A New Lens For Identifying Potential Adult Persistent Problem Drinkers During College

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Because 20% of college high-risk drinkers continue this drinking behavior into adulthood, we used a development lens to compare the characteristics of high-risk college drinkers who matured out (time limited) with those who remained adult persistent. Respondents (4,428 undergraduate alumni over the age of 34) completed surveys about their drinking habits in college and their current drinking habits and personal characteristics. Exploratory factor analysis showed three components (20 items) that distinguished time limited from adult persistent drinkers and that correlated with student development theories related to drinking behavior, reasons for drinking and matters of control, intervention or consequences. Results suggest directions for prevention and intervention programs, and research to extend these findings.

College student involvement with alcohol consumption can be categorized broadly into three types: nondrinkers, moderate or low-risk drinkers, and drinkers whose consumption puts them at high risk for serious consequences that have been well-documented in the literature (National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2002). The proportion of college students identified as high-risk drinkers has remained remarkably stable at about 40% for more than 2 decades (Wechsler et al., 2002). During this time educators have given substantial and increased attention to educational programming, creating effective policies that regulate drinking on campuses, and enforcement (NIAAA, 2002). Within the high-risk population is a subgroup of about 20% who are likely to continue high-risk alcohol behavior into adulthood; the remainder appear to change their behaviors and “mature out” (Jackson, Sher, Gotham & Wood, 2001). The stability of the numbers suggests the need to consider more fundamental issues to identify the roots of the problem. For this study we used a developmental lens to investigate the characteristics and behaviors that distinguish time limited and adult persistent high-risk drinkers.

Students in college drink for a wide variety of reasons. Developmental frameworks will contribute substantially to an understanding of college alcohol consumption. A developmental approach helps identify two contexts that explain college drinking. First, for college student drinkers, there is significant interplay between alcohol use (Dawson et al., 2005; Jackson et al., 2001; Schulenburg, 2001) and student progress in social, identity, cognitive, and moral developmental areas (Chickering & Reisser, 1993; Kohlberg, 1971; Perry, 1970). Second, alcohol use is a symbol of maturity in American society (Sadava, 1995). As college students approach the legal drinking age of 21, mastery of alcohol consumption itself may become a developmental task for some students (Sadava, 1995). Considering the problems of college alcohol use and abuse, student development theory offers new perspectives of college alcohol consumption.
drinking behavior and may provide a basis for more refined intervention strategies.

**Psychosocial Development**

Psychosocial development seems to be related to alcohol use for some college students. The following discussion outlines the theories of college student development related to identity, peers, managing emotions, and developing competence and their interplay with alcohol abuse.

Establishing identity is one of the major developmental tasks for college students (Chickering & Reisser, 1993; Erickson, 1963) and has been shown to correlate with alcohol use in college. Bishop, Weisgram, and Hollique (2005) found an inverse relationship between identity development and alcohol consumption among first-year college students, suggesting that progression through identity development is related to lower levels of alcohol consumption. However, certain dimensions of identity development seem more closely related to alcohol use than others. Lewis and Gouker (2007), demonstrated that ideological identity development (commitments to values such as work, religion, and politics) “appears to play a greater role in college alcohol involvement compared to, interpersonal identity issues” (friendship, romantic relationships, and leisure choices; p. 28).

Achieving a sense of self separate from parents or peers is a primary task for the college student. The learning process of establishing an individuated self, “developing autonomy” (Chickering & Reisser, 1993), coincides with the process of testing boundaries, rules, and authority. Underage alcohol use and drug use can be understood within this context (Welton & Houser, 1997). A qualitative study of LSD use in Germany found that a primary reason for using the substance was the desire for individuation (Prepeliczay, 2002). Although LSD and alcohol are distinct, their use is similar with regard to the nature of experimentation and desiring an altered state to individuate.

Peer influence on college students is well documented. Recent researchers have further clarified the influence of peers on college student outcomes through better understanding of the college student peer culture (Renn & Arnold, 2003). This mirrors research showing significant effects of peer influence on alcohol consumption during college, based on social learning theory (Borsari & Carey, 2006). Having a high percentage or large network of friends who are regular drinkers is negatively correlated with both maturing out from high school to college and recovering from an alcohol use disorder (Novak & Crawford, 2001; Schutte, Bryne, Brennan & Moos, 2001; Vik, Cellucci, & Ivers, 2003). Research about African American students’ use of alcohol has shown that they are less likely to drink than white or Hispanic college students and more likely than those same peers to drink moderately, when they do drink (Grenier, Borskey, & Folse, 1998; O’Malley & Johnston, 2002); research also has indicated the presence of strong peer disapproval toward alcohol abusers among African American college students (Globetti, Globetti, Lo & Brown, 1996).

Learning to manage emotions is another developmental task for college students (Chickering & Reisser, 1993). Research shows that alcohol abuse plays a role in assisting some college students with emotional management. College students perceive a coping benefit to drinking (Schulenburg & Maggs, 2002). The expectation of an effect from alcohol on social coping, personal coping, and self-efficacy increases the likelihood of alcohol consumption and decreases the likelihood of maturing out of high-risk drinking (Kuther & Timoshin, 2003; Vik et al., 2003).

Additionally, the developmental task of establishing competence (Chickering &
Reisser, 1993) provides insight and context to college student drinking behaviors. Once competence has been established, alcohol consumption decreases. For example, maturing out is often correlated with a change in life tasks, such as new jobs, marriage, or need for conventionality (Jackson et al., 2001; Schulenburg, Maggs, Steinman & Zucker, 2002; Vik et al., 2003). A similar pattern has been found in cessation of marijuana and cocaine use post college, due to conventionality of roles and life transitions (Kandel & Raveis, 1989).

Cognitive Development

Patterns of alcohol use coincide with cognitive development particular to the age of adolescence and young adulthood (Schulenburg & Maggs, 2002). The way that knowledge and authority are perceived changes a young person’s perception of alcohol and drinking, in particular the shift made as college students move through stages from dualistic to relativistic thinking (Perry, 1970). For example, where drinking underage may be perceived as “bad” due to influences by authority during high school, the multiplistic or relativistic thinking of a college student will cause authority to have little (or sometimes negative) influence on decisions regarding drinking during college (Schulenburg & Maggs). Patterns of alcohol consumption by women can also be better understood using a cognitive developmental framework. According to (Belenky, Clinchy, Goldberger & Tarule, 1986), women move through their cognitive development in stages that place a stronger emphasis on relational knowledge. For college women, peers play a significant role in alcohol use and alcohol in turn plays a significant role in relationship management (Gleason, 1994). This suggests an interesting interaction between alcohol and psychosocial and cognitive development for college women.

An individual’s cognitive stage may also relate to that person’s ability to change drinking patterns. Drinking trajectories can often be associated with the degree of “readiness” to make change (Prochaska & DiClemente, 1992). The stages of readiness according to the Prochaska and DiClemente model include: precontemplative (they never thought they had a problem), contemplative (they considered that they might have a problem, but were ambivalent or did not want to change it), preparation (they wanted to change their drinking but did not know how), action (they took steps to try and change their drinking), and maintenance (they made a change and are trying to maintain it). Research has shown that greater ambivalence to change or less problem recognition indicates a lower likelihood to mature out from high school to college (Vik et al., 2003). Problem recognition requires introspective abilities and the ability think for oneself (e.g., outside of peer authorities), abilities consistent with at least a multiplistic stage of cognitive development (Perry, 1970), suggesting the possibility of a correlation between readiness and stages of cognitive development.

Moral Development

Moral development is another important aspect of college student development. However, we found no current research that demonstrated a link between moral development and alcohol use. Considering Kohlberg’s (1971) stages of moral development, it seems logical that the choice to use or abuse alcohol might be made differently by a student that is in an individualistic moral framework in contrast with a student who is socially conscious or using a morality of universal principles. Similarly, alcohol consumption might be understood using an ethic of care framework of moral development, especially for women students (Gilligan, 1982).
Drinking as a Competence/ Developing Mastery

In the United States, drinking has been viewed as a symbol of maturity due to the establishment of a legal drinking age and societal perception of drinking as an adult activity (Sadava, 1995). Young adults, and therefore college students, engage in a learning process to achieve competency over drinking habits. Many prevention programs aimed at curtailing high-risk drinking in college students have focused on helping students develop mastery over healthy alcohol consumption. For example, A Call to Action (NIAAA, 2002), described programs that combine cognitive-behavioral skill building with motivational enhancement to reduce alcohol consumption and consequences. Students who participate in CHOICES (Parks & Wooford, 2005), a program of this nature that has demonstrated effectiveness, build skills related to safe drinking by monitoring their drinking and receiving feedback on habits. Thus, alcohol use is closely related to the main developmental tasks for college students, but achieving the skills for appropriate alcohol use is a developmental task in itself.

Differences in Developmental Patterns: Time Limited vs. Adult Persistent

Approximately 40% of college students nationwide are high-risk drinkers during college (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). A majority of these students eventually mature out of this pattern (Jackson et al., 2001). Research shows there are several different drinking trajectories that students may follow as they progress toward establishing their pattern of drinking as adults (Dawson et al., 2005; Schulenburg, 2001).

Schulenburg et al. (2001) studied drinking patterns of students, ages 18 to 24, and found 5 trajectories: chronic, decrease, increase, fling, and rare. Of these patterns, decrease (decreasing drinking over ages 18 to 24) and fling (initially increasing and then decreasing drinking over ages 18 to 24) both coincided with the developmental perspectives described above. These students fit the pattern of drinking in a high-risk fashion early in college and then maturing out after college. Their use of alcohol during college may have related to experimentation to establish autonomy, peer influence, social coping or identity issues. Factors associated with the maturing out process appear to include friends and social networks, negative consequences, and academics (Misch, 2007).

The three other patterns in Schulenburg et al.’s (2001) study are: students who did not drink in a high-risk way throughout the study (rare), those who drank in a high-risk way throughout the study (chronic), and those who initially did not drink in a high-risk way but did at the end of the study (increase). The chronic and increase trajectories indicate that some students seem to deviate from a developmental pathway, and fail to mature out of the high-risk drinking patterns (Ellickson, Tucker, & Klein, 2003; Jackson et al., 2001; Schulenburg & Maggs, 2002; Schulenburg et al., 2001). These students continue alcohol abuse into adulthood and may be using alcohol to avoid stressful development tasks. Jackson et al. found that students with a family history of alcohol abuse were more likely than those without a family history, and males were more likely than females to be among those that do not mature out of high-risk drinking.

Although considerable research has been focused on the general population of college students who are high-risk drinkers, very few researchers have examined the differences between the students for whom alcohol consumption is time limited (related to development) and the students whose alcohol
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consumption seems to be more related to a long-term problem (adult persistent). This study focused on exploring two questions:

1. Do patterns of drinking behavior or personal characteristics allow us to distinguish the students with the potential to persist in high-risk drinking into adulthood from those who mature out (time limited) while they are still in college?

2. Do perspectives related to student development, or young adult development theories offer insight into high-risk college student drinking behaviors?

METHOD

For the analysis we used survey data drawn from a previous study (Campbell & Demb, 2008), using a cross-sectional, retrospective, self-report survey, which was approved by the university office of responsible research practices. A random sample of 20,860 alumni from the graduating classes of 1983 through 1993 at a large, Midwestern, public research university were invited to respond to a Web-based survey asking about college and postcollege drinking behaviors, the consequences of those behaviors, and other pertinent factors (demographics, life events, relationships, perceptions, drinking patterns, and college environment).

Participants

Usable responses were received from 4,428 alumni, a response rate of 24.6% after adjusting the sample (20,860) for non-deliverable e-mail addresses (2,824). Comparing survey respondents with the current university population showed parallel proportions of students entering college before age 22 (between 91% and 94%), and male-female ratios (approximately 53% to 47%). The proportion of minority students differed from the current University student population, which has a non-minority enrollment of 78.8%. Study respondents were overwhelmingly Caucasian (96.9%). The difference may be explained by a generational effect (e.g., student data from 1987 shows an 86% nonminority population). Nonetheless, minority populations were underrepresented in this survey and no separate analyses of minority alcohol use were undertaken.

Instruments

Items on a four-section survey instrument were drawn from instruments recommended for use by the NIAAA. We used AUDIT Screening for Sections 1 and 2. Items from an NIAAA national survey, the Treatment Utilization Screening of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, NIAAA, 2004b) made up Section 3. Section 4 consisted of 24 original questions. At the end of each survey section a question was included to determine the participant’s confidence in responses. The sections were: Retrospective AUDIT (college drinking behavior), AUDIT (current drinking behavior), Treatment Utilization, and Personal Characteristics.

The AUDIT screening (NIAAA, 2004a) is used to identify individuals who are at high-risk for consequences from their alcohol consumption. The ability to vary cutoff scores and the use of multiple factors permits more specificity than other measures. This study used the NIAAA guidelines to determine cutoff values for various levels of problematic drinking (Campbell & Demb, 2008). According to the NIAAA (2004a), a score of 8 or more on the AUDIT screening is an indicator of high-risk drinking, a score of 16 or more indicates “harmful” drinking patterns, and a score of 20 or more indicates possible alcohol dependence. Items dealing with current drinking were drawn from the original AUDIT screening, and retrospective
items were the same questions with the time reference changed to “in college.”

For purposes of this study, individuals were classified as “time limited” if they were a high-risk drinkers during college but were not high-risk drinkers at the time of survey. The classification of “time limited” also required a participant to have indicated no past treatment for an alcohol or drug abuse disorder because treatment might have indicated needing help to recover rather than maturing out. Individuals were considered “adult persistent” high-risk drinkers if they received a score of eight or more both on the Retrospective AUDIT screening and on the current AUDIT screening, or if they received past treatment for an alcohol or drug abuse disorder. This combination would indicate a problem that continued into adulthood and/or that needed help for recovery rather than maturing out.

Procedures

All communication with participants was handled electronically during November and December 2005. A first e-mail introduced the study, its importance and possible risks; a second e-mail served as the invitation to participate and included a Web address which participants were asked to cut and paste into their browser to access the online version of the survey instrument. One week later reminder e-mails were sent out. The survey instrument collected responses using eListen survey software (eListen, 2003) and the data was exported into SPSS 14.0 for Windows for processing and analysis.

In addition to the anonymous survey responses, during data collection 656 personal participant e-mails were received by the researchers which fell into five categories. We responded individually to each: (a) Erroneous first mailing (i.e., graduate student alumni; 294); (b) problems putting the survey Web address into a browser (150); (c) praise for the research topic, or the survey (90); (d) expressions of concern or opinions about issues related to college drinking (92); (e) those who did not drink in college (30).

Data Analysis

We conducted exploratory factor analysis to provide descriptive categorization of the variables and to test the internal consistency of the survey. Due to the exploratory nature of the survey and the desire to descriptively group variables into more meaningful categories, Principal Components Analysis was chosen as the method of factor analysis. Additional analyses of Cronbach’s alpha were conducted to test the internal reliability of each component.

The significance testing analysis focused on participants who were high-risk drinkers during college, and sorted them into two groups: adults who continued as high-risk drinkers or adults who matured out (Campbell & Demb, 2008). Because of the number of variables being addressed with the matured out and adult persistent groups, several analyses were performed to determine group characteristics. We used t tests to analyze the survey items in each component from the principal components analysis and other individual categorical items related to development or mastery. Dummy coding was used on several of the personal characteristics questions that required yes or no responses. Although t tests can be affected by a large difference in sample size between groups, which is the case between matured out and adult persistent samples here, the sample size of each group appears large enough to override this error. However, because the large sample size and multiple t tests could cause significance testing to be unduly sensitive, the Boneferroni Correction was used, yielding a conservative p-value of < .00088. Statistical power analyses were also performed using Cohen’s criteria for t-tests.
and effect sizes (ES) are reported (small = .20, medium = .50, large = .80; Cohen, 1992)

RESULTS
Drinking Characteristics

Respondents’ drinking patterns during college were: nondrinkers (5.2%); low-risk drinkers (48.6%); and high-risk drinkers (46.2%). The percentage of nondrinkers among respondents was much lower than in the current student population (20%). This may reflect the difficulty experienced by some nondrinkers when completing the survey, and/or the legal drinking age, which was 18 in this state from 1983 to 1986, when some respondents were undergraduates. The nondrinking proportion did not affect the analysis of the high-risk data.

The proportion of respondents reporting college behaviors scored as high-risk (46%) parallels the national average reported using the 5/4 definition, 44% (Wechsler, et al., 1994). Of the high-risk drinkers, 78.9% (1,613) scored as “matured out” with a mean current AUDIT score of 3.3, and 21.1% (431) scored as “adult persistent” with a mean current AUDIT score of 11.6, proportions that are consistent with previous studies (Gotham, Sher, & Wood, 2003; Jackson et al., 2001). Of the adult persistent group, subsequent analyses identified 24.6% (106) adults whose current drinking behavior could cause them harm.

Exploratory Factor Analysis

To investigate the dimensionality of the instrument and to provide a descriptive categorization of the individual variables, we conducted an exploratory factor analysis with 36 items that were of the same directionality and assumed to be interval in nature. We selected a principal components analysis method of extraction because the primary goal of the analysis was descriptive in nature; we hoped to uncover subsets of items that were correlated strongly with each other to reorganize individual items into more general, meaningful categories. The large sample size of this study (over 4,400 usable responses) is more than sufficient for a principal components analysis. Bartlett’s Test of Sphericity (p < .001) and the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.868) indicate that our correlation matrix was, in fact, factorable.

Five components were extracted from the analysis as was determined by a visual examination of the Scree Plot (Chart 1). We found a notable drop in eigenvalue magnitude after the fifth component, and the eigenvalues associated with the successive components hovered just above or fell below 1.0. Additionally, the five components together explained a sufficient amount of the total variance (43%), see Table 1. A Promax rotation with Kaiser Normalization was applied to achieve simple structure. Three items (GPA, involvement in student organizations, employment during college) did not seem to load on any of the components, and were removed to improve interpretation. For the

<table>
<thead>
<tr>
<th>TABLE 1. Eigenvalues and % of Variance Explained for Each Extracted Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>College Drinking</td>
</tr>
<tr>
<td>Current Drinking</td>
</tr>
<tr>
<td>Confidence in Answers</td>
</tr>
<tr>
<td>Reasons for Drinking</td>
</tr>
<tr>
<td>Control/Intervene/Consequences</td>
</tr>
</tbody>
</table>
remaining 33 items, loadings on the five components ranged from .308 to .841, with a majority above .600 (see Table 2 below). Items that loaded on more than one component were retained only for the component with the largest loading and strongest theoretical base. Including these items in the other component either reduced or did not notably improve the Cronbach’s alpha for that component.

We evaluated internal consistency among items in each component through Cronbach’s alpha. Analyses revealed that deleting one item (attending religious services) would substantially improve the Cronbach’s alpha level, and therefore, was removed. Once removed, all five components had Cronbach’s alpha values greater than .700 (range .743 to .844), see Table 3. Deleting additional items from any component would not improve the Cronbach’s alpha level more than .013 units. Based on these findings, the descriptive categorization of the items based on the five components was sufficiently reliable. In addition, each component seemed to be internally consistent.

We examined the content of items within each component and developed construct names. Then, each item was categorized as either Development or Mastery according to its primary orientation. An item was classified as Development if the primary use of alcohol related to identity, psychosocial, or cognitive development (e.g., “During college, drinking alcohol helped me to feel comfortable in social situations”). An item was classified Mastery if it described the achievement of a mastery of responsible alcohol consumption without reference to its use in the context of other developmental tasks (e.g., “How often during college were you unable to remember what happened the night before because of your drinking?”). Table 3 shows that a clear pattern emerged across items within components. A majority of the items in Components 1 and 5,
### TABLE 2.
Loading of Individual Items on Components in Rotated Component Matrix

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1: College Drinking</th>
<th>Component 2: Current Drinking</th>
<th>Component 3: Confidence in Answers</th>
<th>Component 4: Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>In college, how often did you have a drink containing alcohol?</td>
<td>.813 M</td>
<td>.486</td>
<td>.681</td>
<td>.469 D</td>
</tr>
<tr>
<td>How many standard drinks (12 oz of beer, 5 oz of wine, 1.5 oz liquor) containing alcohol did you have on a typical day in college when you were drinking?</td>
<td>.662 M</td>
<td>.677</td>
<td>.697</td>
<td>.679 D</td>
</tr>
<tr>
<td>How often in college did you have five or more alcoholic drinks on one occasion?</td>
<td>.841 M</td>
<td>.748</td>
<td>.732</td>
<td>.633 D</td>
</tr>
<tr>
<td>During college, how often did most of your friends drink and/or use drugs?</td>
<td>.720 D</td>
<td>.337</td>
<td>.615</td>
<td>.727 D</td>
</tr>
<tr>
<td>Did you attend religious services while in college?^a</td>
<td>.308 D</td>
<td>.685</td>
<td>.706</td>
<td>.571 D</td>
</tr>
</tbody>
</table>

### Component 1: College Drinking

- In college, how often did you have a drink containing alcohol? (.813 M)
- How many standard drinks (12 oz of beer, 5 oz of wine, 1.5 oz liquor) containing alcohol did you have on a typical day in college when you were drinking? (.662 M)
- How often in college did you have five or more alcoholic drinks on one occasion? (.841 M)
- During college, how often did most of your friends drink and/or use drugs? (.720 D)
- Did you attend religious services while in college? (仅为以 D)

### Component 2: Current Drinking

- How often do you currently have a drink containing alcohol? (.486)
- How often during the last year were you unable to remember what happened the night before because of your drinking? (.677)
- How often during the last year have you had a feeling of guilt or remorse after drinking? (.748)
- How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session? (.337)
- How often during the last year have you failed to do what was expected of you because of drinking? (.685)
- How often during the last year have you found that you were not able to stop drinking once you started? (.733)
- How often do you have five or more alcoholic drinks on one occasion? (.690)
- How many standard drinks (12 oz of beer, 5 oz of wine, 1.5 oz liquor) containing alcohol do you have on a typical day in college when you are drinking? (.610)

### Component 3: Confidence in Answers

- How confident are you that your answers above are accurate? (.681)
- How confident are you that your answers in the College Drinking section are accurate? (.697)
- How confident are you that your answers in the Current Drinking section are accurate? (.732)
- How confident are you that your answers above are accurate? (.615)
- How confident are you that your answers above are accurate? (.706)
- How confident are you that your answers in the Individual Characteristics section are accurate? (.763)

### Component 4: Reasons

- During college, when I drank alcohol, I experienced the effects of alcohol (such as lowering inhibitions, feeling relaxed, warm, etc.). (.469 D)
- During college, drinking alcohol helped me to feel comfortable in social situations. (.679 D)
- During college, drinking alcohol helped me to deal with personal problems. (.633 D)
- During college, drinking alcohol helped me to feel more confident. (.727 D)
- During college, I felt what has been termed “uncomfortable in your own skin.” (.738 D)
- During college, I was a sensation-seeking individual. (.429 D)
- During college, how often did you feel isolated or alone? (仅为以 D)

* table continues
TABLE 2. continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Loading</th>
<th>M/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 5: Control/Intervene/Consequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often during college did you find that you were not able to stop drinking once you had started?</td>
<td>.648</td>
<td>M</td>
</tr>
<tr>
<td>How often during college had you failed to do what was expected of you because of drinking?</td>
<td>.673</td>
<td>M</td>
</tr>
<tr>
<td>How often during college did you need a first drink in the morning to get yourself going after a heavy drinking session?</td>
<td>.382</td>
<td>M</td>
</tr>
<tr>
<td>How often during college did you have a feeling of guilt or remorse after drinking?</td>
<td>.638</td>
<td>M &amp; D</td>
</tr>
<tr>
<td>How often during college were you unable to remember what happened the night before because of your drinking?</td>
<td>.578</td>
<td>M</td>
</tr>
<tr>
<td>During college, were you or someone else injured because of your drinking?</td>
<td>.481</td>
<td>M</td>
</tr>
<tr>
<td>During college, did a relative, friend, doctor, or other health care worker express concern about your drinking or suggest you cut down?</td>
<td>.511</td>
<td>M</td>
</tr>
</tbody>
</table>

Note. M = Mastery; D = Development.

a Item was later removed from component to improve reliability and Cronbach’s alpha.

College Drinking and Control/Intervention/Consequences, related to Mastery, whereas Component 4, which dealt with the reasons for drinking, emerged as Developmental.

Significance Testing

Twenty characteristics related to development or mastery were found to be significantly different (p < .00088) when comparing alumni who matured out of high-risk drinking with those of the alumni whose high-risk drinking is adult persistent. Six items were clearly related to Development. Thirteen appear in Table 4, within the components where they loaded. Seven others were categorical items (see Table 5), which were not included in the factor analysis. Effect sizes were small to moderate, ranging from .19 to .66.

TABLE 3.
Cronbach’s Alpha Reliability Analysis for Each Component

<table>
<thead>
<tr>
<th>Component</th>
<th>Construct Name</th>
<th># of Items</th>
<th>Cronbach’s Alpha</th>
<th>Dominant Lens: Development or Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>College Drinking</td>
<td>4</td>
<td>.844</td>
<td>Mastery</td>
</tr>
<tr>
<td>2</td>
<td>Current Drinking</td>
<td>8</td>
<td>.744</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Confidence</td>
<td>6</td>
<td>.776</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Reasons for Drinking</td>
<td>7</td>
<td>.773</td>
<td>Development</td>
</tr>
<tr>
<td>5</td>
<td>Control/ Intervention/Consequences</td>
<td>7</td>
<td>.743</td>
<td>Mastery</td>
</tr>
</tbody>
</table>
### Component 1. College Drinking

**Question: During college . . .**

<table>
<thead>
<tr>
<th>Item</th>
<th>Response Options</th>
<th>Adult Persistent</th>
<th>Time Limited</th>
<th>Sig* / Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>how often did you have an alcoholic drink?</td>
<td>never (1), more than 4 times per week (5)</td>
<td>4.40</td>
<td>4.23</td>
<td>Yes/.28</td>
</tr>
<tr>
<td>how many standard alcoholic drinks (12 oz beer, 5 oz wine, 1.5 liquor) on a typical day when you were drinking?</td>
<td>0 to 2 (1), 3 to 4, 5 to 6, 7 to 9, 10 or more (5)</td>
<td>2.93</td>
<td>2.47</td>
<td>Yes/.42</td>
</tr>
<tr>
<td>how often did you have five or more alcoholic drinks on one occasion?</td>
<td>never (1), almost daily (5)</td>
<td>3.90</td>
<td>3.60</td>
<td>Yes/.47</td>
</tr>
<tr>
<td>how often did most of your friends drink and/or use drugs?</td>
<td>never (1), almost daily (5)</td>
<td>4.31</td>
<td>4.12</td>
<td>Yes/.27</td>
</tr>
</tbody>
</table>

### Component 4. Reasons for Drinking

**Question: During college . . .**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Response Options</th>
<th>Adult Persistent</th>
<th>Time Limited</th>
<th>Sig* / Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>drinking alcohol helped me to deal with personal problems.</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>3.51</td>
<td>3.79</td>
<td>Yes/.19</td>
</tr>
<tr>
<td>drinking alcohol helped me to feel more confident.</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>2.45</td>
<td>2.67</td>
<td>Yes/.19</td>
</tr>
<tr>
<td>I was a sensation-seeking individual.</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>3.04</td>
<td>3.44</td>
<td>Yes/.33</td>
</tr>
<tr>
<td>when I drank alcohol, I experienced the effects of alcohol (such as lowering inhibitions, feeling relaxed, warm, etc.)</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>1.37</td>
<td>1.40</td>
<td>No</td>
</tr>
<tr>
<td>drinking alcohol helped me to feel comfortable in social situations.</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>1.90</td>
<td>1.99</td>
<td>No</td>
</tr>
<tr>
<td>I felt what has been termed “uncomfortable in your own skin.”</td>
<td>strongly agree (1), strongly disagree (5)</td>
<td>3.69</td>
<td>3.78</td>
<td>No</td>
</tr>
<tr>
<td>how often felt isolated or alone?</td>
<td>never (1), more than 3 times a week (5)</td>
<td>1.80</td>
<td>1.72</td>
<td>No</td>
</tr>
</tbody>
</table>

### Component 5. Control/Intervene/Consequences

**Question: How often . . .**

<table>
<thead>
<tr>
<th>Item</th>
<th>Response Options</th>
<th>Adult Persistent</th>
<th>Time Limited</th>
<th>Sig* / Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>did you find that you were not able to stop drinking once you started?</td>
<td>never (1), almost daily (5)</td>
<td>2.19</td>
<td>1.70</td>
<td>Yes/.44</td>
</tr>
<tr>
<td>did you fail to do what was normally expected of you because of drinking?</td>
<td>never (1), almost daily (5)</td>
<td>1.89</td>
<td>1.65</td>
<td>Yes/.29</td>
</tr>
<tr>
<td>did you need a first drink in the morning to get yourself going after a heavy drinking session?</td>
<td>never (1), almost daily (5)</td>
<td>1.16</td>
<td>1.05</td>
<td>Yes/.25</td>
</tr>
</tbody>
</table>

*Table continues*
TABLE 5.  
Categorical Items (Questions) Related to Development Showing Significance for Adult Persistent Compared to Time Limited High-Risk College Drinkers

<table>
<thead>
<tr>
<th>Response Option/Dummy Coding</th>
<th>Adult Persistent</th>
<th>Time Limited</th>
<th>Significance*/Effect Size</th>
<th>Development or Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective AUDIT Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question: During college . . .</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>did you use drugs other than alcohol for recreation?</td>
<td>Yes (1), No (2)</td>
<td>1.44</td>
<td>1.61</td>
<td>Yes/.34</td>
</tr>
<tr>
<td>my drinking decreased over the four years.</td>
<td>Yes (1), No (0)</td>
<td>.08</td>
<td>.18</td>
<td>Yes/.30</td>
</tr>
<tr>
<td>my drinking increased then decreased over the four years.</td>
<td>Yes (1), No (0)</td>
<td>.20</td>
<td>.35</td>
<td>Yes/.34</td>
</tr>
<tr>
<td>my drinking stayed constant and was frequent over the four years.</td>
<td>Yes (1), No (0)</td>
<td>.46</td>
<td>.26</td>
<td>Yes/.42</td>
</tr>
<tr>
<td>I never thought I had a problem.</td>
<td>Yes (1), No (0)</td>
<td>.75</td>
<td>.87</td>
<td>Yes/.31</td>
</tr>
<tr>
<td>I considered that I might have a problem, but was ambivalent or did not want to change it</td>
<td>Yes (1), No (0)</td>
<td>.20</td>
<td>.09</td>
<td>Yes/.31</td>
</tr>
</tbody>
</table>

* Words shortened for presentation here.
*p < .00088.
DISCUSSION

Survey results provide significant evidence that college high-risk drinkers can be divided into two groups: time limited and adult persistent. For example, the scores on the Retrospective AUDIT Section were substantially different between these two groups. The factor analysis suggests that using a developmental lens may add depth to an understanding of the differences between the college high-risk drinkers who will mature out from those who will continue as problem drinkers into adulthood. This is consistent with previous findings, suggesting the differentiation of time limited and adult persistent high-risk drinking behavior (Jackson et al., 2001).

The time limited high-risk drinkers appear to do a better job at developing mastery of appropriate alcohol use. Time limited students scored significantly lower on items in Component 1 (College Drinking), which contained questions related to a student’s quantity of alcohol consumption, indicating that they had achieved a higher level of mastery over responsible alcohol use. When taken in context with research on peer influence on development in young adulthood (Renn & Arnold, 2003), one item in Component 1 regarding peer alcohol use appears more related to development (i.e., psychosocial) than mastery. However, the results of the factor analysis indicate that this item hangs together with other mastery items, suggesting that students may be choosing their peers based on their level of mastery, rather than the peer group having an influence over their alcohol consumption.

Component 4, Reasons for Drinking, included items related to developmental reasons for alcohol use (i.e., social coping, need for self-confidence, dealing with personal problems). Within this component, three items distinguished between the time limited and adult persistent high-risk drinkers, whereas others did not. Consistent with previous findings on the intersection of alcohol and development (Schulenburg & Maggs, 2002; Schulenburg et al., 2001), in this study we found that both categories of high-risk drinkers used alcohol to assist in coping with certain developmental tasks. Two items, experiencing the effect of alcohol and using alcohol to help with social coping, did not discriminate between the time limited and
adult persistent drinkers. Both time limited and adult persistent students were likely to use alcohol for the effects and to help with social coping, suggesting that all high-risk drinkers may feel that alcohol helps them in social situations. Two items, feeling uncomfortable in one’s own skin and feeling isolated or alone, did not distinguish between the groups, and both groups were likely to disagree with these statements.

Adult persistent high-risk drinkers were more likely than the time limited participants to use alcohol for developmental needs beyond the desire for the effect and help with social coping. We found in our study that the adult persisters were more likely to use alcohol for self-confidence, mirroring research that demonstrates the interplay between identity development and alcohol use (Bishop et al., 2005). Similar to the research on alcohol use for coping (Schulenburg & Maggs, 2002; Vik et al., 2003), this study also showed that adult persisters were significantly more likely to use alcohol to cope with personal problems. The students who continue their high-risk drinking into adulthood may depend more on alcohol for their developmental needs as opposed to those that mature out of high-risk use.

Two categorical items classified as developmental refer to a participant’s readiness to change (Prochaska & DiClemente, 1992). According to these results, time limited students were more likely than the adult persisters to think that they did not have a problem with alcohol during college. The students may have been right: High-risk use of alcohol was a part of their developmental stage during college, and they matured out of this high-risk use over time. By contrast, adult persistent students were more likely to consider that they might have a problem, but were ambivalent or did not want to change their drinking during college. Thus, although these students appeared to have made enough cognitive progress to think introspectively about their drinking, they did not make changes to their drinking.

LIMITATIONS

This was an exploratory study (Campbell & Demb, 2008). Section 1 of the survey instrument represented a new use of a well-tested instrument developed for use by the NIAAA (Retrospective AUDIT). Section 4 of the survey instrument represented 24 original items (Personal Characteristics) and has not been independently validated.

For this study we recruited participants who were at least 34 years old, the age by which most problem drinkers have sought treatment. As a result, when the survey was administered in November 2005, respondents were being asked to recall behaviors that occurred 12 to 22 years prior to their participation in this study. Several elements of the study design and responses provide convincing evidence that the responses are sufficiently reliable to support initial conclusions. First, although the retrospective AUDIT used in Section 1 changes the time reference in each question of the AUDIT to “in college,” participant responses yielded the proportion of high-risk drinkers that would have been expected based on national data (approximately 40%; Wechsler et al., 2002). Second, participants were specifically asked to rate their confidence level for each section of the survey. The mean confidence levels for all sections were between 3.58 and 3.92 (3 = confident; 4 = very confident), with little variation in the expressed confidence levels across sections of the survey, indicating that participants were confident in their recall abilities. This suggests that participants were confident with both their responses about college drinking (M = 3.65, retrospective AUDIT) and current drinking (M = 3.89, current AUDIT). Third, among
the more than 600 personal e-mails received, none mentioned difficulty with recall.

Extrapolating from the responses from this study to the behavior of current students raises the important question of the effect of differences in values, developmental experiences, and environmental impacts across generations of students on alcohol abuse. These questions need to be addressed in new research. However, it is worth noting that the percentage of students identified through research as high-risk drinkers has remained remarkably stable for almost 4 decades (i.e., more than 2 generations of student) at about 40% of the student population.

Conclusions

This study reveals that a developmental lens does seem to provide context for the drinking patterns of time limited students. Time limited students appear to be engaged in two sets of developmental tasks: (a) developing mastery over alcohol and (b) making progress along typical young adult psychosocial and cognitive developmental tasks (Chickering & Reisser, 1993; Erickson, 1963; Perry, 1970). These time limited students were high-risk drinkers in college, but both the quantity and the consequences of their use were less extreme than for their peers who persisted in high-risk drinking behaviors into adulthood. Although time limited students use alcohol to assist with social coping, they are not as likely as adult persistent students to use alcohol as a coping mechanism for other types of developmental tasks (i.e., personal problems, developing a sense of self). Their heightened alcohol use appears to coincide with grappling with identity, autonomy, or developing relationships, and then decreases as they develop mastery over both appropriate alcohol use and the other developmental tasks.

By contrast, the adult persisters do not seem to master their alcohol use as a part of mastering other young adult developmental tasks. According to this study, these students exhibit the opposite pattern: they appear to use alcohol to cope with or avoid developmental tasks. This creates a pattern of use that continues into adulthood, far beyond the timeline of young adult development. Neither do they seem to gain mastery over alcohol. Further research needs to be conducted to determine whether adult persisters are using alcohol for coping instead of developing other healthier coping mechanisms; in essence, are they drinking instead of developing along other lines? In fact, research is needed that is designed for predictive analysis along these lines and should involve a broad-based, multi-institutional sample to confirm results of this exploratory study from a single institution.

Using this new developmental lens to understand the two different types of college high-risk drinkers (time limited and adult persistent) has implications for prevention and intervention efforts. Currently, many existing programs assist students with mastery tasks (i.e., cognitive-behavioral skill building). According to this study, the interplay among alcohol use and other developmental tasks is also significant for time limited students. Programs that focus on drinking behaviors should be designed using a developmental lens.

For the time limited high-risk students, prevention or intervention methods that specifically build skills to help the student mature out could be more successful than methods that do not, because high-risk drinking for these student appears to be an integral part of a developmental process. Some current prevention and intervention efforts seem to use this philosophy of maturing out, such as the BASICS program (Dimeff, Bear, Kivlahan & Marlatt, 1999), which uses motivational interviewing techniques specifically designed to move students through
the stages of change. By contrast, bringing in speakers who are recovering alcoholics may be less helpful with this group than with the adult persisters because the story and message tends to focus on the long-term effect of alcohol abuse.

The 20% of high-risk drinkers in college that are likely to continue with alcohol problems into adulthood require focused attention from student affairs practitioners. This study suggests that these students are identifiable during college from personal characteristics or observations of behavior. For example, according to the results of this study, if a senior scored very high on the AUDIT, and said she or he drank to feel more confident and to help with personal problems, she or he could be more likely to become an adult persistent high-risk drinker. Adult persistent students are unlikely to change drinking behavior over the 4-year period and perhaps could be identified by drinking patterns in the junior year, enabling interventions geared to helping those with a long-term alcohol abuse problem.

The adult persistent high-risk drinkers seem to be unable to master the task of learning how to drink reasonable quantities or to protect themselves from the negative effects of use. As a result, they may need a different kind of intervention for their alcohol use. Intervention methods that focus on the here and now may be ineffective for these students because they may be incapable of making that type of change. Social norms marketing, a prevention campaign commonly used on campuses today is unlikely to be effective for adult persistent high-risk drinkers because it focuses on current healthy norms. Some programs outside of university and college campuses do focus on the long term (e.g., Alcoholics Anonymous). The challenges for campus programming are (a) to determine when someone needs to be referred to these programs or to intensive counseling, and (b) to develop campus programming along the same parameters, as few current college prevention programs are geared toward the long term. There are fewer examples of these types of programs at hand because most prevention and intervention efforts for college students have focused on the short-term definitions of risk.

Finally, adult persistent high-risk drinkers may need additional assistance with their developmental abilities due to their use of alcohol to cope with development. Interventions related to alcohol use should coincide with programming that encourages progress along other developmental tasks (e.g., introspective skill building, developing social competencies outside of alcohol use).

Several implications for student affairs practice may be drawn from the preliminary understanding offered by this study of how to identify time limited and adult persistent students and the types of programs that may effect change for these populations. Residence life, judicial affairs, counseling services and wellness centers are a few of the functions that could benefit from knowing these patterns. For example, judicial affairs staff could tailor individualized sanctions depending on the likelihood of maturing out. Wellness centers staff could create a two-tiered prevention effort, targeting time limited and adult persistent students separately. Counseling services could be focused on long-term drinking effects and current developmental needs for potentially adult persistent students.

Despite significant evidence for using a developmental framework to better understand the use of alcohol in college, critical gaps exist in the literature. Through the lens of Erickson (1963), the link between identity development and alcohol use has been well researched; nonetheless, more research is needed on the effect of development on drinking using...
specific theories of college student development (e.g., Chickering & Reisser, 1993; Josselson, 1987; Kohlberg, 1971; Perry, 1970). Also, there is a notable lack of research on the interplay between development of racial or gender identities and alcohol involvement. Research on students at Historically Black Colleges and Universities indicated very little alcohol abuse (Meilman, Presley, & Cashin 1995; Meilman, Presley, & Lyerla, 1994). However, those studies may not reflect the behavioral patterns of current students. New studies about the behavior and attitudes of African-American and other minority students on predominantly White campuses are needed (Globetti et al., 1993; Williams, Newby & Kanitz, 1993). More research is also needed to expand the understanding of the effect of moral development of college students on alcohol consumption, using perspectives such as those offered by Gilligan (1982) and Kohlberg (1971). Lastly, more research is needed to determine the effect of programming geared towards improving mastery of other developmental tasks on alcohol use, specifically for adult persistent high-risk drinkers.

As educators learn more about the many personal and developmental dimensions that affect patterns of high-risk drinking behavior among college students, investment in a long-term longitudinal study may be warranted. Only data drawn from longitudinal studies can address the three inherent limitations of the type of research design used in this exploratory study: differences across generational values and experiences, problems of recall, and the interplay of environment with behavior. Such a study would require a fairly complex multidimensional research design, and could be resource-intensive because of the size of the participant population and needs for tracking, communication, and follow-up over an extended period (e.g., 20 years). In the health sciences, such studies have been undertaken (e.g., the National Longitudinal Study of Adolescent Health; Resnick, et al., 1997). The quality of the results should enable professionals in college campuses across the country to design prevention and intervention programs better suited to the needs of both time limited and adult persistent high-risk college drinkers.

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REFERENCES


