohort 4-Combo		Total	
Number of participants	188		165		190		159		702	
Response rate	32.7%		28.9%		33.0%		27.7%		30.5%	
Sex										
Male	75	39.9%	55	33.3%	71	37.4%	54	34%	255	36.3%
Female	113	60.1%	110	66.7%	119	62.6%	105	66%	447	63.7%
Ethnicity										
Caucasian	138	73.8%	119	71.7%	146	77.2%	116	73.4%	519	74.1%
African American	16	8.6%	9	5.4%	11	5.8%	11	7%	47	6.7%
Hispanic	19	10.2%	21	12.7%	20	10.6%	14	8.9%	74	10.6%
Asian or Pacific Islanders	11	5.9%	14	8.4%	7	3.7%	12	7.6%	44	6.3%
Others	3	1.6%	3	1.8%	5	2.7%	5	3.2%	16	2.3%
Greek Membership	34	18.2%	21	12.7%	41	21.7%	25	15.7%	121	17.3%

Note: No statistical significance on the response rate, sex, ethnicity and Greek membership among four cohorts.

pizza dinner and ice cream and redeemable only on the student's birthday between the hours of 8:00 pm and 1:00 am. Cohort 2, or the intervention by social norms cohort (SN), received the control birthday card and coupons plus a social norms message stating that "Most [school mascot] have 0-4 drinks on their 21st Birthday." The social norms data used for this message were based on a pilot study (n=583) conducted at this same institution, thus participants are receiving normative information about their fellow students 21st birthday drinking behaviors .[21] Cohort 3 or the intervention by risk reduction (RR) cohort received the control card and coupons plus eight risk reduction tips for preventing alcohol over-consumption and related consequences. Cohort 4, or the combination intervention cohort (COMBO), received a combination of the control birthday card, coupons, social norms message and the risk reduction tips.

Assessment Instrument

Three days following their 21st birthday, all study participants received an electronic survey consisting of 21 items. The survey items were modified and adapted from the standardized Core Alcohol and Drug Survey Long Form developed by Dr. Presley and colleagues.[22] Other nationally recognized college alcohol instruments were also reviewed and utilized including the National College Health Assessment and the College Alcohol Survey.[1] The 21st Birthday Survey was analyzed by a variety of experts including a college health promotion specialist, a student affairs administrator, an alcohol and drug researcher and an epidemiologist. The survey was designed by the institution's coordinator of Alcohol & Other Drug Prevention. The 21st Birthday Survey was pilot-tested with 583 selected members from the target audience.[21] Demographic items assessed participant sex and race, as well as membership in a social Greek fraternity or sorority. Survey items also asked students if they received the electronic birthday card from the Dean of Students Office and whether they redeemed the coupons for the free ice cream, movie, or pizza, respectively. Response options for these questions were dichotomous (yes/no). To determine students' 21st birthday alcohol consumption normative beliefs, two items required students to estimate what percentage of their friends they believe consumed five or more drinks on their own 21st birthday and what percentage of students at their university they believe consumed five or more drinks on their own 21st birthday. Subsequent to these questions, the following item asked students if they consumed alcohol on their 21st birthday; response options were again (yes/no). The survey was terminated if the student indicated no alcohol consumption. Students indicating alcohol consumption on their 21st birthday were asked to estimate the number of hours they spent drinking on their birthday, the number of alcoholic drinks consumed and the number of free drinks received from bartenders/wait staff on their birthday (the standard definition of one drink was included on the survey.) For comparison purposes students were also asked to report the number of drinks they consumed the last time they partied or socialized, not including their 21st birthday. For each question the response options for the number of hours partied, number of drinks consumed and free drinks received ranged from zero to 24 or more, in increments of one.

The survey concluded by asking students to report whether, on their 21st birthday, they experienced any of the alcohol-related consequences including: having a hangover, vomiting, driving after drinking, driving after five or more drinks, suffering memory loss, injuring oneself, fighting, doing something they later regretted, being arrested, being taken advantage of sexually, having unplanned sexual activity, and/or having unprotected sex. The response option for each alcohol consequence was dichotomous (yes/no). Lastly, utilization of protective strategies was assessed by asking students if they had employed any of the following while celebrating their birthday: setting a limit to the number of drinks consumed, drinking slowly, minimizing the number of hours drinking, drinking water, eating before drinking, avoiding drinking games, designating a friend to tell them when they have had enough to drink, and utilizing safe transportation. The response option for each of these protective strategies was dichotomous (yes/no).

Data Analysis Procedures

Participant responses were collected electronically and disseminated into Excel files depending on the cohort they were randomly assigned to pre-intervention. Then files were merged and entered into the Statistical Package for Social Sciences (SPSS), version 16.0. Descriptive statistics determined the number of drinks consumed, alcohol-related consequences, perceived social norms and the use of protective factors among students celebrating their 21st birthday. To assess intervention efficacy an analysis of variance (ANOVA) was conducted to determine differences among the four cohorts on the abovementioned key indicators. Appropriate post-hoc tests were conducted when indicated.

RESULTS

21st Birthday Alcohol Use

Among all participants, the mean number of drinks consumed was 6.8 (SD = 5.7) and the total number of hours spent drinking was 4.1 (SD = 4.0). Table 2 illustrates that the COMBO cohort reported consuming the highest mean number of drinks (7.3, SD = 6.1) and also yielded the highest mean number of hours spent drinking 4.5 (SD = 4.1), however neither of these differences were statistically significant when compared to the other three cohorts.

Participants in both the second (SN) and fourth (COMBO) cohorts received the social norms message attempting to correct misperceptions regarding the amount of alcohol students consumed while celebrating their 21st birthday. The message stated that the majority of students drink 0-4 drinks on their 21st birthday. However, in spite of the social norms intervention message, a high percentage (66.8%) of participants, believed that their fellow students consumed five or more drinks on their 21st birthday. Students in both the SN cohort and the COMBO cohort estimated, on average, that 61.4% and 65.1% of fellow students consumed five

or more drinks, respectively. Approximately 43% of all participants consumed five or more drinks on their 21st birthday.

The mean difference in the number of drinks consumed on one's 21st birthday (M = 6.8, SD =5.7), when compared to the number of drinks consumed the last time the student partied, M= 3.6, SD = 3.8) indicated that the 21st birthday celebration nearly doubles the number of drinks students report consuming the last time they partied (t = 27.5, df = 541, P = 0.001). This difference is consistent across all four cohorts. Gender differences also indicate that males consume an average of 9.3 drinks (SD = 7.1) on their 21st birthday compared to a mean non-birthday consumption of 4.9 drinks (SD = 4.9; t = 18.4, df = 195, P = 0.001). Females report consuming less alcohol on their 21st birthday than males; on average females consumed 5.3 drinks (SD = 4.2) compared to a mean consumption of 2.8 drinks (SD = 2.6) the last time they partied (t = 23.7, df = 345, P = 0.001).

Table 3 reveals that 21st birthday alcohol consumption varied among participants with 20.3% consuming 10 or more drinks, 22.6% consuming 5 to 9 drinks, while another 32.7% reported having 1 to 4 drinks, and approximately 24% of the participants reported abstaining from alcohol consumption.

Incentive Redemption

To determine the utilization rate of the birthday coupons, students were asked to report which, if any, of the coupons they redeemed. Of the three coupons offered, the ice cream coupon was redeemed most often (16.6%), followed by the movie theater coupon (5%) and free pizza coupon (5%).

Table 2. Mean Alcohol Use among Cohorts

Cohort	Control (SD)	SN (SD)	RR (SD)	Combo (SD)
Drinks consumed on birthday	6.8 (5.6)	6.1 (5.2)	6.9 (6.1)	7.3 (6.1)
Hours spent drinking on birthday	3.9 (3.6)	3.5 (2.4)	4.7 (5.2)	4.5 (4.1)
Number of free drinks received	1.3 (2.7)	1.1 (1.9)	1.7 (4.2)	1.6 (3.8)
Perceived % of friends consuming 5 or more drinks on 21st birthday	60.5 (33.9)	56.6 (36.3)	57.6 (36.5)	59.9 (34.2)
Perceived % of fellow students consuming 5 or more drinks on 21st birthday	66.8 (25.6)	61.4 (26.3)	64.6 (27.5)	65.1 (26.9)
Number of drinks last time partied	3.9 (3.8)	3.1 (3.6)	3.8 (4.3)	3.5 (3.3)

Notes: Control represents the card with the birthday message and coupons. The card with the control message and the social norms message is SN. The card with the control message and the risk reduction tips is represented by RR. Combo refers to the card with all three messages. There was no significant difference found between the four cohorts concerning the number of drinks consumed (F = 1.001, df = 3/538, P = 0.392). There also was no significant difference found between the mean number of hours spent drinking among the four cohorts (F = 2.517, df = 3/538, P = 0.057).

Table 3. Drinking Levels by Cohort

Cohort	Control (N=188)	SN (N=165)	RR (N=190)	Combo (N=159)
Extreme (10+ drinks) %	20.1	18.2	20.0	21.5
High Risk (5-9 drinks) %	24.5	21.2	22.6	22.1
Social (1-4 drinks) %	31.9	38.2	32.6	28.5
Abstainers (0 drinks) %	22.5	23.6	24.7	26.6

Notes: Control represents the card with the birthday message and coupons. The card with the control message and the social norms message is SN. The card with the control message and the risk reduction tips is represented by RR. Combo refers to the card with all three messages. There was no statistically significant difference found between the four drinking levels and the four cohorts. Extreme (F = 0.609, df = 3/538, P = 0.610); High Risk (F = .207, df = 3/699, P = 0.892); Social (F = 1.176, df = 3/699, P = 0.318); Abstainers (F = 0.326, df = 3/697, P = 0.807).

Negative Consequences and Protective Behaviors

When asked to report negative consequences associated with 21st birthday alcohol consumption, Table 4 shows that participants most often reported having a hangover (29.2%), followed by vomiting (20.3%) and experiencing a blackout or memory lapse (19.7%). There were no statistically significant differences among the four cohorts.

Table 5 illustrates the protective behaviors employed while celebrating their 21st birthday. Most students (91.8%) reported using safe transportation and another 88.9% reported eating before drinking. Approximately 70% of students reported drinking water in addition to drinking alcohol. Again, differences in protective behaviors employed among the cohorts were not statistically significant.

Table 4. Negative Consequences among All Cohorts (N=702)

	% respondents
Hangover	29.2
Vomited	20.3
Blackout (memory loss)	19.7
Did something later regretted	7.5
Physically injured	5.4
Unprotected sex	5.0
Got into a fight or argument	4.7
Drove after drinking	4.5
Unplanned sexual activity	4.1
Taken advantage of sexually	1.9
Drove after drinking 5 or more drinks	1.9
Arrested or ticketed	0.4

Table 5. Protective Behaviors Used among All Cohorts (N=702)

	% respondents
Used safe transportation	91.8
Ate before drinking	88.9
Drank water during drinking	70.0
Paced drinking	60.0
Avoided drinking games	57.4
Minimize hours drinking	39.5
Set limit to number of drinks	30.8
Designate friend to tell you when they've had enough	28.2

DISCUSSION

Excessive alcohol consumption associated with 21st birthday celebrations remains a high-risk event for a significant percentage of college students.[2,4,8] The purpose of this study was to determine if social norms or risk reduction interventions, delivered electronically, either alone and/or in combination would alter 21st birthday alcohol consumption patterns and the associated negative consequences.

Consistent with previous findings,[2,4] the present study failed to yield any statistically significant differences among the treatment or control groups. Perhaps, because all groups received basic health education concerning alcohol use and alternatives, this negated the impact of the other interventions. However, the large majority of students did not redeem their coupons for pizza, ice cream or a movie indicating the need to reassess the use of this technique as an intervention for excessive alcohol consumption on students' 21st birthdays. This finding makes it vital for researchers and university officials to understand what type of incentive would motivate students to consider/adopt alcohol alternatives on their 21st birthday.

Social norm campaigns surrounding 21st birthday celebrations also require additional research. More effective interventions are needed to change misperceptions concerning the alcohol consumption rates students portray among their peers. In the present study, students significantly over-estimated the number of drinks their peers consumed on their 21st birthday, in spite of receiving the birthday card containing the social norms message. Approximately two-thirds of students estimated their fellow students drank five or more drinks on their 21st birthday, while roughly two-fifths of students reported drinking at these rates. This raises concern regarding the believability of social norm messages. These findings are similar to a related study on the believability and effectiveness of the social norms messages where only 27% of respondents believed "The majority of students drink 0 to 4 drinks when they party."[23] Evidently, students' experiences and perceptions seem to override or offset the social norms message(s). These findings add to the growing body of literature indicating that social norms messages alone are not effective in decreasing high-risk drinking among college students.[2,8,12,13,24,25]

Whereas statistically significant differences in the use of protective behaviors or

risk reduction strategies were not found among the cohorts, a high percentage of students reported engaging in these behaviors. Almost all students reported using safe transportation (91.1%) and eating prior to alcohol consumption (89.1%). Also, well over 50% of the respondents reported drinking water along with drinking alcohol or avoided drinking alcohol altogether. Students' knowledge of the risk reduction factors may have resulted from previous educational efforts, vicarious learning or "common sense."

However, recent research conducted by LaBrie and colleagues[26] indicates that a 21st birthday intervention which includes harm reduction strategies and social norms, and highlights alternative celebratory activities can yield significant reductions in alcohol consumption. This intervention was paper-based rather than electronic and also included reminders. Apparently, resident advisors wrote a personal note to each student who was turning 21 in their respective residence hall or floor. Perhaps this personalized care is more effective in influencing behavioral change than a standard birthday card sent by the university. Although, the sample size (n=81) for this study was small calling into question the validity of the results. Further, residence halls (two control and two treatment groups) were randomized for this study rather than participants. Establishing group equivalence at the onset of the intervention can minimize internal threats to validity due to selection bias, but no such procedures were enumerated in their study. Finally, intervention specific cohorts were not established in this inquiry so we do not know if participants were influenced by the social norms message, harm reduction strategies, or the alternatives listed.[26]

There are also limitations in the present study which are not uncommon with studies in the social science field. First, the accuracy of establishing the correct number of drinks consumed may have been compromised by using self-report data. Students who drank excessively may have had trouble accurately recalling the number of drinks they consumed. Other students may have exaggerated the number of drinks to conform to what they believe is the "drinking norm." Whereas the sample size in this study was adequate, it may not have been large enough to detect small differences, subjecting it to Type II error. One area of concern is that females were overrepresented in study; however, this finding is consistent with other online data collected at this institution.[3,5] The results of this investigation are from a large public university in the southeast; consequently, drinking patterns and motivations for drinking may vary from school to school. Also, the intervention and related assessments only addressed participants' celebrations on the actual night of their 21st birthday; thus students who choose to celebrate their 21st birthday at other times were not reported in this study. Finally, we did not track the number of students who actually read the birthday card, nor do we know if students opened up the electronic attachments (with specific intervention messages) they received. This may help to explain why no differences were found among the intervention and control groups.

TRANSLATION TO HEALTH EDUCATION PRACTICE

Developing interventions which target individuals turning 21 represent the foundation of a comprehensive prevention plan. However, the results from this study suggest that social norm or risk reduction messages and or the mechanism for delivering these messages (e-mail) needs improvement. For example, given that males drink substantially more than females on their 21st birthdays perhaps prevention messages need to be gender specific; although, previous research indicates that this strategy has not yielded significant behavioral change.[7] Perhaps, future 21st birthday interventions need to extend beyond targeting the individual to yield behavior change. Considering that 21st birthday celebrants generally do not celebrate alone, designing interventions to address peers, friends or parents may represent another way to remedy the heavy drinking associated with 21st birthdays. Tailoring a message to those who may have to "care for" their friend on their birthday could possibly affect the way the night is celebrated. Involving parents or legal guardians may also prove useful in preventing the tragedies associated with 21st birthdays; however, Hembroff et al[7] reported deleterious effects (treatment group engaged in fewer self-protecting behaviors, experienced more alcohol-poisoning risk outcomes and consumed more alcohol) with this intervention strategy. Nevertheless, involving parents and or legal guardians on the day/night of the 21st birthday remains an area ripe for research.

Altering of the social and physical environment during 21st birthday celebrations may be more effective than trying to change a person's behavior directly. For example, on average, respondents in this study received at least one free drink from bar/restaurant wait staff on their birthday. Emulating the state of Michigan's policy making it illegal for bartenders to distribute free drinks for birthday celebrations[8] should be considered. In addition, training and enforcement of policies requiring bartenders and/or wait staff to discontinue service to those who are visibly intoxicated represents a promising, if not fundamental prevention strategy.

In conclusion, the 21st birthday celebration is a complex ritual which is wide spread in college communities. Results from this study suggest the need for a multi-tiered intervention if this behavior is to be changed. Indeed, many students develop strong intentions and expectancies concerning celebratory drinking well before their 21st birthday; thus, traditional interventions, may be implemented too late and lack the wherewithal to foster meaningful change. The perceived role of the 21st birthday celebration as a "rite of passage" most likely requires a behavior change strategy employing efforts more substantial than a health message and alcohol free alternatives. Nevertheless, while the interventions incorporated in the present study were unsuccessful in reducing alcohol consumption rates, additional research utilizing rigorous methodological standards needs to be conducted before definitive conclusions can be made regarding

electronic, individual based, 21st birthday interventions.

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