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Creation and validation of the barriers to alcohol reduction (BAR) scale using classical test theory and item response theory☆

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ABSTRACT

Those who binge drink are at increased risk for alcohol-related consequences when compared to non-binge drinkers. Research shows individuals may face barriers to reducing their drinking behavior, but few measures exist to assess these barriers. This study created and validated the Barriers to Alcohol Reduction (BAR) scale. Participants were college students (n = 230) who endorsed at least one instance of past-month binge drinking (4+ drinks for women or 5+ drinks for men). Using classical test theory, exploratory structural equation modeling found a two-factor structure of personal/psychosocial barriers and perceived program barriers. The sub-factors, and full scale had reasonable internal consistency (i.e., coefficient omega = 0.78 (personal/psychosocial), 0.82 (program barriers), and 0.83 (full measure)). The BAR also showed evidence for convergent validity with the Brief Young Adult Alcohol Consequences Questionnaire (r = 0.39, p < .001) and discriminant validity with Barriers to Physical Activity (r = −0.02, p = .81). Item Response Theory (IRT) analysis showed the two factors separately met the unidimensionality assumption, and provided further evidence for severity of the items on the two factors. Results suggest that the BAR measure appears reliable and valid for use in an undergraduate student population of binge drinkers. Future studies may want to re-examine this measure in a more diverse sample.

Alcohol use is excessively common on college campuses, with nearly 60% of students endorsing past-month alcohol use and two-thirds of those endorsing alcohol use reporting past-month binge drinking (SAMHSA, 2015). Binge drinking while in college has serious consequences for students ranging from a hangover or being late to class (Perkins, 2002) to blacking out (Merrill et al., 2016), sleep disorders (Miller, Janssen, & Jackson, 2016), increased risk of sexual assault (Abbey, 2002), and physical injury or death from motor vehicle accidents (Perkins, 2002). While college students do not necessarily view all consequences of drinking as negative (e.g. reduced stress from drinking was seen as a positive benefit), research suggests that the incidence of negative consequences doubles for each successive drink per day (incidence rate ratio = 2.34) (Barnett et al., 2014). Alcohol misuse (i.e. heavy drinking or binge drinking) is also associated with higher rates of health consequences, including certain types of cancer, cirrhosis of the liver, and cardiovascular disease (Rehm et al., 2009), and despite being a highly modifiable behavior, binge drinking contributes greatly to global mortality and morbidity (Control and Prevention, 2012; Mokdad, Marks, Stroup, & Gerberding, 2004). College students who binge drink have been shown to be more likely to experience at least one alcohol-related problem while in college compared to their non-binge drinking peers (Jennison, 2004). Thus, the college years are an important time to intervene to reduce the risk of these negative consequences.

However, there may be significant barriers that individuals face when attempting to reduce their alcohol consumption, especially in those that binge drink. The widespread nature and normative environment of alcohol use on college campuses may make students reluctant to seek treatment to help reduce their drinking (Baer, 2002). Peer influences may also contribute to difficulty in reducing alcohol use and maintaining that reduction. Among social networks where peers are not accepting of reduced drinking, even when individuals have been mandated to receive treatment for alcohol use, peak blood alcohol content sharply rose over time compared to social networks which did accept reduced drinking (Reid, Carey, Merrill, & Carey, 2015). Therefore, peers represent a major barrier to cutting down or stopping alcohol use.

However, few studies have focused specifically on peers or other barriers. Two major types of barriers to changing drinking behavior have been identified: client barriers and program barriers (Schober &

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Annis, 1996). Client barriers include psychosocial risk factors (e.g. situations leading to increased drinking), stigma associated with receiving treatment for alcohol misuse (e.g. fear that being seen in alcohol treatment programs may decrease one's social standing), and insufficient social or financial resources to seek help. The remaining were program barriers, including the type of treatment (multimodal or unimodal), the program's sensitivity to the needs of the individual, whether the client thought the treatment would help, lack of consistent therapists for clients to see, and requiring abstinence instead of controlled drinking (Schober & Annis, 1996). Some of these barriers identified by Schober and Annis are included in recent studies of alcohol use (Dawson, Goldstein, & Grant, 2007; Reid et al., 2015). However, no comprehensive measure of these barriers exists, limiting research in this area.

Given that there are significant health outcomes related to alcohol use and misuse on college campuses, and that college students who binge drink face barriers to reducing their alcohol consumption, establishing ways to measure these possible barriers merits further investigation. Moreover, as men are six times more likely to develop alcohol dependence if they continue heavy drinking patterns post-college, and women are twelve times more likely (Jennison, 2004), identifying barriers to reducing alcohol use during the college years could lead to interventions to reduce heavy consumption. It may well be that assessing these barriers could assist care-providers in working with college students to reduce unsafe drinking practices, similar to research of smoking cessation barriers predicting smoking abstinence (Martin, Cassidy, Murphy, & Rohsenow, 2016). However, it is currently difficult to assess barriers to seeking alcohol treatment among college students who rarely seek help (Caldeira et al., 2009) and likely have unique needs compared to other groups (e.g. combat veterans) (Santiago et al., 2010). Therefore, our study addresses this need in the literature for a measure that assesses barriers to alcohol reduction specifically for college students, using both classical test theory (CTT) and item-response theory (IRT). CTT provides information on reliability, validity, and dimensionality of a measure (Nunnally, 1978), whereas IRT provides information on the severity or difficulty of each item (Andrich, 1988; Rasch, 1960), such as with respect to reducing substance use (Kahler, Strong, & Read, 2005).

The purpose of the current study was to develop and validate a measure of barriers to alcohol use reduction, specifically in a sample of college student binge drinkers. Our hypotheses were that the final measure would achieve acceptable internal consistency levels (≥ 0.70: Nunnally, 1978) using the recommended coefficient omega (Dunn, Baguley, & Brunsden, 2014), convergent validity with the Brief Young Adult Alcohol Consequences Questionnaire (BYACQ: Kahler et al., 2005), and discriminant validity with Barriers to Physical Activity. Consistent with Schober and Annis (1996), we expected two facets would emerge within a single overall construct of barriers to alcohol reduction using both exploratory and confirmatory factor analysis (i.e., EFA & CFA). Finally, IRT analyses were expected to show that all items provided a cohesive list of item severity with higher values showing greater perceived barriers to alcohol reduction.

1. Methods

1.1. Participants

Participants for this study were drawn from a larger study on physical activity, adversity, and alcohol use ($N = 720$); 363 of the 720 participants completed the alcohol use portion of the study, with 230 reporting an incidence of binge drinking in the past month. These 230 participants constituted a relevant convenience sample of undergraduate students at a large, rural university in the northeastern United States who received one-point extra course-credit as compensation. This reduced sample was predominantly female ($N = 172$, 74.8%) and white ($N = 179$, 77.8%). All participants were asked to give their initial informed consent by reading the online consent document and checking that they read the document and were willing to participate. IRB approval was obtained prior to conducting this study.

1.2. Materials

1.2.1. Demographics

Participants completed a demographic questionnaire asking about gender identity, racial/ethnic identity, and age.

1.2.2. Alcohol use

Participants were asked about the frequency of their drinking behavior (past-week and past-month), and about their frequency of binge drinking.

1.2.3. Barriers of alcohol reduction

We developed the initial items for the Barriers of Alcohol Use Cessation (BAR) scale based on barriers identified by Schober and Annis (1996). In total, we identified 13 different barriers grouped into two categories of personal/psychosocial barriers and program barriers. The personal/psychosocial barriers included: stigma around reducing drinking, drinking in social situations, drinking alone, drinking while celebrating, drinking to cope with anxiety, drinking to cope with sadness, drinking to cope with life stressors, feeling like they could not drink less, and the program barriers included: difficulties affording treatment, low social support, treatment programs not meeting needs, treatment programs not working, and treatment programs not having a consistent therapist. These items were reworded for clarity, and placed on a 4-point rating scale (0 = False, 1 = True and Hardly at All Important, 2 = True and Moderately Important, 3 = True and Very Important) which has been used as response options in other measures of addictive behavior (Rohsenow et al., 2003). All 13 items were reviewed for content validity by the third author, who has a PhD in clinical psychology with advanced training in addiction and alcohol use.

1.2.4. Brief Young Adult Alcohol Consequences Questionnaire

The BYACQ has 25 items in which participants endorse whether or not they have experienced consequences of alcohol use rated on a “yes” or “no” scale (Kahler et al., 2005; Read, Kahler, Strong, & Colder, 2006). A sample item is “While drinking, I have said or done embarrassing things.” This scale has evidence for convergent validity with heavy drinking and frequency of drinking and good internal consistency levels ($\alpha = 0.83$) (Kahler et al., 2005), and has been validated using IRT (Kahler et al., 2005). We used the BYACQ to assess convergent validity with our newly created barriers measure.

1.2.5. Barriers to physical activity (BPA)

Data for this study were gathered as part of a larger study on health behaviors. One of the scales measured was barriers to physical activity, which was a 13-item scale where 1 = Not a Barrier and 5 = Very Much a Barrier (Salmon, Owen, Crawford, Bauman, & Sallis, 2003). Salmon et al. found acceptable internal consistency among these items (Cronbach's alpha = 0.73). This measure was used to assess discriminant validity with the BAR.

1.2.6. Procedure

Participants for this study were recruited through several health-related undergraduate-level courses. If a student chose to participate, they were directed to an online survey link. After providing consent, participants completed several surveys including the BAR, BYACQ, BPA and demographic surveys. After completion of the study, participants were given one extra course-credit point for participating. If they were in multiple classes (i.e. in both a psychology and kinesiology course), they received course credit in each class.