

## Predicting functional outcomes among college drinkers: Reliability and predictive validity of the Young Adult Alcohol Consequences Questionnaire

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### Abstract

Heavy drinking and associated consequences are widespread among U.S. college students. Recently, Read et al. (Read, J. P., Kahler, C. W., Strong, D., & Colder, C. R. (2006). Development and preliminary validation of the Young Adult Alcohol Consequences Questionnaire. *Journal of Studies on Alcohol*, 67, 169–178) developed the Young Adult Alcohol Consequences Questionnaire (YAACQ) to assess the broad range of consequences that may result from heavy drinking in the college milieu. In the present study, we sought to add to the psychometric validation of this measure by employing a prospective design to examine the test–retest reliability, concurrent validity, and predictive validity of the YAACQ. We also sought to examine the utility of the YAACQ administered early in the semester in the prediction of functional outcomes later in the semester, including the *persistence* of heavy drinking, and academic functioning.

Ninety-two college students (48 females) completed a self-report assessment battery during the first weeks of the Fall semester, and approximately one week later. Additionally, 64 subjects (37 females) participated at an optional third time point at the end of the semester. Overall, the YAACQ demonstrated strong internal consistency, test–retest reliability, and concurrent and predictive validity. YAACQ scores also were predictive of both drinking frequency, and “binge” drinking frequency. YAACQ total scores at baseline were an early indicator of academic performance later in the semester, with greater number of total consequences experienced being negatively associated with end-of-semester grade point average. Specific YAACQ subscale scores (Impaired Control, Dependence Symptoms, Blackout Drinking) showed unique prediction of persistent drinking and academic outcomes.

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## 1. Introduction

College students are not just a younger group of adults, but a population unique in developmental life stage, culture, and environment (Arnett, 2000; Schulenberg & Maggs, 2002; Sher & Gotham, 1999; Slutske et al., 2004). During the college years, students experience adult freedoms and responsibilities, and must learn to negotiate these in an environment where drinking is common place.

Despite considerable efforts by college administrators and public health professionals over the last several decades, heavy alcohol use in college persists (O'Malley & Johnston, 2002). Moreover, college students typically perceive their drinking as normative (Baer & Carney, 1993; Baer, Stacy, & Larimer, 1991; Perkins, Mielman, Leichliter, Cashin, & Presley, 1999). As such, despite drinking heavily, the overwhelming majority of students may either be unaware of or else unconcerned by the hazardous effects of their drinking.

Consequences resulting from college drinking reflect the uniqueness of the population itself, and include a spectrum of deleterious outcomes. These can be immediate, resulting from a single episode of heavy drinking (e.g., high risk sexual behaviors, drunk driving) or they can be more persistent or cumulative, the aggregate result of repeated heavy drinking (e.g., sliding grades, dependence symptoms, health and self-care problems).

Some drinking consequences may presage the development of more significant alcohol problems later in life (e.g., Nelson, Little, Heath, & Kessler, 1996; O'Neill & Sher, 2000). The detection of such consequences can help to stem the development of long-term problem alcohol use. Yet, even among the many students who eventually “mature out” of heavy drinking (Chassin, Flora, & King, 2004), never progressing to alcohol abuse or dependence, the consequences (e.g., risky sexual behavior, drunk driving, poor self-care) encountered during the period of heavy alcohol involvement can be significant (O'Malley & Johnston, 2002; Perkins, 2002; Wechsler, Lee, Kuo, & Lee, 2000). Further, while data show that for some, alcohol problems can serve as a catalyst for change (e.g., Barnett, Goldstein, Murphy, Colby, & Monti, 2006), not all students interpret the experience of drinking consequences in this way, and instead persist in risky drinking patterns (Barnett et al., 2004). An understanding of associations between alcohol problems and readiness to change drinking, and of which types of consequences predict continued heavy drinking, may lead to the identification of those students who perhaps are unable to make self-initiated changes in drinking.

Moreover, important but often overlooked is the fact that academics – putatively a primary reason for college attendance – have been shown to be negatively affected by alcohol involvement. Heavy drinking and problematic alcohol involvement have been linked to poorer academic performance (e.g., Paschall & Freisthler, 2003; Paschall, Kypri, & Saltz, 2006; Wood, Sher, & Rutledge, 2005) and to worse longer-term academic outcomes such as attrition and college drop-out (see Jennison, 2004). To our knowledge, no studies have examined the prospective association between specific types of alcohol problems and academic indicators such as grade point average. Early identification of drinking consequences, accompanied by knowledge regarding the types of consequences that are predictive of poorer short- and long-term functioning will help university administrators and health professionals to identify those students at greatest risk for harmful outcomes.

A number of interventions have been developed to reduce both short-and long-term consequences that may result from heavy drinking in college. Among these are personalized feedback interventions, which are geared toward highlighting those negative effects of drinking that are most salient to the drinker, and thus most likely to catalyze behavior change (c.f., Borsari & Carey, 2005; Larimer et al., 2001; Marlatt et al., 1998; Neighbors, Larimer, & Lewis, 2004). Measures that specifically assess a range of distinct

types of consequences, and that represent the full spectrum of consequence severity, may be used in such interventions to provide comprehensive individualized feedback to students about their drinking and its effects across multiple domains of functioning.

Recently, Read, Kahler, Strong and Colder (2006) developed the Young Adult Alcohol Consequences Questionnaire (YAACQ) to assess the broad range of consequences that may result from heavy drinking in the college milieu. This measure was developed with the intention of providing an efficient and comprehensive method for evaluating these consequences that could be easily incorporated into clinical settings such as personalized feedback interventions. Further, as previous psychometric work with the YAAPST identified a need for assessment of consequences at the less severe end of the alcohol problems continuum (see Kahler, Strong, Read, Palfai, & Wood, 2004), the YAACQ was designed to broaden the assessment scope of potentially deleterious consequences. Features of this measure include a dichotomous response option set that facilitates quick administration and scoring, a resulting total score that represents a simple and easily interpretable count of types of consequences experienced, and unique subscales that may lend themselves well to the provision of personalized feedback to students about their drinking and its effects. Confirmatory factor analysis revealed eight consequence domains: Social Interpersonal Problems, Impaired Control, Self-Perception, Self-Care, Risky Behaviors, Academic/Occupational Consequences, Physiological Dependence, and Blackout Drinking. In preliminary validation work, these domains showed strong internal reliabilities, and all loaded on a single, higher-order alcohol consequences factor. These subscales and the higher order factor all showed significant associations with other indices of alcohol involvement. Moreover, two of the eight YAACQ subscales (Impaired Control and Self-Care) assess domains of problems not fully assessed by other existing measures. The initial validation of the YAACQ was conducted with cross-sectional data. It was noted by these authors that a contribution of future research would be to offer data regarding the YAACQ's utility in repeated measures designs (i.e., test–retest reliability), and to examine the predictive validity of the YAACQ relative to later alcohol involvement and other functional domains.

Our objectives in the present study were twofold. First, we sought to add to the psychometric validation of the YAACQ as an index of heavy/problem alcohol involvement in college by employing a prospective design to examine the test–retest reliability, concurrent validity, and predictive validity of this measure. We also examined whether those in our sample differed in their readiness or motivation to change drinking behaviors based on the number of deleterious experiences they had encountered in the previous year. Our second objective was to examine the utility of the YAACQ administered early in the semester in the prediction of functional outcomes later in the semester. Specifically, we were interested in whether the YAACQ could be used to predict the *persistence* of heavy drinking over time, and whether certain types of consequences might portend an inability to adjust alcohol consumption behaviors downward in a manner that would be adaptive. Further, as grade point average is an index of overall academic functioning in the college setting, we also examined the relationship between alcohol consequences and GPA in our sample.

## 2. Method

### 2.1. Participants

Participants were students enrolled in introductory psychology classes at a mid-sized university in the northeast. Ninety-two participants (48 females) completed the assessment battery at Time 1. Eighty-four participants (45 females) completed the Time 2 assessment. Of the Time 1 sample, 78 subjects expressed

interest in taking part in a later assessment to take place in the last two weeks of the academic semester (Time 3), of which 64 (82%; 37 females) actually participated. At Time 1 (as in subsequent assessment points), the majority of participants were White ( $n=66$ , 72%); the mean age at Time 1 was 19.1 ( $SD=1.54$ ), the mean GPA at Time 1 was 3.20 ( $SD=.51$ ) and at Time 3 was 3.17 ( $SD=.48$ ). Just over half of participants (51, 55.43%) were freshmen. Comparisons of individuals who completed Time 3 and those who did not on baseline demographic (gender, age, ethnicity, and GPA) and alcohol use variables (quantity of use, frequency of use, “binge” drinking status, YAACQ scores) revealed no significant differences.

In the Time 1 sample, six individuals (6.5%) self-identified as non-drinkers at baseline assessment. Four of these individuals completed the Time 3 assessment. Of these four, one went on to drink during the period between baseline and Time 3. Moreover, some of those who identified themselves as non-drinkers reported experiencing some alcohol consequences in the past year. As such, the “non-drinker” categorization seemed to be a somewhat transient one, particularly for this group of individuals in transition from high school to college. In light of this, we opted to keep these individuals in the analyses.

## 2.2. Procedure

Participants were recruited through a mass-testing procedure that occurred in the first week of the fall semester. Eligibility was based on full-time enrollment in college. In order to receive academic credit, all participants were required to attend both Time 1 and Time 2 sessions, which took place during the first six weeks of school. Participation in Time 3 was optional. Time 1 and Time 2 paper-and-pencil self-report data collection sessions were conducted in mixed-sex groups of 10–20 participants, approximately one week apart. Informed consent was obtained at the beginning of each session and participants received academic credit for completion of each assessment. At the Time 1 session, participants indicated whether they were interested in participating in a third data collection session at the end of the semester. These interested students were later re-contacted and scheduled for Time 3 data collection sessions. Time 3 participants were paid \$20. Time 3 follow-up data were collected approximately nine weeks after Time 2, during the last two weeks of the semester. All study procedures were approved by the university Institutional Review Board.

## 2.3. Measures

### 2.3.1. Demographic Information

Demographic data gathered included gender, age, ethnicity, year in school, work and residential status, and grade point average.

### 2.3.2. Alcohol-related consequences

Consequences from drinking were assessed with the 48-item Young Adult Alcohol Consequences Questionnaire (YAACQ, Kahler, Strong, & Read, 2005; Read et al., 2006). Items assessed eight domains of consequences, all of which load on a single, higher-order consequences factor. These consequence subscales include Social/Interpersonal (e.g., “I have become very rude, obnoxious or insulting after drinking”), Academic/Occupational (e.g., “I have neglected my obligations to family, work, or school because of my drinking”), Risky Behavior (e.g., “I have taken foolish risks when I have been drinking”), Impaired Control (e.g., “I often drank more than I originally had planned.”), Poor Self-Care (e.g., “I have been less physically active because of drinking”), Diminished Self-

Perception (e.g., “I have felt badly about myself because of my drinking”), Blackout Drinking (e.g., “I have awakened the day after drinking and found that I could not remember a part of the evening before”), and Physiological Dependence (e.g., “I have felt anxious, agitated, or restless after stopping or cutting down on drinking”). For a complete listing of items see [Read et al. \(2006\)](#). Response options were rated dichotomously (yes/no) to indicate whether that consequence had been experienced in the last six months (Times 1, 2) or one month (Time 3).

Consequences associated with alcohol consumption were further assessed with a 36-item version of the Young Adult Alcohol Problems Screening Test ([Hurlbut & Sher, 1992](#)). This measure assessed frequency of alcohol problems over the past 6 months for both Time 1 and Time 2, and over the past 1 month for Time 3. The measure assesses both general consequences (e.g., hangovers, blackouts, driving under the influence of alcohol) and consequences more specific to college students (e.g., missing class, getting involved in regrettable sexual situations). Coefficient alpha for this scale was .86 at Time 1, .82 at Time 2, and .83 at Time 3. In addition, we also calculated scores for the YAAPST based on recommendations by [Kahler et al. \(2004\)](#). This briefer (20-item; YAAPST-D) measure, developed using item response modeling, is dichotomously scored, reduces item redundancy and item bias, and shows strong associations with alcohol involvement.

#### 2.3.3. Alcohol use disorders identification test (AUDIT)

The AUDIT is a 10-item screening questionnaire to identify hazardous alcohol consumption. It includes three items on drinking quantity and frequency, three alcohol dependence items, and four items on problems caused by alcohol ([Maisto, Conigliaro, McNeil, Kraemer, & Kelley, 2000](#)). Thus, calculation of both a use and consequence subscale is possible from this measure. Items were queried for the past six months for Times 1 and 2, and past month for Time 3. Alpha coefficient for this sample was .79.

#### 2.4. Alcohol use

Drinking patterns were evaluated for the 30 days preceding assessment. Students were given Standard Drink Conversion charts to facilitate accurate reporting of drinking behaviors. Consistent with [Wood, Read, Palfai and Stevenson \(2001\)](#), alcohol use was measured with items regarding typical weekly quantity and frequency of alcohol consumption in the past month. The frequency question read: “How often (in the past month) have you had some kind of beverage containing alcohol?” The quantity question read: “In the past month, when you were drinking alcohol, how many drinks did you *usually* have on any ONE occasion?” In addition, participants reported on heavy episodic, or “binge” drinking with a single item which read: “In the past month, how many times have you had five or more drinks at a single sitting, either beer, wine, wine coolers, liquor, or some combination of these?”

##### 2.4.1. Readiness to change questionnaire (RCQ)

The RCQ ([Rollnick, Heather, Gold, & Hall, 1992](#)) is a 12-item questionnaire used for assessing readiness to change drinking behaviors and for assignment to Precontemplation (e.g., “I don’t think I drink too much,”  $\alpha=.48$ ), Contemplation (e.g., “Sometimes I think I should cut down on my drinking,”  $\alpha=.72$ ), and Action (e.g., “I am trying to drink less than I used to,”  $\alpha=.77$ ) stages. Each item is rated on a 5-point scale (*strongly disagree* to *strongly agree*). Subjects were assigned to a stage according to their highest subscale score ([Heather, Rollnick, & Bell, 1993](#)). Seven subjects could not be stage-assigned due to equal scores on more than one subscale. Consistent with previous work ([Vik,](#)



Culbertson, & Sellers, 2000) the majority (79%;  $N=67$ ) of our sample were categorized as being in Pre-Contemplation. An additional 9.4% ( $N=8$ ) were in Contemplation, and 11.8% ( $N=10$ ) were in Action.

### 3. Data analytic overview

First, descriptive and inferential statistics were conducted to describe alcohol use and problems in our sample over the three time points that spanned the academic semester. Next, we computed internal and test–retest reliabilities for the full YAACQ scale as well as for each individual subscale. To test concurrent validity of the YAACQ, we computed Pearson correlations among YAACQ scores, measures of alcohol consumption, and other measures of alcohol problems at Time 1. We also examined differences in YAACQ scores based on stage of change (Pre-contemplation, Contemplation, or Action), indexed by the RCQ. In prospective analyses, we did an initial calculation of Pearson correlation coefficients calculated between the Time 1 and Time 3 YAACQ total and subscale data and alcohol outcomes. This was followed by a more stringent test of the YAACQ, examining its prediction of Time 3 alcohol involvement after controlling for baseline alcohol consumption variables in three separate regression models (with Frequency, Quantity, and “Binge” Drinking frequency as the dependent variables). As the YAACQ’s subscale structure is unique from other young adult alcohol consequence measures, we also examined prediction of drinking and academic (i.e., GPA) outcomes by subscale in stepwise regression models.

### 4. Results

At baseline, participants drank an average of 4.19 ( $SD=2.41$ ) drinks on a typical drinking occasion. Consumption remained quite stable at times two and three, with typical number of drinks reported as 4.13 ( $SD=2.44$ ) and 4.34 ( $SD=2.18$ ) respectively. The average frequency rating at Time 1 was 2.75 ( $SD=1.09$ ), indicating that participants drank approximately once weekly on average. Frequency also remained consistent across time, (Time 2  $M=2.66$ ,  $SD=1.11$ , and Time 3  $M=2.67$ ,  $SD=.98$ ). The average rating of binge frequency at Time 1 was 2.05 ( $SD=1.70$ ), 1.94 ( $SD=1.56$ ) at Time 2, and 1.88 ( $SD=1.39$ ) at Time 3. This indicates that the typical student drank 5 or more drinks in a single sitting approximately 2–3 times in the past month, across the semester-long assessment period. Repeated measures ANOVAs showed no significant changes in any of these alcohol consumption indices across the three time points.

Unexpectedly, participant reports of alcohol problems on the YAACQ decreased across the three time periods,  $F(2,104)=7.66$ ,  $p<.001$ . Follow-up contrasts showed that Time 1 scores differed significantly from those at Time 2 ( $p<.05$ ; T1  $M=10.25$ ,  $SD=7.19$ , T2  $M=8.70$ ,  $SD=7.31$ ) and from those at Time 3 ( $p<.01$ ; T3  $M=7.18$ ,  $SD=7.48$ ). A similar pattern was observed for reporting of consequences on the YAAPST,  $F(2,82)=22.8$ ,  $p<.001$ , with contrasts between Time 1 ( $M=21.75$ ,  $SD=15.22$ ) and Times 2 ( $M=19.07$ ,  $SD=13.33$ ) and 3 ( $M=13.65$ ,  $SD=9.93$ ) showing statistically significant decrements at each interval ( $ps<.01$  at Time 2 and  $.001$  at Time 3). Total AUDIT scores did not change significantly over time, though the alcohol consequences subscale of this measure (Maisto et al., 2000) showed a small decrement (from 2.21 to 1.94) from Time 1 to Time 2.

#### 4.1. Reliability

Using tetrachoric correlations appropriate to the dichotomous scoring approach for the YAACQ, we estimated internal reliabilities for each subscale. In this sample, coefficient alphas for Time 1, Time 2, and

Time 3, respectively were .83, .86, .79 for the Impaired Control scale, .89, .89, .94 for the Poor Self-Care scale, .84, .87, .85 for the Diminished Self-Perception scale, .83, .84, .83 for the Social Interpersonal Consequences scale, .80, .91, .95 for the Academic/Occupational scale, .90, .92, .90 for the Blackout Drinking scale, .83, .87, .90 for the Risky Behaviors scale, .74, .82, .85 for the Physical Dependence Scale, and .96, .97, and .98 for the total YAACQ scale.

We computed test–retest reliabilities for the full YAACQ scale as well as for each individual subscale ( $n=84$ , Time 1 and Time 2 completers). The analyses yielded a Pearson correlation of .86 ( $p<.001$ ) between the two full YAACQ scores. All test–retest reliabilities of individual subscales, computed with Pearson correlation coefficients, also were significant at  $p<.001$ . Specifically, the correlations for each of the consequence subscales was .74 for Social/Interpersonal, .69 for Impaired Control, .45 for Self-Perception, .56 for Self-Care, .79 for Risky Behaviors, .78 for Academic/Occupational, .78 for Dependence, and .85 for Blackout Drinking. We also computed inter-scale correlations for the eight YAACQ subscales. These correlations are presented in Table 1.

#### 4.2. Concurrent associations

As predicted, the YAACQ total score was strongly and significantly associated with other Time 1 indices of alcohol use and problems (Table 2). When we examined group differences among those in “Pre-Contemplation”, “Contemplation”, and “Action” stages, we found that students differed in their readiness to change drinking based on the number of consequences that they reported. The omnibus F test for the ANOVA revealed significant differences across stage of readiness groups,  $F(2, 79)=11.81$ ,  $p<.001$ . Tukey follow-up comparisons showed significant differences in Time 1 YAACQ total score for “Contemplation” status: those categorized as Contemplators reported approximately twice the number of consequences ( $M=21.00$ ,  $SD=7.67$ ) in the past six months than those in Pre-Contemplation ( $M=8.86$ ,  $SD=6.35$ ) or in Action ( $M=11.30$ ,  $SD=8.06$ ).

Table 1  
Interscale correlations among YAACQ subscales

Time 1 YAACQ Subscale	Soc	Cont	Self-p	Self-c	Risk	Ac/Oc	Dep	Blk
Soc								
Cont	.39 ***							
Self-p	.25 *	.16						
Self-c	.28 **	.39 ***	.46 ***					
Risk	.49 ***	.54 ***	.23 *	.49 ***				
Ac/Oc	.33 ***	.47 ***	.17	.32 **	.46 ***			
Dep	.41 ***	.34 ***	.16	.12	.35 ***	.45 ***		
Blk	.57 ***	.48 ***	.10	.37 ***	.56 ***	.49 ***	.37 ***	

Note: Soc = Social/Interpersonal subscale; Cont = Impaired control over drinking subscale; Self-p = Self-perception subscale; Self-c = Self-care subscale; Risk = Risky Behavior subscale; Ac/Oc = Academic/Occupational subscale; Blk = Blackout Drinking subscale.

\*  $p \leq .05$ .

\*\*  $p \leq .01$ .

\*\*\*  $p \leq .001$ .

Table 2

Concurrent associations

	Frequency (past mo.)	Quantity (past mo.)	Binge (past mo.)	YAAPST	YAAPST-D	AUDIT	GPA
Time 1 YAACQ	.57 ***	.50 ***	.60 ***	.85 ***	.68 ***	.76 **	-.10 <sup>NS</sup>

YAAPST = Young Adult Alcohol Problems Screening Test; YAAPST-D = 20 item, dichotomously scored YAAPST recommended by Kahler et al., 2004; AUDIT = Alcohol Use Disorders Identification Test.

\*\*  $p \leq .01$ .

\*\*\*  $p \leq .001$ .

#### 4.3. Prospective associations

Pearson correlation coefficients revealed strong and statistically significant bivariate associations between the Time 1 YAACQ total scale and Time 3 use and consequence variables, all  $ps < .05$ . This included a strong inverse association with Time 3 grade point average. Correlations for YAACQ subscales and drinking and grade point outcomes are shown in Table 3.

We followed examination of prospective bivariate associations with a more stringent test of the YAACQ, examining its prediction of heavy alcohol use after controlling for baseline alcohol consumption variables. In three separate regression models, we examined prospective associations between the YAACQ at Time 1 and each of the alcohol consumption variables (Frequency, Quantity, and frequency of “Binge” Drinking) at Time 3, controlling for baseline consumption. As expected, we observed strong ( $ps < .001$ ) autoregressive associations between Times 1 and 3 drinking behaviors in each model. However, in addition to this, we also observed a prospective association between Time 1 YAACQ and Time 3 drinking Frequency,  $\beta = .28$ ,  $sr^2 = .06$ ,  $p < .05$ , and a trend-level prospective association with Time 3 “Binge” Drinking Frequency,  $\beta = .23$ ,  $sr^2 = .03$ ,  $p = .09$ . These models accounted for .40 and .33 of the

Table 3

T1 YAACQ total and subscale scores and selected T3 variables: bivariate correlations

Time 1 Administration	Time 3 measures			
	Frequency (past mo.)	Quantity (past mo.)	Binge (past mo.)	GPA
YAACQ total score	.55 ***	.30 *	.49 ***	-.29 *
YAACQ subscales				
Soc	.35 **	.24	.33 **	-.23
Cont	.47 ***	.27	.36 **	-.20
Self-p	.22	-.01	.14	.08
Self-c	.40 ***	.14	.35 **	-.14
Risk	.38 **	.19	.37 **	-.30 *
Ac/Oc	.34 **	.19	.39 **	-.25
Dep	.24	.24	.36 **	-.02
Blk	.49 ***	.34 **	.42 ***	-.33 **

Note: Soc = Social/Interpersonal consequences subscale; Cont = Impaired Control over drinking subscale; Self-p = Self-Perception consequences subscale; Self-c = Self-Care consequences subscale; Risk = Risky Behavior consequences subscale; Ac/Oc = Academic/Occupational consequences subscale; Blk = Blackout Drinking consequences subscale.

\*  $p \leq .05$ .

\*\*  $p \leq .01$ .

\*\*\*  $p \leq .001$ .



variance in Time 3 drinking and Binge Frequency, respectively. The YAACQ did not show significant prospective associations with Typical Quantity at Time 3.

To examine the YAACQ's prospective association with a non-drinking index of functioning of particular relevance to college, we also conducted a multiple regression with Time 3 GPA as the dependent variable, controlling for baseline GPA. We observed a significant prospective association between T1 YAACQ total and Time 3 GPA,  $\beta = -.23$ ,  $sr^2 = .05$ ,  $p < .01$ , indicating that higher YAACQ scores early in the semester predicted poorer grade point average at the semester's end.

As the subscale structure of the YAACQ is unique from other indices of young adult alcohol involvement, we also examined prediction of drinking and grade point outcomes by subscale. Following bivariate analysis, three stepwise regression models with Drinking Frequency, "Binge" Frequency, and GPA as the dependent variables were conducted. Again, the corresponding baseline consumption variables were controlled. In the model predicting Frequency, the Impaired Control subscale contributed significantly to the prediction of end-of-semester drinking frequency above and beyond baseline frequency,  $\beta = .27$ ,  $p = .01$ ,  $sr^2 = .06$ , Model Adjusted  $R^2 = .42$ . The YAACQ Dependence subscale showed a significant prospective association with Time 3 "Binge" Frequency,  $\beta = .24$ ,  $p < .05$ ,  $sr^2 = .05$ , Model Adjusted  $R^2 = .32$ . When examining Time 3 GPA as the dependent variable, the Blackout Drinking Subscale was a significant predictor,  $\beta = -.23$ ,  $p < .01$ ,  $sr^2 = .05$ , Model Adjusted  $R^2 = .56$ , controlling for Time 1 GPA.

## 5. Discussion

Early detection of drinking consequences among college students may help to reduce their short-term impact and may assist in the identification of students at risk for continued consequences, or escalation of alcohol involvement even as the academic year progresses. The Young Adult Alcohol Consequences Questionnaire was developed to assess a broad range of consequences, many of which are unique to the college environment and drinking experience. The YAACQ has a number of features that may make it advantageous in the assessment of drinking consequences in this particular population. These include dichotomous response format to facilitate administration and scoring, clinically meaningful subscale and total scores, and the inclusion of scales such as Impaired Control and Self-Care which are not assessed in existing consequences measures. The present study used a prospective design to extend previous psychometric validation of the YAACQ and to examine the YAACQ as a method for predicting drinking and academic outcomes over the course of an academic semester.

Overall, the YAACQ demonstrated strong internal consistency, test–retest reliability, and concurrent and predictive validity. We also found YAACQ scores to be predictive of both drinking frequency and binge drinking frequency – two alcohol involvement indices that have been suggested to be associated with risky drinking more broadly (Borsari, Neal, Collins, & Carey, 2001; Presley & Pimentel, 2006). Early semester YAACQ total scores at baseline were predictive of academic performance later in the semester. Specific scores on those YAACQ subscales most closely associated with problem drinking (Impaired Control, Blackout Drinking, Dependence Symptoms) also showed unique prediction of continued drinking and academic outcomes.

### 5.1. Concurrent associations

Reports of drinking (for typical frequency, quantity, and binge frequency) were quite stable across the three time points. This is consistent with previous literature that suggests that, though trajectories vary,

drinking habits in general in college tend to be fairly consistent (Gotham, Sher, & Wood et al., 1997; Schulenberg, O'Malley, Bachman, Wadsworth & Johnston, 1996). Interestingly, despite generally strong test–retest reliability performance, significant reductions on the YAACQ were observed across the three assessments. This was true not just for the YAACQ, but also for the other problems measure that assesses a broad range of types of consequences, the YAAPST. Decreases in symptom reporting over brief assessment intervals have been observed elsewhere in the literature (e.g., Gilbert et al., 1998; Sharp & Gilbert, 1998), and the changes here are consistent with this phenomenon. Still, the rank order of individual scores remained stable across assessments. Moreover, the differences in scores, though statistically significant, represent a mean difference of approximately 1 1/2 consequences across the two time points, a difference not likely to be one that is clinically meaningful on a 48-item measure.

The YAACQ correlated strongly with concurrent alcohol consumption, and with other validated problem measures (i.e., YAAPST, AUDIT). These findings are consistent with and build upon earlier validation work (Read et al., 2006), offering additional support for the concurrent validity of this instrument.

As in other studies (e.g., Vik et al., 2000), the majority of the students in our sample were categorized as “Pre-Contemplators”, indicating that they expressed little or no intention to make imminent changes in their drinking behavior. Interestingly, reported alcohol problems were substantially higher among the Contemplators in our sample, compared to those in Pre-Contemplation or Action stages. This again provides construct validity evidence for the YAACQ. Further, though cross-sectional, this association suggests at least two possibilities to be explored in future research. The first of these is that experiencing a high number of consequences from drinking may have motivated these individuals to consider modification of their drinking practices. Some evidence for such a change process was observed by Barnett et al. (2006), whose data suggested that consideration of and attributions about specific consequences resulted in increased likelihood of motivation for change in drinking. Alternatively, it may be that those already thinking about changing their drinking may be more attentive to alcohol's deleterious effects, and thus more likely to endorse consequences when asked. Though the present study was not designed and is not statistically powered to do so, the question of whether contemplation of alcohol consequences is predictive of longer-term changes in drinking and reductions in associated problems will be an interesting one to address in future studies.

As would be expected from a measure that can be used as both a unidimensional index, and as component subscales, the inter-scale correlations (shown in Table 1) for the YAACQ showed that the subscales are conceptually linked, but not redundant to one another. Correlations among these factors are similar in magnitude to others reported for alcohol involvement measures (e.g., Cooper, 1994; Fromme, Stroot, & Kaplan, 1993; Maisto et al., 2000).

## 5.2. Prospective Associations

The strong test–retest reliabilities that we observed at both the total score and the subscale levels suggest that the YAACQ is a stable way to measure alcohol consequences across brief periods of time. All Time 1 subscales correlated strongly and significantly with those assessed one week later. These correlations fall within the range of “large” effects (Cohen, 1988).

The YAACQ total score was prospectively related to two (frequency, binge) of the three alcohol consumption indices assessed later in the semester. These associations remained significant or near-significant even after controlling for baseline involvement — a particularly stringent test given the brief assessment interval and high stability of drinking behaviors over time. This provides support for the

predictive validity of the YAACQ, and also offers some interesting insight about the persistence of heavy drinking among some individuals who are experiencing a particularly high level of alcohol consequences. Specifically, previous research has reported a self-initiated change in drinking behavior following negative consequences (Barnett et al., 2004, 2006). Indeed, such a change makes intuitive sense, as it stands to reason that many students, when confronted with deleterious outcomes resulting from their alcohol use, would modify their drinking behavior so as to prevent continued problems. Yet, our data suggest that those types of consequences most strongly associated with problem drinking (i.e., impaired control over drinking, dependence symptoms), rather than precipitating a decrease in drinking, instead predict continued and persistent heavy drinking. It appears that these types of consequences suggest a level of involvement with alcohol that may make it difficult for students to self-initiate changes in their consumption.

Our findings regarding prospective associations between YAACQ total and Blackout Drinking subscale scores and academic performance (indexed by grade point average) offer support for the predictive validity of the YAACQ in a domain highly relevant to functioning in the college milieu. Our findings suggest that the YAACQ may assist in the detection of impairment in this functional outcome, as the baseline YAACQ total scores, and Blackout Drinking in particular, were early indicators of academic performance later in the semester.

A major advantage of the YAACQ is the component subscales. As noted, these subscales showed good internal and test–retest reliabilities, and also were associated with concurrent alcohol involvement in our study. Importantly, a subset of these subscales also showed prospective associations with unique types of drinking across the course of the semester. Interestingly, two of the subscales commonly associated with problem drinking – Impaired Control and Dependence symptoms – were unique predictors of risky drinking at the end of the semester. Impaired control long has been implicated in problem alcohol involvement (Heather & Dawe, 2005; Kahler, Epstein, & McCrady, 1995), and in our data, showed prospective prediction of frequency of drinking. Early semester symptoms of alcohol dependence were associated with the frequency of heavy episodic drinking at semester's end. Recent data suggest frequency and not just quantity to be an important indicator of risky drinking in college students (Presley & Pimentel, 2006), and though not a perfect index of risky drinking, previous work has found frequency of “binge” drinking to be associated with alcohol consequences (Borsari et al., 2001). As such, the prediction of these drinking behaviors by the YAACQ total score as well as specific YAACQ subscales has clinical utility, and may alert interventionists to the persistence of risky drinking patterns later to come.

The eight subscales which comprise the YAACQ lend themselves well to personalized feedback interventions which have received much empirical support for intervention on college drinking (c.f., Borsari & Carey, 2005; Larimer et al., 2001; Marlatt et al., 1998; Neighbors et al., 2004). Specifically, such interventions could incorporate these subscales into personalized feedback, focusing on those consequences that are personally relevant or meaningful to the individual student, as these may be the most potent in eliciting motivation for behavior change.

Some limitations of the present study are worth noting. Foremost among these is the small sample size. Original factor analytic work on the YAACQ identified eight unique factors, which loaded on a single higher-order consequences factor (see Read et al., 2006). In the present study, strong internal reliabilities for YAACQ subscales and total score offer further support for the reliability of these factors and for the YAACQ as a whole. Still, studies with larger samples will afford replication and thus stronger confirmation of the factor structure of this measure.

Our measure of “binge” drinking queried only about five drinks or more in a single sitting. Some other studies have used the gender-specific categorization of 4+/5+drinks for women and men, respectively. Though data suggest that many students typically drink more than the minimum “binge” threshold (e.g., White, Kraus, & Swartzwelder, 2006), it is still likely that our more limited assessment of this construct failed to capture the heavy drinking behaviors of at least some of the women in our sample.

Because we were interested in predicting new drinking consequences at the end of the semester, the Time 3 YAACQ queried about the past month, rather than the past six months, the assessment period for Times 1 and 2. Though this makes for a cleaner prediction of end-of-semester drinking consequences, as these consequences do not overlap temporally with those reported from Times 1 or 2, it makes for weaker comparability of this measure across the three time points. Of course, the briefer time frame also likely contributed to the reporting of reduced consequences from Times 1 and 2 to Time 3, as there was a shorter time period in which these consequences could have taken place.

Finally, though all Time 1 subscales correlated significantly with those assessed one week later, at Time 2, the Self-Perception and Self-Care subscales showed the least strong reliabilities across time points ( $r$ s of .45 and .56, respectively), falling below the .70 cutoff recommended by Cicchetti (1994) and others (Nunnally & Bernstein, 1994). Such increased variability across time points is perhaps not surprising, as these two subscales assess consequences that are more likely to occur at a day-to-day level, and thus are more likely to show change over even brief periods of time. In particular, items from the Self-Perception scale are internal, and thus more subjective. As such, these subscales may be more likely than the others to reflect subtle and transient changes in the individual’s self-perception.

Despite these limitations, this study builds on the existing empirical support for the Young Adult Alcohol Consequences Questionnaire. The YAACQ provides reliable assessment of a broad range of drinking consequences, and shows prospective associations at the total scale and subscale level with high risk drinking outcomes and impaired academic performance. Early identification of these consequences may be incorporated into individualized feedback interventions geared toward the reduction of continued risky drinking and consequences, both during college, and in the years beyond.

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