

# Evaluating a Fear Appeal Message to Reduce Alcohol Use among “Greeks”

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**Objective:** To evaluate the impact of a fear appeal message on college students' drinking behavior using the extended parallel process model. **Method:** A survey was administered to a random sample of undergraduates (n=224) in 38 national fraternal organizations. **Results:** Both perceived efficacy and perceived threat were significantly correlated with

drinking behavior. There was a significant difference both in drinking behavior and attendance at alcohol-free events between those who heard and those who did not hear the message. **Conclusions:** Theoretically based fear appeal messages may be a useful way to promote responsible drinking among college students.

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**A**lcohol abuse is a major problem on American college campuses.<sup>1-5</sup> Many studies<sup>2,5,6</sup> have revealed consistently high rates of alcohol use among the college population. Wechsler, Dowdall, Maenner, Gledhill-Hoyt, and Lee<sup>7</sup> found

that 80.9% of all college students drink alcohol. Additionally, college students have the highest rate of binge drinking and are at an even higher risk for heavy episodic drinking compared to peers not attending college.<sup>6</sup>

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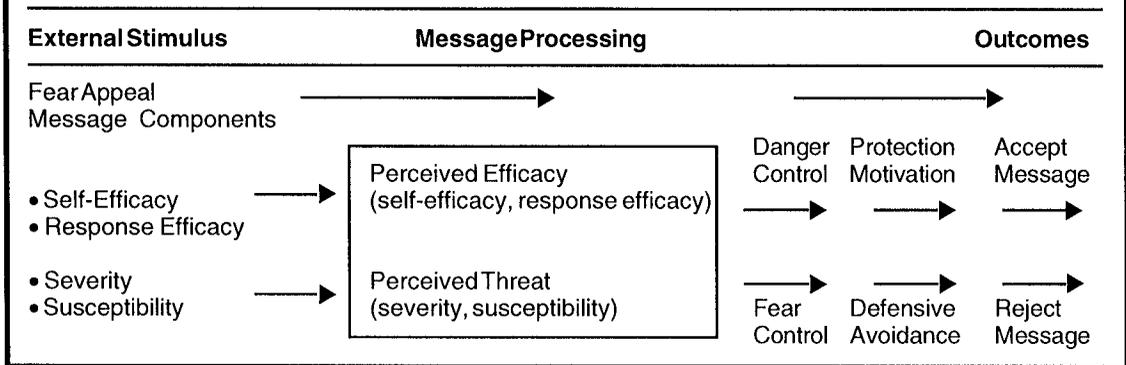
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Overconsumption of alcohol among members of the “Greek” system is even higher than that of the general population of college students. Many researchers<sup>8-12</sup> have found that undergraduate members of national social fraternities and sororities drank more frequently and more heavily than did their “non-Greek” counterparts. Other researchers have noted a similar relationship between fraternity or sorority membership and increased alcohol consumption.<sup>7,13,14</sup> Excessive alcohol consumption has continued despite attempts by colleges and universities as well as national fraternal organizations to promote safe and responsible drinking behavior among members of the Greek system.<sup>1,12,15</sup>

One way to attempt to manage the prob-

**FIGURE 1**  
**The Extended Parallel Process Model (EPPM) Adapted From Witte<sup>26</sup>**



lem of binge drinking on college campuses is to use fear appeal messages that motivate students to drink responsibly. A fear appeal message attempts to arouse the emotion of fear by depicting a personally relevant and significant threat (eg, being arrested and prosecuted for alcohol consumption) and outlines feasible and effective recommendations (eg, reducing alcohol consumption, drinking responsibly) to deter that threat.<sup>16</sup> Research has shown that such fear appeal messages are effective when they contain an efficacy component and are designed according to theory.<sup>17-22</sup> Furthermore, there is a well-established and extant body of literature in the disciplines of social psychology and communication that considers fear appeal messages an effective form of persuasion.<sup>18,23</sup> More recently, fear appeal messages have been found especially effective in decreasing risky health behaviors.<sup>22,24,25</sup>

One theory stemming from fear appeal research is Witte's<sup>26</sup> extended parallel process model (EPPM). The EPPM is based on Leventhal's<sup>27</sup> danger control/fear control framework and Rogers'<sup>19,28</sup> protection motivation theory. As illustrated in Figure 1, a fear appeal message, including the 4 message components of self-efficacy, response efficacy, susceptibility, and severity, constitutes an external stimulus for the message receiver. Perceived efficacy includes self-efficacy, a belief in one's ability to carry out the recommended behavior, and response efficacy, the perception that the response will result in the desired outcome. Perceived threat of dan-

ger or harm in one's environment is determined by one's perceived severity of a threat and one's perceived susceptibility to that threat. When these 4 message components are present, the threat of the fear appeal message is appraised, and either fear control or danger control dominates message processing. If the perceived efficacy of the response proposed in the message is greater than the perceived threat of the message, the individual is motivated to protect him- or herself, and the message is likely to be accepted. When the perceived threat of the message is high and perceived efficacy of the recommended response is low, fear arousal is heightened, and the individual is motivated to become defensive, prompting the likely rejection of the message. Further, research consistently has shown that a high level of threat *and* a high level of efficacy in a fear appeal message produce the greatest amount of message acceptance; and when there are high levels of threat and low levels of efficacy, the message is rejected.<sup>21,26,29-32</sup>

The purpose of the present study was to use the EPPM<sup>26</sup> to evaluate a fear appeal message specifically designed for members of the Greek campus community. As the EPPM<sup>26</sup> purports, when perceived efficacy (ie, self-efficacy and response efficacy) and perceived threat (ie, susceptibility and severity) are high, the message will be accepted. In other words, higher perceived efficacy and threat should be associated with lower drinking behavior, and message acceptance would be negatively correlated with EPPM constructs.

Three main hypotheses were tested: (a) Levels of perceived efficacy and perceived threat were expected to be significantly and negatively correlated with drinking behavior; (b) students exposed to the fear appeal message presented during the intervention, regardless of attendance or hearing the message directly, were expected to reduce alcohol consumption more than those who were unaware of the message; and (c) significantly greater percentages of students who heard the message were expected to attend alcohol-free events versus those who did not hear the message.

## **METHOD**

### **Participants**

A random sample of 418 participants was drawn from the 3,285 residents of 19 fraternities and 19 sororities affiliated with a large Midwestern university. Of the 418 students, 289 (69.1%) had a valid campus address and received the study survey. Of the 289 students, 230 completed and returned the survey for a response rate of 79.6%. Of the 230 surveys returned, 6 were unusable. Random missing values were noted in another 16 surveys; consequently, sample size for analyses varied from 208 to 224 cases.

Respondents were 18-22 years old ( $M=20.4$ ); men constituted 36.5% of the sample and women 63.5%. The age and gender distribution of the sample accurately reflected the total population of the 38 local chapters of Greek students selected for this survey. Binge drinking behavior in the survey sample mirrored the results of a major national study<sup>7</sup> (see Results for additional information). With respect to the intervention message, 175 (78.1%) reported they heard the fear appeal message. Of those, 101 (57.7%) reported they heard the message by attending the intervention, a "community standards panel" (see below), and 74 (42.3%) heard the message from a secondhand source. Of the 74 who heard the message from a secondhand source, 72 (97.3%) heard it through a chapter member or officer, and 2 (2.7%) heard the message from television or radio.

### **Procedures**

**Recruitment.** A nested audience-segmentation hierarchy<sup>33</sup> was used to reduce intervention costs and target those most at risk and likely to benefit from the

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intervention.<sup>34</sup> Rather than focusing on the total number of students on campus, Greek students were targeted because of their history of alcohol-related risk behaviors. Rather than focusing on all Greek students on campus, only those most at risk for alcohol abuse were targeted. Those Greek chapters identified as most at risk were the 19 fraternities and 19 sororities who elected to participate in "pairings" during the target event. A pairing meant that Greek chapters (one fraternity and one sorority house) self-selected each other for socializing (ie, partying together). The social pairings occurred during a large, festive, weeklong set of campus activities that culminated in an outdoor event traditionally associated with excessive alcohol consumption.

**Intervention.** The intervention was a fear appeal message designed according to the message components of the EPPM<sup>26</sup> (see left side of Figure 1). An 11-member community standards panel was convened that included a spokesperson from the office of the dean of students, the Greek judicial board, a judge, and 8 law enforcement agencies. Members of the panel frequently repeated the following message: "Students who are underage and/or are intoxicated will be arrested and prosecuted. We will be carefully monitoring all activities for alcohol use and abuse throughout the week." The message also stated that a county court would be convened on campus and would be open to all who wished to witness legal proceedings and consequences pertaining to alcohol-related arrests. The 3 prior sentences comprise the susceptibility and severity message components of the EPPM. In addition, self-efficacy and response efficacy were addressed by a recommendation that if students chose to drink alcohol, they

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***The survey was developed and pilot tested with 30 college students who were not members of the Greek population.***

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should reduce their consumption and drink responsibly so as not to attract the attention of law enforcement. The message was designed to be persuasive, emotionally arousing, and illicit fear via message processing. The message processes were initiated by depicting a personally relevant and significant perceived threat (ie, being arrested) and suggesting perceived efficacy for deterring the threat (ie, reduce consumption and drink responsibly).

Approximately 1,000 students attended the panel. Every fraternity and sorority president, risk management chair, and social chair from the 19 pairs of chapters were required to attend. The Greek judicial board mandated that all campus chapters that had a current alcohol infraction had to have 95% of their membership in attendance. The intervention, however, was not restricted to Greek students, but was open to any student who wished to attend.

Letters announcing the panel were personally addressed and mailed to each president of all student organizations. Fliers posted in campus buildings provided the date, time, and location of the event. In addition, local media, including campus and community newspapers and television stations, were notified about the event. Two community newspaper representatives and one television anchor attended the panel presentation and published or aired stories about the event.

**Survey.** Witte's<sup>16,35</sup> survey was adapted for alcohol-related behavior to assess the EPPM. Items from Wechsler et al<sup>7</sup> were used to assess alcohol consumption. The survey was developed and pilot tested with 30 college students who were not members of the Greek population. Word-ing of items was modified based on the students' suggestions to improve clarity and readability. The final self-administered survey used in this study contained 42 objective items. The Flesch Reading Grade Level was 7.4.

Six items of the survey focused on demographic information (ie, age, sex, year in school, full-time student or not, residence type, race/ethnicity), 3 on whether the person attended the panel presentation and heard the fear message or not, 11 on alcohol consumption and drinking behaviors, and 22 on EPPM variables and the effect of the fear appeal message. The 22 items related to the EPPM were composed of the following 5 constructs: (a) 6 items to assess fear (eg, "How much did this message make you feel frightened?"), (b) 8 to measure self-efficacy (eg, "I felt I was able to reduce drinking alcohol during 'the event'"), (c) 2 to evaluate response efficacy (eg, "My reducing drinking is effective in preventing arrests during 'the event'"), (d) 3 to measure perceived susceptibility of the threat (eg, "I felt at risk for getting arrested during 'the event'"), and (e) 3 to assess perceived severity of the threat (eg, "I believe drinking alcohol is a serious threat to my health"). Each of these items was measured on an ordinal 7-point Likert-type scale with 1 = Strongly Disagree, 7 = Strongly Agree (at opposite ends of the continuum), and 4 = Neutral (in the middle). Summing across the items developed scales for each of the EPPM constructs. The Cronbach alphas for the fear, self-efficacy, response efficacy, susceptibility, and severity scales were .86, .75, .40, .74, and .83, respectively. The lower Cronbach alpha for response efficacy was most likely due to only 2 items composing the scale.

There were 11 alcohol and drinking behavior items measured on either a nominal or ordinal scale. These items were used to assess the historical drinking behavior and quantity-frequency drinking assessments, drinking classification, and event-specific drinking. According to O'Hare,<sup>36</sup> quantity-frequency drinking behavior assessments are the assessment of choice (based on a comparison of alcohol consumption measurement methods). The 11 items constituted 5 categories. Item stems for each category are noted as follows: (a) drinking history (ie, "Have you ever drunk any alcohol?" and "Have you drunk any alcohol in the last 6 months?"), (b) drinking frequency (ie, "How would you describe your pattern of drinking over the past 6 months?", "How many occasions have you had a drink of alcohol in the past 30

days?", and "In the past 30 days, how often did you drink enough to get drunk?"), (c) drinking quantity (ie, "How much do you typically drink when you have alcohol?", "What is the most you have had to drink on 1 occasion in the past 6 months?", "In the past 30 days, on those occasions when you drank alcohol, how many drinks did you have?", "Think back over the last 2 weeks, how many times have you had 5 or more drinks in a row?"), (d) drinker classification (ie, "How would you describe yourself as a drinker?"), and (e) event-specific drinking (ie, "Did you reduce your drinking behavior during the target event?"). The survey was distributed 5 months after the intervention.

### Independent and Dependent Variables

The independent variables were constructs of the EPPM (ie, self-efficacy, response efficacy, susceptibility, and severity).<sup>26</sup> The effect of the intervention was evaluated by correlating each of the EPPM constructs with the dependent variable (ie, self-reported alcohol consumption during the target event), and comparing differences in alcohol consumption and attendance at alcohol-free events between those who heard the fear appeal message and those who did not. In addition to the variables used to assess the EPPM, the number of alcohol-related arrests during the target event was compared to historical arrest records during past target events. These records were obtained from 3 law enforcement agencies for the years 1992-1999. Total number of arrests per year was divided by the total number of students enrolled that semester to adjust for differences in the total number of students enrolled.

Another assessment of the influence of the intervention was liquor-store alcohol sales, which were obtained for the years 1989-1999. The liquor store used for the analysis was close (within ½ - 1 mile) to the Greek chapters' houses and other student housing developments. The liquor store is considered a student, not a community, liquor store because almost all patrons are college students. The total sales per year were adjusted for yearly inflation rates. Historical records of alcohol sales were compared to those of the target year. The association between alcohol sales and alcohol-related arrests also was computed.

### Research Design and Statistical Analyses

A cross-sectional posttest design (survey

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## ***The total sales per year were adjusted for yearly inflation rates.***

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administration) with historical data was applied. Survey responses were used to evaluate the efficacy of the fear appeal intervention in accordance with the 3 main hypotheses. Historical data served as controls for alternative explanations with respect to changes in alcohol-related arrests and alcohol sales. Subjects in years prior to the study intervention were not exposed to the fear appeal message. Multiple years of data represent a more stable baseline for evaluating trends and whether the change (interruption in the "time series") was due to chance or to the intervention and whether the change was instantaneous or delayed.<sup>37</sup> There was no way to identify prior to the target-week events a subset of the target population that was isolated from the fear appeal message and then to take a control sample from that subset. In addition, a group could not be isolated as a control group because they would have been excluded from hearing the fear appeal message and participating in the alternative events, which would have been antithetical to the purpose of the intervention. One possible alternative was to select a control group from the general population. These students, however, are generally less at risk.<sup>8-12</sup> A latter difference in arrests or alcohol sales would be confounded with any intervention effect due to the controls being from a different population. For these reasons, historical controls provided the most viable option for testing any intervention effect hypothesis related to arrest rates or alcohol sales.

Potential challenges to the results were examined in 3 ways. First, power calculations were computed to estimate whether the sample size was sufficiently large to detect a significant difference if one truly existed in drinking behavior, test constructs of the EPPM, and examine whether hearing the fear appeal message made any difference in alcohol-related behavior. Second, evaluation of quantity and frequency of alcohol consumption was compared with results from national stud-

**TABLE 1**  
**Self-Reported Student**  
**Drinking Behavior**

Classification	n <sup>a</sup>	%
Infrequent drinker	41	18.3
Light drinker	70	31.3
Moderate drinker	102	45.5
Heavy drinker	11	4.9

<sup>a</sup> n = 224; 6 cases were not included because of missing data.

ies to ascertain representativeness of the study data. Third, the validity of the relationship between alcohol sales, arrests, and drinking behavior was examined by exploring whether alternative explanations might account for demonstrated relationships. The alternative explanations investigated are as follows: (a) temperature and alcohol sales, (b) temperature and alcohol-related arrests, (c) historical weather conditions (ie, rainy, sunny, or cloudy) and alcohol sales, (d) historical weather conditions and alcohol-related arrests, and (e) involvement in 3 separate alcohol-free activities and drinking behavior during the target event

Statistical analyses were computed using SPSS 9.0. Descriptive statistics were calculated for all variables. Pearson product-moment correlations were calculated to examine the relationships between EPPM variables and drinking behaviors occurring at the target event. Chi-squared analyses were computed to compare the drinking behavior and attendance at alcohol-free events of those who heard and those who did not hear the fear appeal message. A comparison of arrest records to historical data was calculated using a standard z test. Target-year arrests were compared to those of the previous years, 1998 and 1997, using a standard z test. A z test also was used to compare the mean of prior years 1992-1998 against the target year, 1999. A one-sample t test<sup>38</sup> was used to compare prior years' alcohol sales to the target year, 1999. Finally, a Pearson product-moment correlation was computed using alcohol sales and arrest records for the corresponding years.

Power estimates were calculated to determine if sample sizes were sufficient to

detect meaningful differences, if they existed, in response percentages between subgroups who did and did not hear the fear appeal message or between subgroups who did and did not attend one or more alcohol-free events. Chi-squared analyses and a z test were used to compare drinking behavior of the sample with national statistics. A Pearson product-moment correlation was computed to test alternate explanations related to alcohol sales and alcohol-related arrests because both are measured on interval scales of measurement. A Spearman rank-order correlation was used to test the alternative explanation related to the relationship between weather conditions measured on an ordinal scale and alcohol sales and alcohol-related arrests measured on an interval scale.

## RESULTS

### Potential Challenges to the Results Power calculations.

All power estimates were at an alpha level of .05. Among those who were more than infrequent drinkers, the sample size was sufficiently large to detect a difference in the percentages who reduced drinking during the target event and subgroups who did and did not hear the message. The power was ~75% for a .5 standard deviation (SD) and exceeded 80% for a difference of .53 SD or more. Similarly, for comparisons between subgroups who did and did not attend an alcohol-free event, the power to detect a .5 SD difference was ~87%.

**Sample representativeness and seriousness of drinking behaviors.** The sample was representative of the national population of Greek students in terms of drinking behaviors. The sample of Greek students surveyed in the national study conducted by Wechsler et al<sup>7</sup> showed that 65.0% binge drank. In the present study, 70.4% binge drank, representing a difference of 5.4% between the 2 samples. The binge drinking rates did not differ significantly between the 2 studies,  $\chi^2(1, N=223)=2.858, p=0.091$ .

Subcategories of frequent, occasional, and nonbinge drinkers also were compared. Wechsler et al<sup>7</sup> have defined "frequent" binge drinkers as students who binge drink 3 or more times in a 2-week period. A complex chi-squared test showed that overall the current sample (n=158) binge drank significantly more often than did the national average of college students (n=6186),  $\chi^2(2, N=223)=28.93$ ,

$p < .001$ . A post hoc test revealed that there was a significantly higher percentage (13.4%) of respondents in the present study ( $n=77$ ) versus the national sample ( $n=3006$ ) who were frequent binge drinkers,  $z=2.01$ ,  $p=.0018$ . Similarly, there was a significantly higher percentage (14.4%) of "occasional" binge drinkers (defined as binge drinking 1 or 2 times in a 2-week period) among sample respondents ( $n=81$ ) versus the national sample ( $n=3,180$ ),  $z=3.10$ ,  $p=.001$ . Finally, there was a significantly lower percentage (9.6%) of students in the test sample defined as "nonbinge" drinkers ( $n=65$ ) than in the national sample ( $n=5,562$ ),  $z=5.30$ ,  $p=.00003$ . These data suggest that the study sample was at high risk and appropriate to target for intervention.

The data presented in this and the next 3 paragraphs also suggest the target group represents a high-risk population. The self-reported drinking behavior of this sample indicates that almost all of the students (99.1%) drank alcohol, and almost all (97.8%) had done so in the last 6 months. Over three quarters of all respondents (77.5%) reported drinking an alcoholic beverage at least once or twice per week. Of these students, 39.2% reported drinking alcohol at least 2 times per week. Only 11.7% reported drinking less than 6 times over the past 6 months, and 10.8% reported drinking alcohol only once or twice per month.

Table 1 shows self-classification of drinking habits as reported by student respondents. Over half of the students (50.4%) in this sample classified themselves as "moderate" or "heavy drinkers," and 18.3% classified themselves as "infrequent" drinkers. Almost a third (31.3%) of the sample considered themselves "light" drinkers.

Table 2 shows the number of "binge" drinkers or those who drank 5 or more drinks in one sitting during the past 2 weeks. Over a third (34.1%) binge drank 3 or more times in the past 2 weeks. Another third (36.3%) stated that they binge drank at least once or twice in the past 2 weeks. Finally, 29.6% of the respondents indicated that they had not binged in the past 2 weeks.

**Alternative explanations.** There was minimal support for alternative explanations to the study findings. A significant relationship was found between historical temperature data and arrests, as well

**TABLE 2**  
**Number of Times Binged on Alcohol in Past 2 Weeks**

Response Option	n <sup>a</sup>	%
None	67	29.9
Once	43	19.2
Twice	38	17.0
3-5 times	52	23.2
6-9 times	20	8.9
10 or more times	4	1.8

<sup>a</sup> n = 224; 6 cases were not included because of missing data

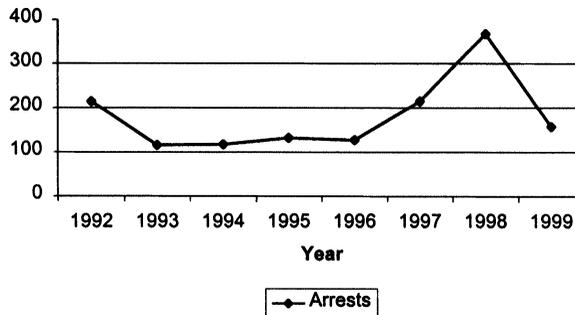
as alcohol sales,  $r(6)=-.84$ ,  $p=.009$ ,  $r(6)=-.79$ ,  $p=.021$ , respectively. However, there was no significant relationship between weather condition data and either alcohol-related arrests or alcohol sales,  $r(6)=.50$ ,  $p=.203$ ,  $r(6)=-.13$ ,  $p=.766$ , respectively.

### Study Findings

**Evaluation of the EPPM and intervention.** As hypothesized, most of the tenets of the EPPM<sup>26</sup> were supported. Perceived efficacy and perceived threat were both significantly and negatively correlated with drinking behavior,  $r(161)=-.40$ ,  $p < .01$  and  $r(167)=-.22$ ,  $p < .01$ , respectively. Further, and in accordance with the EPPM, fear of arrests was not correlated with drinking behavior,  $r(168)=-.01$ ,  $p=.91$ . Results for the EPPM variables produced significant negative correlations between self-efficacy, response efficacy, and severity and drinking behavior,  $r(162)=-.39$ ,  $p < .01$ ;  $r(169)=-.30$ ,  $p < .01$ ;  $r(169)=-.44$ ,  $p < .01$ , respectively. Only susceptibility was not significantly correlated with drinking behavior,  $r(169)=.14$ ,  $p=0.08$ .

As hypothesized, the theoretically derived fear appeal message was associated with drinking behavior. Among light to heavy drinkers (ie, excluding infrequent drinkers), a significantly greater percentage of those who heard the fear appeal message versus those who did not hear the message reduced their drinking during the target event,  $\chi^2(1, N=166)=14.69$ ,  $p < .01$ . Thus, these results show that a greater percentage of students who reported a level of drinking above "infrequent" and heard the message, regardless of

**FIGURE 2**  
**Total Alcohol-Related Arrests during the Target Event, 1992-1999**



whether or not they attended the intervention, reduced their drinking in comparison to those who reported that they did not hear the message.

Those who heard the fear appeal message tended to drink more responsibly and reported less alcohol consumption than those who did not hear the fear appeal message. Among subjects who heard the fear appeal message, 78.3% attended at least one alcohol-free event, whereas 59.6% of those who did not hear the message attended such an event. These percentages differed significantly,  $\chi^2(1, N=218) = 7.12, p=.0076$ .

**Analysis of historical arrest and alcohol sales data.** Historical data supported intervention findings. Figure 2 shows the total arrests during the target-event year, 1999, and prior years. There was a significant reduction in alcohol-related arrests between 1998 and 1999,  $z=9.34, p<.00003$ , between 1998 and 1997,  $z=6.14, p<.00003$ , and between years 1997 and 1999,  $z=3.46, p<.0003$ . Also, there was a significant reduction in the mean for years 1992-1998 in comparison to 1999,  $z=1.90, p<.0287$ . These results show a significant reduction in alcohol-related arrests between the target year and all other years to which comparisons were made.

Alcohol sales (adjusted for percentage of annual inflation) were analyzed for the years 1989-1999. Alcohol sales data suggest that, overall, students spent similar amounts in the years examined. One-sample t-test results indicated there was no significant difference between the target year, 1999, and prior year alcohol sales,

$t(10)=.83, p>.05$ . There was no significant correlation between the amount of alcohol sold and the number of alcohol-related arrests,  $r(14)=.04, p=.917$ .

### DISCUSSION

This study evaluated a targeted community public health intervention on college-student drinking behaviors at a large Midwestern university. The intervention was assessed using a survey based on Witte's<sup>16</sup> extended parallel process model, appropriate directional associations of key theoretical concepts with drinking behavior, reduction in drinking behavior associated with hearing the fear appeal message, appropriate directional changes in historical alcohol-related arrest data, and a null finding related to alcohol-sales data. Five alternative explanations for the outcome behaviors were considered and rejected. The explanations examined were the relationships between temperature and arrests and alcohol-sales during the target event, the effects of weather conditions on historical arrest records and alcohol sales, and involvement in any one of 3 alcohol-free activities versus drinking behavior during the target event.

The institution selected for the intervention and the target audience of Greek students were appropriate choices for this study. Students in the sample drank more frequently and more heavily than did the average college student. Greek students also binge drank more than national samples. These results suggest that the preponderance of Greek students in this study were alcohol abusers

and, therefore, an appropriate target group to test the EPPM and the intervention. Success on a campus with a profound drinking problem may have implications for similar successes on other campuses with a similar alcohol problem.

The hypotheses related to the intervention were supported. Three EPPM constructs (ie, self-efficacy, response efficacy, and severity) operated in accordance with the theory. These 3 constructs were significantly and negatively correlated with student drinking behavior. The variable fear, as expected, was not significantly correlated. Light-to-heavy drinkers who heard the fear appeal message, regardless of whether they heard it at the panel or from someone who attended, significantly reduced their drinking. Further support for the intervention was the significant difference found between historical arrest records and the target-year arrests. In 1999, arrests decreased by 42.7% from 1998 and by 27.0% from 1997. A significant difference was not found when historical alcohol sales data were compared to the target year, 1999. In other words, alcohol sales remained consistent during the immediate years preceding the intervention. Responsible drinking, as recommended by panelists, may be an explanation.

Another support for the use of the EPPM is that the fear appeal message did not seem to decay over time. Post hoc analysis revealed that of those 101 students who attended the panel and heard the message, 84 (83.2%) could recall the message. Of the 74 who did not attend the panel and heard the message from a chapter officer, another chapter member, or by another means, 46 (62.5%) could recall the message. Significantly more respondents could recall the message who heard it firsthand versus those who heard it secondhand,  $z=3.07$ ,  $p=.0022$ . These findings may contradict those reported by Witte,<sup>26</sup> who found when evaluating sunscreen blocks that even after a relatively extended timeframe of 6 weeks, there was a significant decay in attitude, intention, and behavior responses when compared to earlier responses. In the present study, the components of the message may have been so relevant to the study population that time did not diminish the effect, or the perceived severity was so dramatic that the intervention made a

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more lasting impression. A future study might further address the effect of time on the fear appeal message and examine the differential response in hearing messages firsthand rather than secondhand as well as the effect of different message components.

There were 5 alternative explanations considered during data analysis. Results indicate that temperatures during the event were significantly and negatively correlated with alcohol-related arrests and alcohol sales. One possibility may be that when temperatures are lower, students may remain indoors and out of public view. Students who drink indoors may not drink as responsibly as those who drink outdoors in full public view. No significant correlation was found between weather conditions and alcohol-related arrests or sales. Although these results may seem contradictory, it is important to stress that college administrators should focus on student accountability for their actions when attempting to combat the negative effect of temperature on drinking behavior. Finally, attendance at any one of 3 alcohol-free activities was not correlated with student drinking behavior during the target event. These results indicate that alcohol-free activities do not appear to influence student-drinking behavior.

The reduction in alcohol arrests also does not appear to be related to the addition of new policies regarding alcoholic beverages in chapter housing facilities. There was only one new alcohol policy ratified by the fraternal organizations during the study timeframe in 1997. This policy prohibited fraternity and sorority members from purchasing bulk quantities of alcohol and distributing them during social events at a chapter house. However, in 1998, when the policy was first implemented, alcohol-related arrests skyrocketed and reached an all-time high.

It also might be argued and be possible that the trend in alcohol-related arrests was affected by some significant anomaly in 1998. Accordingly, the 1999 figures may be the "expected" figures, if the 1998 data were removed. There was no evidence, however, of an anomaly affecting the data based on analyses of alternative explanations, reviews of historical records, knowledge of events such as higher alcohol-related arrests, or policy changes related to the use of alcohol on campus. The upward trend also seems cogent based on the upward trend observed since 1993. The upward 2-year trend in 1997 and 1998, however, was what prompted this university's administration to take "corrective" actions to promote the responsible use of alcohol.

This study has implications for both college administrators and student leaders. College administrators can use fear appeals as an effective way to discourage unhealthy or dangerous drinking behaviors. It seems important, however, to have both threat and efficacy components when relaying a fear appeal message. As Witte<sup>16</sup> suggests, if a message contains only threat components, fear control processes will produce message rejection. By employing efficacy components consistently with threat components, peers will be more likely to accept the message and recommendations provided. Student leaders also can learn from the results of this study when attempting to change behaviors among peers. The panel not only used credible outside sources to deliver the message, but also employed student leaders (eg, Greek judicial board and chapter presidents) to appeal to attendees. As the results indicate, students who did not attend the panel also "got" (heard) the message. Chapter leaders and/or other chapter members relayed the message as requested.

It is important to consider possible limitations of the findings. Cronbach alpha level (.40) was low for the variable of response efficacy. This lower level may be attributed to the small number of response-efficacy items. In future studies, more survey items might be developed and added in an effort to strengthen the scale and increase the alpha level. Another limitation of this study is self-report data because of recall bias due to inaccurate memory or response bias to provide socially acceptable rather than honest

responses. Pilot testing and anecdotal information, however, did not confirm that either were threats to internal validity. An additional consideration would be to replace the cross-sectional posttest design with a pretest-posttest analysis, quasi-experimental, or experimental design to better demonstrate treatment effectiveness and control for the influences of extraneous variables.

In summary, this study provides valuable information about a major nationally recognized problem on college campuses and research in an area where there is a dearth of published intervention studies related to the modification of drinking behavior of Greek college students. Theoretically based fear appeal messages may be an appropriate population strategy for changing student-drinking behaviors and reducing alcohol-related arrests. Results of this study may encourage college administrators and student leaders to continue to employ creative methods to reduce high-risk behaviors such as binge drinking on college campuses. ■

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