



Published in final edited form as:

J Subst Abuse Treat. 2010 April ; 38(3): 284–291. doi:10.1016/j.jsat.2010.01.004.

Hostility in mandated students: Exploratory analysis and implications for treatment

Caitlin K. Barthelmes, M.P.H.^b, Brian Borsari, Ph.D.^{a,b,*}, John T.P. Hustad, Ph.D.^b, and Nancy P. Barnett, Ph.D.^b

^aMental Health and Behavioral Sciences Service, Providence Veterans Affairs Medical Center, 830 Chalkstone Ave, Providence, RI 02908, USA

^bBrown University, Center for Alcohol and Addiction Studies, Box G-S121-4, Providence, RI 02912, USA

Abstract

College students mandated to receive an intervention following an alcohol-related campus violation are a high-risk group of students experiencing the negative effects of alcohol. Understanding the psychological properties associated with mandated students' alcohol use may provide useful clinical information. Hostility is a trait that has shown association with heavy drinking in adults but has gone unstudied in mandated students. We examined the relationship between hostility and a variety of drinking-related variables in mandated students ($N = 466$). Results indicated that individuals reporting higher levels of hostility reported riskier drinking and alcohol-related problems, yet exhibited ambivalence regarding their alcohol use. Findings are discussed in the context of treating mandated students exhibiting high hostility and risky drinking, a particularly challenging population.

Keywords

Hostility; Mandated students; Alcohol use

1. Introduction

Drinking behaviors on college campuses are a significant public health concern, and alcohol use continues to be a major contributor to morbidity and mortality for college students (Hingson, Edwards, Heeren, & Rosenbloom, 2009). College students have reported a higher prevalence of alcohol use and alcohol use disorders compared with their noncollege peers (Slutske, 2005). Heavy episodic drinking (HED), typically defined as five or more drinks for a male and four or more drinks for a female in about 2 hours (National Institute on Alcohol Abuse and Alcoholism, 2004), has been associated with an increase in negative consequences including academic failure, risky sexual practices, injuries, illness, and death (Perkins, 2002; Wechsler & Nelson, 2008).

At particular risk for negative consequences are *mandated students*, defined as students required to complete an intervention as a result of violating a school alcohol policy or receiving medical treatment for intoxication (Barnett & Read, 2005). These students report a higher percentage of heavy drinking episodes and typical weekly consumption as well as more alcohol-related negative consequences than their nonmandated peers (Barnett et al.,

*Corresponding author. Center for Alcohol and Addiction Studies, Box G-S121-5, Providence, RI 02912, USA. Tel.: +1 401 863 6659; fax: +1 401 863 6697. brian_borsari@brown.edu (B. Borsari).

2004; Fromme & Corbin, 2004; LaBrie, Tawalbeh, & Earleywine, 2006). It is possible that preexisting personality traits or cognitive schema may influence this risky drinking behavior.

One such trait, hostility, has been found to have important health implications in adults and college students, yet has been unstudied in populations of heavy-drinking students. Hostility, or cynical hostility, is the cognitive trait of people who are highly suspicious, resentful, and manipulating and who exhibit cynical distrust of others rather than overtly aggressive behavior or emotional distress (Hardy & Smith, 1988; Smith & Frohm, 1985). At the extreme, hostile individuals see fellow humans as dishonest, immoral, mean objects who should be punished for wrongdoings (Cook & Medley, 1954; Epps & Kendall, 1995; Smith & Frohm, 1985). Hostility has been identified as a risk factor for the development of cardiovascular disease and premature mortality across age groups (Miller, Smith, Turner, Guijarro, & Hallet, 1996). In adult populations, hostility is an independent risk factor for alcohol consumption (Boyle, Mortensen, Gronbaek, & Barefoot, 2008; Whiteman, Fowkes, Deary, & Lee, 1997).

Research with nonmandated college students has linked hostility levels with several factors. For instance, students with high hostility scores express more resentment than their lower hostile peers (Smith & Frohm, 1985), which may pose a threat to intervention success particularly for students who feel unjustly punished for a referral event. Hostile students also report more negative life events and daily irritants than less hostile peers; in addition, when talking about negative events with a friend, higher hostile students were less open and felt less comfortable during discussions than lower hostile individuals and also found such discussions to be challenging, upsetting, threatening, and difficult (Hardy & Smith, 1988; Holt-Lunstad, Smith, & Uchino, 2008). Therefore, hostile students may feel threatened by the processes the interpersonal interactions encouraged in interventions for college students (e.g., expressing empathy, inquiring about personal behaviors; Dimeff, Baer, Kivlahan, & Marlatt, 1999).

Although some hostility research has been conducted in college populations, these samples are typically composed of undergraduate volunteers enrolled in psychology courses. To date, there have been no studies of hostility in mandated students. Students violating school alcohol policies are already experiencing negative aspects of alcohol use, and many have been mandated to receive interventions (Barnett & Read, 2005). Therefore, the purpose of this study was to identify demographic, behavioral, and perceptual variables (e.g., reactions to the referral event) that are associated with hostility in mandated students. We paid particular attention to indicators of hazardous alcohol use and ambivalence about change, as they are central to any type of intervention provided to this at-risk group of students.

2. Method

Data were collected at a private, 4-year liberal arts university located in the Northeast. Enrollment of full-time undergraduates is roughly 3,800 (48% female), with 78% of undergraduates living on campus.

2.1. Participants

Participants had been mandated to the alcohol program following an alcohol-related offense or incident in the academic years 2005–2008. Students participated in the study as an alternative to a standard alcohol education session. Participants for this study were enrolled in an ongoing randomized, controlled trial evaluating a stepped care program for mandated college students (see Borsari & O’Leary Tevyaw, 2005; Borsari, O’Leary, Barnett, Kahler, & Monti, 2007). All students with a first-time alcohol offense are referred to the university’s

Alcohol Incident Referral Program (AIRP) by resident hall advisors or campus security. Students are required to pay a \$50 fine for their offense and to receive a brief alcohol intervention. Students were invited to participate in this project when they presented for their initial session at the AIRP. Those who declined to participate were provided the standard alcohol intervention—a 30-minute discussion of the drinking incident. Participants in the project fulfilled their obligation to the university and were paid \$15 for their paper-and-pencil baseline assessment, administered by an AIRP staff member. All procedures were approved by the university institutional review board.

Of 797 eligible students, 473 students (60%) enrolled in the study. Because of the small proportion of ethnic and racial minority participants in the sample ($n = 18$), the race variable was collapsed into White/non-White. General demographic analysis revealed that the sample was largely first- or second-year students (70.7% freshman; 21.0% sophomores) and primarily male (65.7%). All but 11 participants were under the legal drinking age of 21 years. The most common alcohol violation was alcohol possession (76.7%; see Table 1 for demographic information).

2.2. Measures

2.2.1. Demographic questionnaire—The measure records the participants' gender, age, education level, race and ethnicity, and grade point average (GPA).

2.2.2. Cook–Medley Hostility Scale (Cook & Medley, 1954)—This instrument is one of the most widely used measures of hostility (Ho), particularly for studies linking hostility with poor health outcomes and habits. To reduce participant burden, we used a 17-item version that was developed to reduce gender bias; this version correlated .93 and .94 with the original 50-item scale in a large gender-balanced sample and was also replicated in a large medical sample (Strong, Kahler, Greene, & Schinka, 2005). Sample items include, “I’m on guard with friendly people,” “Many are guilty of bad conduct,” and “I am often disappointed by others.” Items are scored on a dichotomous (yes/no) scale and are summed, with higher scores indicating higher levels of hostility.

2.2.3. Alcohol and drug use measure (Borsari & Carey, 2005)—This 14-item measure assesses drinking frequency, HED episodes, peak number of drinks on one occasion, age at first drink, and other drug use (including marijuana) in the past 30 days. HED was defined for men as consuming five or more drinks (four or more drinks for women) in a 2-hour period (National Institute on Alcohol Abuse and Alcoholism, 2004).

2.2.4. Alcohol Use Disorders Identification Test (WHO Brief Intervention Study Group, 1996)—This 10-item questionnaire has been evaluated for more than two decades and has been found to be an accurate measure of risk across gender, age, and cultures, including college students (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Kokotailo et al., 2004). It assesses three domains of drinking: hazardous alcohol use, dependence symptoms, and harmful alcohol use with items such as “How often have you had a feeling of guilt or remorse after drinking?” One benefit of this measure is that scores are easy to interpret. Scores range from 0 to 40, with scores of 8 or above indicating risky alcohol use. For college students, the Alcohol Use Disorders Identification Test (AUDIT) has displayed a primary capacity of identifying high-risk drinkers in the past 28 days, as opposed to past-year history of alcohol problems (Kokotailo et al., 2004). Mandated students have consistently shown elevated mean AUDIT scores (see Borsari & Carey, 2005; O’Hare & Sherrer, 2000).

2.2.5. Young Adult Alcohol Consequences Questionnaire (Read, Kahler, Strong, & Colder, 2006)—The 48-item, dichotomous questionnaire was developed specifically for measuring negative consequences specific to college students. Item samples include, “While drinking I have said or done embarrassing things” and “I have passed out from drinking.” The Young Adult Alcohol Consequences Questionnaire (YAACQ) provides an overall total score and eight subscale scores: social–interpersonal, impaired control, self-perception, self-care, risk behaviors, academic/occupational, physical dependence, and blackout drinking. Cronbach’s alphas in this sample ranged from .63 to .76, with the exception of blackout drinking ($\alpha = .30$). This scale was not used in subsequent analyses.

2.2.6. Alcohol and Drug Consequences Questionnaire (Cunningham, Sobell, Gavin, Sobell, & Breslin, 1997)—This 29-item measure assesses the costs and benefits of changing personal alcohol use. The two scales, costs (14 items; e.g., “I will feel bored”) and benefits (15 items; e.g., “I will save more money”), are rated on a Likert scale ranging from *not important* (1) to *extremely important* (5; “not applicable” is also an option). This measure displayed excellent reliability in this sample (costs $\alpha = .92$; benefits $\alpha = .93$) and was used as an indicator of ambivalence about alcohol use.

2.2.7. Event attributions and reactions measure (Longabaugh et al., 1995)—This six-item scale was originally developed to assess injury and event reactions to alcohol-related incidents in emergency department patients and has been used previously in studies of mandated students (Barnett et al., 2008; Borsari, Boyle et al., 2007). Items are scored on a 7-point scale from *not at all* (1) to *extremely or totally* (7). Principal component analysis of the current data set revealed two constructs measured by the questionnaire (responsibility for the event and aversiveness to the incident). Responsibility is evaluated by questions such as “To what extent was the event your own fault?” (three items, $\alpha = .71$). Aversiveness of the event is measured by questions such as “To what extent has this event upset you?” (three items, $\alpha = .61$).

2.2.8. Event Description—This open-ended, interviewer-administered measure was originally developed for use emergency settings and mandated students (Borsari, Boyle et al., 2007; Monti et al., 1999). The purpose is to record the participants’ description of the alcohol-related infraction through a verbal description. The interviewer also records the number of standard drinks consumed and duration of drinking, which can be used to estimate a blood alcohol concentration.

3. Results

Observations that were missing data for hostility level ($n = 7$) were excluded, leaving a total sample size of 466 participants for analysis. Outliers more than 3 standard deviations from the group mean were recoded as a value one beyond the next highest nonoutlier value (Fidell & Tabachnick, 2003).

We first performed correlations between the continuous measure of hostility and the variables of interest. Gender and race showed significant correlations with hostility ($p < .01$), with males and non-Whites showing higher scores of hostility than females and Whites but were not confirmed with independent t tests ($p > .05$). Alcohol use and problems displayed highly significant positive correlations with hostility ($p < .001$), whereas age at first drink displayed a significant negative correlation with hostility ($r = -.12, p < .01$). The costs of change and benefits of change also exhibited highly significant correlations with hostility ($p < .001$). Event responsibility and aversiveness both displayed weak correlations with hostility.

Modeling other studies (Hardy & Smith, 1988; Holt-Lunstad et al., 2008; Rhodes, Harrison, & Demaree, 2002), we then divided the sample into low, medium, and high Ho scores. The low Ho group includes scores ranging from 0 to 2 ($n = 177$), the middle Ho group contains scores from 3 to 4 ($n = 142$), and the highest Ho group includes scores of 5 and above, with a maximum sample score of 14 ($n = 147$). With an overall Ho median of 3 and mean of 3.6, the three groups reflect individuals below, at, and above the sample average.

To test for mean differences among the three groups, we performed chi-square tests (dichotomous variables) and one-way analysis of variance (continuous variables). The Scheffé correction for multiple-comparison tests was used because it remains valid under a wide variety of conditions (see Bender & Lange, 2001). Regarding demographics, age, gender, and GPA among the three groups did not differ significantly. Although the omnibus tests of race and year in school were significantly different, post hoc comparisons did not confirm any differences between groups in either category. Type of offense was also related to hostility, with the low Ho group exhibiting significantly fewer behavioral and medical infractions. Regarding risky behaviors, the medium and high Ho groups displayed significantly higher AUDIT scores and peak number of drinks, and the high Ho group also displayed significantly more marijuana use than the low Ho group.

Next, we examined alcohol use and problems in the three Ho groups. Given the exploratory nature of these analyses, we used a multivariate analysis of variance (MANOVA) to examine the four drinking variables and the seven subscales of the YAACQ. Significant omnibus tests in the MANOVAs were subject to the Scheffé correction for multiple-comparison tests. For the alcohol use variables, the 3 (hostility) by 4 (drinking variables) MANOVA was significant, as indicated by the Pillai-Bartlett multivariate test statistic, $V = 0.46$, $F(8, 658) = 1.950$, $p = .05$. Specifically, the high Ho group reported higher peak number of drinks on one occasion ($p < .01$) than the other two groups. Regarding alcohol-related problems, a 3 (hostility) by 7 (YAACQ subscales) was highly significant, $V = .187$, $F(14, 904) = 6.663$, $p < .001$. Examination of the seven subscales reveals that for all subscales, the medium and high Ho groups reported significantly more problems than the low Ho group.

Regarding ambivalence about alcohol use, Alcohol and Drug Consequences Questionnaire (ADCQ) scores showed significant differences across hostility groups, and the post hoc comparisons showed the hostility groups differed from one another, although not between all groups. For both the costs and benefits, the low- and high-hostility groups were significantly different from each other, whereas the medium group was not statistically different from either. Because it is possible that the costs and benefits of change could be linked with heavy drinking, and not hostility, we decided to explore this possible confound. To do so, we performed hierarchical regressions on the costs and benefits of change and found that hostility predicted both costs and benefits of change, even after controlling for risky drinking (measured by the AUDIT) and typical number of drinks consumed per drinking occasion. Therefore, hostility appears to have a unique relationship with ambivalence about drinking. Finally, initial analysis suggested a slight possible relationship between event responsibility and hostility; however, group differences were not found in either event responsibility or event aversiveness.

4. Discussion

This is the first study to examine the relationship between hostility and alcohol-related variables in mandated college students. Higher hostility scores were somewhat associated with males and racial minorities, which was consistent with findings from other studies (Barefoot et al., 1991; Boyle et al., 2008). That said, the associations observed between

drinking measures and hostility may be more important to consider than demographic associations in this sample. Our data indicate a positive association between hostility and high-risk drinking, a finding consistent with research in adult populations (e.g., Boyle et al., 2008). Specifically, the medium- and high-hostility groups reported a higher peak number of drinks in the past month, higher AUDIT scores, and more negative consequences from drinking than the low hostility group.

Surprisingly, Although other studies have been able to profile mandated students according to levels of aversiveness and responsibility (Barnett et al., 2008), our findings indicate that hostility does not appear to play a large role in shaping cognitive reactions to the event in terms of these two measures. Correlations indicated slight positive trends in the relationships between hostility and aversiveness and responsibility; however, these findings were not significant ($p > .05$). The weakness of the relationship may relate to sample homogeneity in terms of type of offense, with alcohol possession as the primary sanction event in our sample. It is possible that hostility may be more influential in shaping reactions to confrontational events like fighting. In addition, other variables, such as gender or event severity, may have confounded or moderated the relationship; therefore, future investigations may be able to provide more comprehensive information about the relationship between hostility and reactions to critical events. It is also possible that trait characteristics have minimal influence over the acute reaction to specific life events, but rather provide a general framework for information processing that was not adequately captured by the outcome measures in the present study.

4.1. Treatment implications

Mandated students high in hostility and exhibiting risky drinking appear to be a difficult population with which to implement effective interventions. Our study offers insights into how practitioners may better tailor intervention sessions to the individual needs of these students. There are four significant treatment implications evident in the link between hostility and (a) alcohol use and problems; (b) ambivalence about changing alcohol use; (c) student in-session behavior; and (d) interventionist behavior.

First, hostility may serve as a useful screening tool in identifying students that are exhibiting risky alcohol use and may benefit from intervention. The results in this study indicate that mandated students higher in hostility tend to drink more and experience more alcohol-related problems than students with low hostility. Therefore, measures of hostility could be an important addition to assessment batteries used in large-scale screenings to identify students who may be currently exhibiting, or will develop, risky drinking. Hostility may also have utility in identifying at-risk students who may have intentionally underreport their alcohol use and problems, especially mandated students (see Borsari & Muellerleile, 2009). Specifically, hostility was significantly associated with risky alcohol use and problems, yet the items on the hostility measure are not directly linked to drinking and problems. Therefore, students who intentionally misrepresent their risky drinking may not intentionally obfuscate their responses on this measure.

Second, mandated students exhibiting high hostility may enter interventions ambivalent regarding their alcohol use—a necessary precursor to motivation to change. We found that hostility was uniquely related to students' self-reported state of endorsing several benefits, as well as costs, of reducing or stopping one's alcohol use could be better conceptualized as a being in a state of ambivalence or being “stuck” between two behaviors—in this case, drinking heavily or cutting down or stopping (see Miller & Rollnick, 2002). Because hostile students may be less open and feel less comfortable during discussions (Hardy & Smith, 1988), perhaps a formal decisional balance exercise would help facilitate this discussion (e.g., LaBrie, Pedersen, Earleywine, & Olsen, 2006). In this exercise, a student explicitly

lists the pros and cons of changing or not changing his or her use, which can facilitate building motivation to change. Therefore, it is then a question of the best way to translate this motivation into actual behavior change during a session—which implicates in-session behaviors. Clearly, future studies are needed to investigate whether hostility distinguishes students who are receptive to reducing their drinking following a sanction.

Third, hostility may significantly influence in-session behaviors of mandated students. Specifically, the tendency for highly hostile individuals to be skeptical and unwilling to trust others poses a unique challenge for counseling interventions focused on changing alcohol use and problems following a negative alcohol-related episode (Smith & Frohm, 1985). Confrontational or impersonal educational approaches are most likely going to be ineffective with hostile mandated students. In contrast, motivational interviewing (Miller & Rollnick, 2002) is a directive, client-centered counseling style that has shown success in reducing alcohol consumption and alcohol-related negative consequences with mandated students (Borsari & Carey, 2005; LaBrie, Thompson, Huchting, Lac, & Buckley, 2007). Because highly hostile students tend to be less comfortable talking about negative events and more mistrusting of others, and less open and comfortable (Hardy & Smith, 1988; Holt-Lunstad et al., 2008), they may exhibit resistance in the session (e.g., arguing, questioning the interventionists' ability, downplaying their alcohol use).

Finally, the exhibition of hostility in session will have to be effectively countered by the interventionist (Hester & Miller, 2003). Confrontation, labeling, blaming, or other approaches are likely to decrease the probability of any behavior change. Instead, the motivational interviewing techniques of rolling with resistance, expressing empathy, and supporting self-efficacy may be particularly well suited for mandated students reporting high levels of hostility. By reviewing the hostility measure prior to the intervention, the interventionist will be better able to anticipate resistance during the session. For example, endorsement of items such as “I question the motives of helpful people,” “My behavior is often misunderstood,” and “I go out of my way to win an argument” may help the interviewer anticipate in-session behaviors. Given that students with high levels of hostility may be experiencing significant ambivalence changing their alcohol use, the interventionists' ability to roll with the students' resistance may facilitate the exploration and resolution of ambivalence, thus fostering behavior change. Of course, future research examining in-session student and interventionist utterances (e.g., Moyers et al., 2007) will be required to verify the link between hostility and in-session behaviors of mandated students.

4.2. Limitations

The findings of this study must be considered in the light of some limitations. First, data were from a small Northeastern private university, and the results may not generalize to nonmandated students or larger, public universities in different areas of the country. In addition, with almost 90% of the sample having an alcohol possession or presence-related offense, the limited severity of event types may have also inhibited the range of reaction responses. Given previous research linking alcohol possession violations with low event responsibility and aversiveness (Barnett et al., 2008), the lack of event diversity may have limited outcomes. Second, because mandated students have demonstrated less agreement with collaterals in previous studies, it is possible that the students may have underreported their alcohol use in this study (Borsari & Muellerleile, 2009). Third, the cross-sectional nature of the study does not provide information about the temporal sequence among hostility, risky drinking, and ambivalence about drinking. Observing the trait of hostility preceding risky drinking and ambivalence about drinking would increase our confidence in the proposed role of hostility discussed here. Fourth, there was a lack of variance in hostility within the sample. The mean and median hostility scores were low (3.6 and 3, respectively),

and the findings may be a result of the limited predictive power of the Ho scale, as restrictions in range can reduce correlations with external predictors (Strong et al., 2005). Because the Cook–Medley Hostility Scale captures a limited element of hostility (cynical hostility), other dimensions of hostility more applicable for mandated students may exist. Along those lines, several other risk factors for problematic drinking like family history of alcoholism, conduct problems, and antisocial personality disorder were not measured in this study. Finally, we consistently found delineated differences between students scoring 0 to 2 on the 17-item Cooke–Medley Hostility Scale and students scoring 3 and higher. Because there are no standards for classifying students into categories of hostility, a score of 3 or higher may be a useful threshold to consider in future research. Knowing the point at which hostility scores in mandated students become more associated with negative outcomes related to drinking may allow clinicians and interventionists to shape conversations and tailor programs to more effectively reach the target population.

4.3. Conclusion

Because mandated students are a primary audience for alcohol intervention efforts on college campuses, furthering our understanding of how cognitive traits like hostility relate to drinking behaviors offers an opportunity for improving care. Mandated students who are high in hostility and exhibiting risky drinking appear to be a particularly challenging population for on-campus interventions aimed at reducing alcohol use. That said, these students do appear to be exhibiting ambivalence about their alcohol use. However, this combination of hostility, ambivalence, and risky drinking may pose a daunting challenge for interventionists working with these individuals. Therefore, techniques (such as MI) may have better success than more confrontational approaches (e.g., confrontational counseling; Hester & Miller, 2003) with this at-risk group.

Acknowledgments

This work was supported by National Institute on Alcohol Abuse and Alcoholism Grant R01-AA015518 to B. Borsari and Grant T32-AA07459 to J.T.P. Hustad. The views expressed in this article in no way represent the views of the Department of Veterans Affairs or the United States Government. The authors would also like to thank Nadine Mastroleo and Erica M. Eaton for their assistance on this manuscript, and Dr. John King, Kathleen McMahan, and Donna Darmody's assistance at the research site.

References

- Babor, TF.; Higgins-Biddle, JC.; Saunders, JB.; Monteiro, MG. The alcohol use disorders identification test: Guidelines for use in primary care. 2nd ed.. World Health Organization, Department of Mental Health and Substance Dependence; 2001.
- Barefoot JC, Peterson BL, Dahlstrom WG, Siegler IC, Anderson NB, Williams RB Jr. Hostility patterns and health implications: Correlates of Cook–Medley Hostility Scale scores in a national survey. *Health Psychology*. 1991; 10:18–24. [PubMed: 2026126]
- Barnett NP, Borsari B, Hustad JT, Tevyaw TO, Colby SM, Kahler CW, et al. Profiles of college students mandated to alcohol intervention. *Journal of Studies on Alcohol and Drugs*. 2008; 69:684–694. [PubMed: 18781243]
- Barnett NP, O'Leary Tevyaw T, Fromme K, Borsari B, Carey KB, Corbin WR, et al. Brief alcohol interventions with mandated or adjudicated college students. *Alcoholism: Clinical and Experimental Research*. 2004; 28:966.
- Barnett NP, Read JP. Mandatory alcohol intervention for alcohol-abusing college students: A systematic review. *Journal of Substance Abuse Treatment*. 2005; 29:147. [PubMed: 16135343]
- Bender R, Lange S. Adjusting for multiple testing—When and how? *Journal of Clinical Epidemiology*. 2001; 54:343–349. [PubMed: 11297884]

- Borsari B, Boyle KE, Hustad JT, Barnett NP, O'Leary Tevyaw T, Kahler CW. Drinking before drinking: Pregaming and drinking games in mandated students. *Addictive Behaviors*. 2007; 32:2694–2705. [PubMed: 17574344]
- Borsari B, Carey KB. Two brief alcohol interventions for mandated college students. *Psychology of Addictive Behaviors*. 2005; 19:296–302. [PubMed: 16187809]
- Borsari B, Muellerleile P. Collateral reports in the college setting: A meta-analytic integration. *Alcoholism Clinical and Experimental Research*. 2009; 33:826–838.
- Borsari B, O'Leary Tevyaw T. Stepped care: A promising treatment strategy for mandated college students. *NASPA Journal*. 2005; 42:381–397.
- Borsari B, O'Leary TT, Barnett NP, Kahler CW, Monti PM. Stepped care for mandated college students: A pilot study. *The American Journal on Addictions*. 2007; 16:131–137. [PubMed: 17453615]
- Boyle SH, Mortensen L, Gronbaek M, Barefoot JC. Hostility, drinking pattern and mortality. *Addiction*. 2008; 103:54–59. [PubMed: 17995996]
- Cook WW, Medley DM. Proposed hostility and pharisaic scales for the MMPI. *The Journal of Applied Psychology*. 1954; 38:414–418.
- Cunningham JA, Sobell LC, Gavin DR, Sobell MB, Breslin FC. Assessing motivation for change: Preliminary development and evaluation of a scale measuring the cost and benefits of changing alcohol or drug use. *Psychology of Addictive Behaviors*. 1997; 11:107–114.
- Dimeff, LA.; Baer, JS.; Kivlahan, DR.; Marlatt, GA. *Brief Alcohol Screening and Intervention for College Students (BASICS). A harm reduction approach*. New York: Guilford Press; 1999.
- Epps J, Kendall PC. Hostile attributional bias in adults. *Cognitive Therapy and Research*. 1995; 19:159–172.
- Fidell, LS.; Tabachnick, BG. Preparatory data analysis. In: Schrinka, JA.; Velicer, WF., editors. *Handbook of psychology: Research methods in psychology*. Vol. Vol. 2. New York: John Wiley & Sons; 2003. p. 115-141.
- Fromme K, Corbin W. Prevention of heavy drinking and associated negative consequences among mandated and voluntary college students. *Journal of Consulting and Clinical Psychology*. 2004; 72:1038. [PubMed: 15612850]
- Hardy JD, Smith TW. Cynical hostility and vulnerability to disease: Social support, life stress, and physiological response to conflict. *Health Psychol*. 1988; 7:447–459. [PubMed: 3215156]
- Hester, RK.; Miller, WR., editors. *Handbook of alcoholism treatment approaches: Effective alternatives*. 3rd ed.. New York: Allyn & Bacon; 2003.
- Hingson RW, Edwards EM, Heeren T, Rosenbloom D. Age of drinking onset and injuries, motor vehicle crashes, and physical fights after drinking and when not drinking. *Alcoholism Clinical and Experimental Research*. 2009; 33:783–790.
- Holt-Lunstad J, Smith TW, Uchino BN. Can hostility interfere with the health benefits of giving and receiving social support? The impact of cynical hostility on cardiovascular reactivity during social support interactions among friends. *Annals of Behavioral Medicine*. 2008; 35:319–330. [PubMed: 18584266]
- Kokotailo PK, Egan J, Gangnon R, Brown D, Mundt M, Fleming M. Validity of the Alcohol Use Disorders Identification Test in college students. *Alcoholism, Clinical and Experimental Research*. 2004; 28:914–920.
- LaBrie JW, Pedersen ER, Earleywine M, Olsen H. Reducing heavy drinking in college males with the decisional balance: Analyzing an element of Motivational Interviewing. *Addictive Behaviors*. 2006; 31:254–263. [PubMed: 15970393]
- LaBrie JW, Tawalbeh S, Earleywine M. Differentiating adjudicated from nonadjudicated freshmen men: The role of alcohol expectancies, tension, and concern about health. *Journal of College Student Development*. 2006; 47:521–533.
- LaBrie JW, Thompson AD, Huchting K, Lac A, Buckley K. A group motivational interviewing intervention reduces drinking and alcohol-related negative consequences in adjudicated college women. *Addictive Behaviors*. 2007; 32:2549–2562. [PubMed: 17628347]
- Longabaugh R, Minugh PA, Nirenberg TD, Clifford PR, Becker B, Woolard R. Injury as a motivator to reduce drinking. *Academic Emergency Medicine*. 1995; 2:817–825. [PubMed: 7584769]

- Miller TQ, Smith TW, Turner CW, Guijarro ML, Hallet AJ. A meta-analytic review of research on hostility and physical health. *Psychology Bulletin*. 1996; 119:322–348.
- Miller, WR.; Rollnick, S. *Motivational interviewing: Preparing people for change*. 2nd ed.. New York: Guilford Press; 2002.
- Monti PM, Colby SM, Barnett NP, Spirito A, Rohsenow DJ, Myers M. Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology*. 1999; 67:989. [PubMed: 10596521]
- Moyers TB, Martin T, Christopher PJ, Houck JM, Tonigan JS, Amrhein PC. Client language as a mediator of motivational interviewing efficacy: Where is the evidence? *Alcoholism: Clinical and Experimental Research*. 2007; 31 Suppl(10):40s–47s.
- National Institute on Alcohol Abuse and Alcoholism. NIAAA council approves definition of binge drinking. 2004; 3:3.
- O'Hare T, Sherrer M. Co-occurring stress and substance abuse in college first offenders. *Journal of Human Behavior in the Social Environment*. 2000; 3:29–44.
- Perkins HW. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol, Suppl*. 2002; 14:91–100.
- Read JP, Kahler CW, Strong DR, Colder CR. Development and preliminary validation of the Young Adult Alcohol Consequences Questionnaire. *Journal of Studies on Alcohol*. 2006; 67:169–177. [PubMed: 16536141]
- Rhodes RD, Harrison DW, Demaree HA. Hostility as a moderator of physical reactivity and recovery to stress. *International Journal of Neuroscience*. 2002; 112:167–186. [PubMed: 12325405]
- Slutske WS. Alcohol use disorders among US college students and their non-college-attending peers. *Archives of General Psychiatry*. 2005; 62:321–327. [PubMed: 15753245]
- Smith TW, Frohm KD. What's so unhealthy about hostility? Construct validity and psychosocial correlates of the Cook and Medley Hostility Scale. *Health Psychology*. 1985; 4:503–520. [PubMed: 3830702]
- Strong DR, Kahler CW, Greene RL, Schinka J. Isolating a primary dimension within the Cook–Medley Hostility Scale. *Personality and Individual Differences*. 2005; 39:21–33.
- Wechsler H, Nelson TF. What we have learned from the Harvard School Of Public Health College Alcohol Study: Focusing attention on college student alcohol consumption and the environmental conditions that promote it. *Journal of Studies on Alcohol and Drugs*. 2008; 69:481–490. [PubMed: 18612562]
- Whiteman MC, Fowkes FG, Deary IJ, Lee AJ. Hostility, cigarette smoking and alcohol consumption in the general population. *Social Science & Medicine*. 1997; 44:1089–1096. [PubMed: 9131733]
- WHO Brief Intervention Study Group. A cross-national trial of brief interventions with heavy drinkers. *American Journal of Public Health*. 1996; 86:948–955. [PubMed: 8669518]

Table 1
Correlations with hostility, and hostility subgroup means and analytic comparisons

Variable	Sample summary, <i>n</i> (% or <i>SD</i>)	<i>r</i> ^a	Low Ho <i>n</i> = 177 <i>M</i> (<i>SD</i>)	Medium Ho <i>n</i> = 142 <i>M</i> (<i>SD</i>)	High Ho <i>n</i> = 147 <i>M</i> (<i>SD</i>)	Test statistic <i>F</i> / <i>χ</i> ²
Ho scores	3.60 (2.62)		0–2	3–4	5–14	
Age in years	18.68 (0.81)	–0.01	18.65 (0.73)	18.75 (0.86)	18.65 (0.86)	0.82
Gender						
Male	302 (65.65)	–0.14 **	103 (60.23)	92 (64.79)	107 (72.79)	5.58
Female	158 (34.34)		68 (39.77)	50 (35.21)	40 (27.21)	
Race						
White	441 (95.94)	0.12 **	169 (98.83)	136 (95.77)	136 (93.15)	6.80 *
Non-White	18 (3.92)		2 (1.17)	6 (4.23)	10 (6.85)	
Year in school						
Freshman	324 (70.43)	0.00	117 (68.42)	98 (69.01)	109 (74.15)	4.50 *
Sophomore	96 (20.87)		42 (24.56)	31 (21.83)	23 (15.65)	
Upperclassmen	40 (8.70)		12 (7.02)	13 (9.15)	15 (10.20)	
GPA	3.01 (0.50)	–0.04	3.03 (0.43)	3.01 (0.51)	2.97 (0.56)	0.47
Type of offense						
Alcohol presence or possess	405 (89.01)	0.07	164 (97.04) ^c	116 (82.86) ^d	125 (85.62) ^e	25.41 **
Behavioral infraction	19 (4.18)		0 (0.00)	9 (6.43)	10 (6.85)	
Medical infraction	31 (6.81)		5 (2.96)	15 (10.71)	11 (7.53)	
Risky behaviors						
Age at first drink	15.64 (1.53)	–0.12 **	15.76 (1.42)	15.78 (1.39)	15.36 (1.75)	3.66 *
Frequency of marijuana use ^b	5.14 (10.21)	0.12 *	3.96 (8.96) ^c	4.44 (8.89) ^c	7.21 (12.33) ^d	4.49 *
AUDIT score	11.41 (5.34)	0.24 ***	9.98 (4.60) ^c	11.74 (5.23) ^d	12.73 (5.85) ^e	11.33 ***
Current drinking						
No. of drinking episodes ^b	9.05 (5.01)	0.11 *	8.50 (5.67)	9.80 (5.32)	9.21 (4.85)	1.95 *
Average no. of drinks: typical episode ^b	7.20 (3.42)	0.09 *	6.64 (3.32)	7.61 (3.74)	7.53 (3.45)	
No. of HED episodes ^b	7.23 (5.00)	0.13 **	6.25 (4.57) ^c	8.04 (5.31) ^d	7.61 (5.01) ^e	
Peak no. of drinks ^b	11.37 (5.35)	0.17 ***	10.15 (5.10) ^c	12.05 (5.40) ^d	12.12 (5.36) ^d	

Variable	Sample summary, <i>n</i> (% or <i>SD</i>)	r^d	Low Ho <i>n</i> = 177 <i>M</i> (<i>SD</i>)	Medium Ho <i>n</i> = 142 <i>M</i> (<i>SD</i>)	High Ho <i>n</i> = 147 <i>M</i> (<i>SD</i>)	Test statistic F/χ^2
Alcohol problems						
YAACQ total	11.95 (8.31)	0.41 ***	7.68 (6.01) <i>c</i>	13.26 (8.25) <i>d</i>	15.74 (8.49) <i>d</i>	46.36 ***
YAACQ subscales ^b						
Social–Interpersonal	1.92 (1.74)	0.35 ***	1.23 (1.40) <i>c</i>	2.08 (1.77) <i>d</i>	2.59 (1.78) <i>d</i>	6.29 ***
Impaired control	1.49 (1.50)	0.29 ***	0.91 (1.08) <i>c</i>	1.71 (1.50) <i>d</i>	1.95 (1.70) <i>d</i>	
Self-perception	0.56 (1.05)	0.26 ***	0.23 (0.65) <i>c</i>	0.61 (1.13) <i>d</i>	0.90 (1.23) <i>d</i>	
Self-care	1.42 (1.71)	0.26 ***	0.85 (1.31) <i>c</i>	1.56 (1.66) <i>d</i>	1.93 (1.99) <i>d</i>	
Risk behaviors	1.60 (1.84)	0.34 ***	0.91 (1.36) <i>c</i>	1.70 (1.84) <i>d</i>	2.33 (2.04) <i>d</i>	
Academic/Occupational	1.31 (1.34)	0.26 ***	0.91 (1.09) <i>c</i>	1.43 (1.47) <i>d</i>	1.69 (1.38) <i>d</i>	
Physical dependence	0.45 (0.65)	0.22 ***	0.25 (0.46) <i>c</i>	0.59 (0.71) <i>d</i>	0.56 (0.72) <i>d</i>	
ADCQ scores						
Costs of change	12.12 (12.74)	0.29 ***	8.23 (10.65) <i>c</i>	12.58 (13.46) <i>d</i>	16.09 (13.03) <i>d</i>	15.14 ***
Benefits of change	27.46 (18.49)	0.16 **	23.33 (18.52) <i>c</i>	27.63 (17.07) <i>d</i>	32.03 (18.46) <i>e</i>	8.57 **
Event responsibility	12.09 (5.19)	0.07	11.22 (4.93)	12.80 (5.21)	12.41 (5.26)	4.12 *
Event aversiveness	9.73 (4.80)	0.08	9.25 (4.65)	9.82 (4.90)	10.20 (4.87)	1.60

Note. Ho = Cook–Medley Hostility Score; Behavioral infractions = Drunk in public, fighting, or fake ID.

^aCorrelations performed with continuous Ho score.

^bPast month.

c, d, e Group differences notated by different subscripts $p < .01$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.