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# Development and Validation of the Personal Assessment of Responsible Drinking Identity (PARDI) With a College Student Sample

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Recent research shows a link between identity and behavior change. Despite the existence of several measures that assess components of drinking identity, no measures examine the idiosyncrasies of a "Responsible Drinking Identity," though responsible drinking is an aim of many alcohol-related interventions. The present study created a measure of responsible drinking identity, the Personal Assessment of Responsible Drinking Identity (PARDI). Two cross-sectional designs and a prospective follow-up were used to develop and assess the psychometric properties of the PARDI. Study 1 used a U.S. national sample of college students who endorsed alcohol use ($n = 911$) to conduct an Exploratory Factor Analysis. Study 2 consisted of college students from a Southeastern University ($n = 1{,}096$) and was used to conduct a Confirmatory Factor Analysis, as well as evaluate convergent, discriminant, concurrent, and incremental validity. A subsample from Study 2 was then assessed after 1 month ($n = 194$). The follow-up examined test–retest reliability and predictive validity. The PARDI consists of four identity-based factors that are indicative of responsible drinking. The measure had adequate validity across all domains and good test–retest reliability. The measure appears to predict future protective behaviorial strategies (safe drinking behaviors), which mediates the relationship between the PARDI and both future alcohol use and consequences, suggesting safe or responsible drinking identity may drive a key behavioral target of substance use interventions. The PARDI may offer a tool to aid in quantifying underlying constructs of identity and behavior change in substance use interventions.

***Public Significance Statement***

The Personal Assessment of Responsible Drinking Identity (PARDI) is a measure of responsible drinking identity for college students in the United States and consists of four identity-based factors (Personal Identity, Future-Oriented Identity, Social Identity, and Counter Identity). The PARDI has adequate validity across domains, good test–retest, and predictive reliability and appears to predict future protective behavioral strategy use, which mediates the relationship with future alcohol use and consequences.

*Keywords:* identity change, alcohol use, identity, measure development, factor analysis



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Dangerous or problematic drinking continues to be a significant public health concern within the United States (Substance Abuse and Mental Health Services Administration, 2021). Generally defined, dangerous or problematic alcohol consumption involves drinking to excess or putting oneself at an increased risk for compromising situations (Marlatt et al., 1995). College students appear to be particularly susceptible to dangerous or problematic drinking (Substance Abuse & Mental Health Services Administration, 2021), with over 1,500 college student deaths related to alcohol use annually. In addition, nearly 700,000 students experience a sexual assault, and over 22,000 college students are hospitalized for an alcohol overdose (Hingson et al., 2017). Further, about 15% of college-aged adults experience an alcohol use disorder within the past year (Substance Abuse and Mental Health Services Administration, 2021).

## Protective Behavioral Strategies

Given the numerous and severe negative consequences associated with dangerous or problematic drinking, the identification of possible strategies or behaviors which may mitigate these outcomes remains critical. Within extant literature, alcohol-protective behavioral strategies (PBS; behaviors aimed at reducing alcohol-related consequence) have been identified as important putative protective factors (Martens et al., 2005). Prior research has shown that engagement in PBS is linearly related to lower alcohol use and fewer alcohol-related consequences (Peterson et al., 2021). Consequently, PBS have been the target of multiple intervention studies (Peterson et al., 2021). Initial intervention efforts found that simply increasing PBS did not have the intended effect on alcohol outcomes (see LaBrie et al., 2015). However, more recent interventions that sought to increase PBS by leveraging personal and social identity have shown more promise (see Dvorak, et al., 2015, 2018). Leary et al. (2020) suggested that this may be the result of changes in personal identity around safe drinking. However, to date, this has not been evaluated as there is no validated measure of safe drinking identity.

## Drinking Identity

Broadly, identity involves one's perception of themselves, accounting for beliefs, personal qualities, and culture (Stryker & Burke, 2000) and has been found to be associated with changes in behavior across several domains (Lede et al., 2019; Oliver et al., 2016). The Maintain–Identity Transformation (Maintain-IT) model (Caldwell et al., 2018) is a model of identity transformation, which posits that long-term behavior change is a function of changes in identity. Importantly, the success of efforts aimed at decreasing the occurrence of dangerous or problematic drinking and increasing overall PBS use seem to be impacted heavily by an individual's identity (Rinker & Neighbors, 2014). Consistent with the Maintain-IT model, identity transformation creates less effortful—and therefore more reinforcing—long-term behavioral change (Caldwell et al., 2018).

In the alcohol literature, most research has focused on "drinking identity" as a potentially important construct in understanding and changing both dangerous drinking and the use of PBS (Lindgren, Foster, et al., 2013). Drinking identity involves the extent to which an individual's identity is associated with their alcohol use or the extent to which they classify themselves as "a drinker" (Lindgren, Foster, et al., 2013; Lindgren, Neighbors, et al., 2013). Individuals fall on a continuum, with some associating their overall self-concept strongly with alcohol use (e.g., those with strong drinking identities), and others associating themselves less strongly with alcohol use. Strong drinking identities have been consistently associated with an increased risk of alcohol-related consequences (Lindgren, Foster, et al., 2013; Montes et al., 2018). Furthermore, research has shown that interventions targeting PBS use are more efficacious when they meaningfully address an individual's identity (Cimini et al., 2015; Dvorak et al., 2018). Given the importance of drinking identity in decreasing the occurrence of dangerous or problematic drinking and increasing overall PBS, recent research has begun to develop measures and methodologies that may "tap" into the construct of drinking identity.

Several measures of drinking identity have been derived from implicit measures of identity (i.e., Implicit Associations Tests; Lindgren, Neighbors, et al., 2013; Montes et al., 2018), which use reaction time measures and avoid/approach tasks to stimuli, such as "drinker," "nondrinker," "me," and "not me" (see Lindgren, Neighbors, et al., 2013). Explicit measures of drinking identity use semantic differential questioning assessing the basics of drinkers' self-concepts (i.e., "Drinking is a part of who I am"; Lindgren, Neighbors, et al., 2013; Montes et al., 2018; Ramirez et al., 2017). Some of these scales have been adapted from other assessments, for example, the Alcohol Self-Concept Scale developed by Lindgren, Neighbors, et al. (2013) was adapted from the Smoking Self-Concept Scale developed by Shadel & Mermelstein (1996). While there are scales to assess the extent to which one identifies as a "drinker" or how closely they align alcohol consumption with their personal identity and values, there are no scales that examine the extent to which a person identifies as a "safe and responsible" drinker or how "safe and responsible" drinking might align with their personal identity. The current project examines the existence of a *Responsible Drinking Identity*.

## I Drink (Responsibly), Therefore I Am: A Responsible Drinking Identity

Development of a "responsible drinking identity" involves the internalization of safe and responsible drinking that translates to increases in future use of behaviors meant to portray oneself as a responsible drinker (e.g., use more PBS). Consequently, this should result in a decrease in alcohol use and alcohol-related consequences. Positive identities are associated with positive behavioral change (or positive behaviors broadly), and thus identification of a responsible drinking identity may benefit future public health research. While responsible drinking behaviors may encompass a responsible drinking identity, as someone with this identity may engage in those behaviors, identity goes beyond the context of behavior. Identity can be defined as one's perception of themselves across multiple scenarios, whereas behaviors may change based on scenario. For the present study, we operationally define a responsible drinking identity as "how a person's self-perception is intertwined with their responsible drinking habits." The purpose of this study was to create a safe and responsible drinking identity questionnaire, the Personal Assessment of Responsible Drinking Identity (PARDI).

## Study Overview

The present studies aimed to develop the PARDI and establish psychometric properties of the new measure, normed in a college student sample. The first aim was to establish the factor structure of responsible drinking identity (A1). The second aim was to confirm the factor structure in a new sample (A2a) and examine correlations with other measures of responsible drinking behaviors (A2b). The PARDI was expected to exhibit weaker but positive correlations with identity measures that are not drinking-specific (A2c), show convergent validity with measures of alcohol outcomes (A2d), and incremental validity above and beyond PBS use (A2e). The third aim was to establish test–retest reliability (A3a) and predictive validity over time, as measured at a 1-month follow-up (A3b). Aims were tested across two cross-sectional, and one prospective, designs, all approved by the University of Central Florida Institutional Review Board. All materials and data are located at https://osf.io/k4hbr/. These studies were not preregistered.

# Study 1

Study 1 used a national sample of college students who endorsed alcohol use ($n$ = 911) to conduct an exploratory factor analysis (EFA) and identify the best-fitting factor model (A1). We then removed items that were least related and/or held substantial shared variance, yielding a final measure with 20 items across four factors (A1).

## Method

### *Procedure*

The first study was part of a larger national project investigating substance use and harm reduction strategies across 12 college campuses (University of New Mexico; University of Montana; California State University, Dominguez Hills; Lehigh University; University of Wisconsin, Stevens Point; University of Central Florida; Colorado State University; Southern Methodist University; University of Wyoming; University of Arkansas; University of Southern Mississippi; Ohio State University) in the United States. These colleges included public/state universities, private universities, liberal arts colleges, and religiously affiliated colleges. Data for Study 1 were collected from September 2020 to May 2021. Participants were recruited via each university's electronic participant management system. Participants completed a survey titled Harm Reduction Multisite Study, where they reported sociodemographic information and responded to 16 core measures and a selection of 10 randomized measures, the PARDI being one. The total study included 5,205 participants. The larger study used a planned missingness design, so not all participants received all questionnaires. Exploratory factor analyses (EFA) were limited to participants who completed the PARDI and passed the majority of validity checks (i.e., four out of seven validity checks; $n$ = 911). Missing data were rare (covariance coverage across item: 98.8%–100%) and were handled using full-information maximum likelihood estimation with robust standard errors. For detailed information, see Hurlocker et al. (2022).

### *Participants*

Participants ($n$ = 911; 70.33% female) were an average age of 19.48 ($SD$ = 1.51) years old. Regional location, year in school, racial, ethnic, and sexual orientation breakdown of the sample can be found in Table 1. Course credit was provided as compensation for participation.

### *Measures*

**Demographics.** Age, sex assigned at birth, gender identity, year in school, race, ethnicity, and sexual orientation were all self-reported.

**Alcohol Pathology.** The Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) is a 10-item measure of assessing for a possible presence of an alcohol use disorder (Saunders et al., 1993). Previous research has found the AUDIT ($\alpha$ = .81) to be valid and reliable among college students (DeMartini & Carey, 2012).

**Protective Behavioral Strategies Scale–20 (PBS-20).** The PBS-20 (Treloar et al., 2015) was used to assess PBS use ($\alpha$ = .93). The PBS-20 consists of 20 items that examine protective strategies within three subtypes: Manner of Drinking (MD; $\alpha$ = .73), Stopping/Limiting Drinking (SLD; $\alpha$ = .87), and Serious Harm Reduction (SHR; $\alpha$ = .84). Frequency of each PBS, within each subtype, is assessed on a 5-point scale from 1 (*never*) to 5 (*always*).

**Responsible Drinking Identity.** The PARDI was originally 80 items which were created from adaptations of other measures (i.e., PBS-20, CHORDS, IAF) as well as through discussions with undergraduate students in our research group regarding what items they believe should be included the measure. The items adapted from other measures included changing wording to be more applicable to someone's identity rather than a behavior they engage in. For example, an item from the IAF is "My decisions represent my most important values and feelings (Weinstein et al., 2012)" that was transformed to "My decisions to be a safe drinker represents my most important values and feelings" for the PARDI. The undergraduate students helped to generate new items and provide feedback on the items adapted from other measures. The participants responded on a 5-point Likert scale from 0 (*not at all true*) to 5 (*completely true*). Through EFA, items were eventually reduced to 20. Internal consistency of the final 20 items was acceptable ($\alpha$ = .89).

**Validity Checks.** To control for respondent fatigue and response bias, seven validity checks were implemented in the survey. Attention checks instructed participants to respond in a certain way at random points throughout the survey (i.e., "Select not at all true of me"). If participants passed at least four of the seven validity checks, they were included in the analysis for the study. In total, $n$ = 16 participants were removed for failing at least four validity checks.

## Results

### *Descriptive Statistics*

Descriptive data are listed in Table 1. Participants scored an average of a 7.50 ($SD$ = 5.61) on the AUDIT, suggesting hazardous alcohol consumption among a sizable proportion of participants.

**Table 1**
*Descriptive Statistics for Study 1*

| Variable | *M* (*SD*) | Skewness | Range |
|---|---|---|---|
| Age | 19.48 (1.51) | 1.27 | 18.00–25.00 |
| PARDI (20 items) | 2.24 (0.70) | −0.47 | 1.00–5.00 |
| AUDIT score | 7.50 (5.61) | 1.33 | 0.00–39.00 |

| Variable | *n* (% of Sample) | Variable | *n* (% of Sample) |
|---|---|---|---|
| Region of United States | | Sex assigned at birth | |
| Northeast | 38 (4.10%) | Male | 274 (29.56%) |
| Southeast | 213 (23.09%) | Female | 652 (70.33%) |
| Midwest | 36 (3.99%) | Intersex | 1 (0.11%) |
| West/northwest | 442 (48.54%) | Ethnicity | |
| Southwest | 182 (20.28%) | Latino/a | 131 (14.62%) |
| Race | | European | 516 (57.59%) |
| White/Caucasian | 669 (73.44%) | Middle Eastern | 7 (0.78%) |
| Black/African American | 42 (4.61%) | African | 37 (4.30%) |
| Indigenous American | 3 (0.32%) | Asian | 25 (2.79%) |
| Asian/Pacific Islander | 24 (2.59%) | Indigenous American/Pacific Islander | 12 (1.34%) |
| Biracial/multiracial | 92 (10.10%) | American/ Pacific other | 70 (7.81%) |
| Other | 2 (0.22%) | Multi-ethnic | 97 (10.83%) |
| Sexual orientation | | Class standing | |
| Completely heterosexual | 617 (67.73%) | FTIC | 424 (46.54%) |
| Mostly heterosexual | 150 (16.47%) | Sophomore | 249 (27.33%) |
| Bisexual | 111 (12.18%) | Junior | 142 (15.59%) |
| Mostly homosexual | 15 (1.65%) | Senior | 97 (10.54%) |
| Completely homosexual | 18 (1.98%) | | |

*Note*. PARDI = Personal Assessment of Responsible Drinking Identity; AUDIT = Alcohol Use Disorders Identification Test; FTIC = first time in college student.



### *Exploratory Factor Analysis (A1)*

First, an EFA using Mplus 8.7 (Muthén & Muthén, 2021) was performed on the 80 original items of the PARDI. Six factors were identified with eigenvalues exceeding 1. Factor 5 only had one item on this factor. There were four items on Factor 6; however, they cross-loaded heavily with other factors. Therefore, the decision was made to retain the four-factor model. Following recommendations from Yong and Pearce (2013), items were dropped with shared factor loadings (.35 and higher for two factors, .20 and higher for three factors) or no factor loadings across factors. Items in the four-factor model were then iteratively removed for high correlations ($r > .80$; one item), high shared factor loadings with other items (30 items), similarity to other items (27 items), and inclusion that resulted in poor model fit (two items). After seven iterations, all factors had five remaining items.

Internal consistency of Factor 1 ($\alpha = .92$), Factor 2 ($\alpha = .90$), Factor 3 ($\alpha = .84$), and Factor 4 ($\alpha = .84$) were adequate. The internal consistency of the entire measure, across all items, was also adequate ($\alpha = .89$). A four-factor latent model was then specified. This model showed reasonable fit to the data, $\chi^2(164) = 606.66, p < .001$, comparative fit index (CFI) = .95, root-mean-square error of approximation (RMSEA) = .05, 90% CI [.04, .06], standardized root-mean-squared residual (SRMR) = .06, with no correlated errors.

Based on prior literature, the content of the items in Factor 1 included items hypothesized to tap into aspects of personal relevance, the content of the items in Factor 2 included items hypothesized to tap into aspects of future goals, Factor 3 tapped into social relevance, and Factor 4 included items tapping into aspects of nonconformity. Factor 1 was labeled Personal Identity; Factor 2 was labeled Future-Oriented Identity; Factor 3 was labeled Social Identity; and Factor 4 was labeled Counter Identity. Items and factor loadings are shown in Table 2. Personal Identity was positively correlated with Future-Oriented Identity ($r = .75$) and Social Identity ($r = .52$), but inversely correlated with Counter Identity ($r = -.19$). Future-Oriented Identity was positively correlated with Social Identity ($r = .63$), but negatively correlated with Counter Identity ($r = -.18$). In contrast to Personal and Future-Oriented, Social Identity was positively related to Counter Identity ($r = .20$). All correlations among factors were significant (all $p < .001$).

### *Incremental Validity of PARDI Beyond PBS (A2e)*

Finally, we examined the incremental validity of the PARDI as a predictor of alcohol pathology above and beyond PBS (this aim is also addressed in Study 2). Alcohol pathology among individuals who drink (assessed via the AUDIT) was regressed onto the PARDI total score, $F(1, 903) = 188.80, p < .001, R^2 = .17$. Next the PBS total score was added to the model, $F(2, 902) = 98.65, p < .001, R^2 = .18, \Delta R^2 = .01, p = .003$ (switching the order, and adding PBS first, indicated that the PARDI accounted for 9% variance over PBS). In the initial model, PARDI score ($\beta = -0.37, t = -11.17, p < .001$) was a robust predictor of alcohol pathology. PBS scores also significantly predicted alcohol pathology (assessed via PBS-20; $\beta = -0.10, t = -2.98, p = .003$; Fischer's $r$ to $z$ comparing the PARDI and PBS standardized slopes: $z = -6.14, p < .001$). Thus, the PARDI appears to add incremental predictive validity over PBS scores (i.e., identity over behavior) and the PARDI appears to be a stronger predictor of alcohol pathology than PBS.

**Table 2**
*Final PARDI Items and Factor Loadings*

| Items ordered by factor | Study 1 (EFA) | Study 2 | Study 3 |
|---|---|---|---|
| Personal Identity | | | |
| 1. My decision to be a safe drinker represents my most important values and feelings. | .81 | .86 | .82 |
| 5. My actions when I use alcohol responsibly are congruent with who I really am. | .88 | .81 | .70 |
| 10. People view me as a safe drinker | .76 | .75 | .80 |
| 17. My whole self stands behind my decision to be a safe drinker. | .71 | .77 | .74 |
| 19. I strongly identify being a safe drinker because I use alcohol responsibly | .68 | .88 | .85 |
| Future-Oriented Identity | | | |
| 2. I identify as a safe drinker because I want to be the best version of myself | .75 | .83 | .78 |
| 7. I am a safe drinker because I want to be responsible for my own health | .74 | .80 | .76 |
| 9. I identify as a safe drinker because I would feel bad if I act irresponsibly | .67 | .70 | .77 |
| 12. I am a safe drinker because of my morals | .70 | .77 | .80 |
| 15. I identify as a safe drinker because I also identify as a mindful person | .79 | .80 | .86 |
| Social Identity | | | |
| 4. I am a safe drinker so my social group (such as my friends) will like me. | .53 | .67 | .68 |
| 13. Being a safe drinker is important to me because it is important to my social group | .62 | .83 | .83 |
| 14. Being a safe drinker is very important to my social status | .31 | .64 | .65 |
| 18. I am a safe drinker because my friends are also safe drinkers | .60 | .73 | .77 |
| 20. I am a safe drinker because it is my responsibility to watch out for my friends | .66 | .55 | .60 |
| Counter Identity | | | |
| 3. Being a safe drinker is NOT important to me. | .60 | .59 | .52 |
| 6. I DO NOT identify as a safe drinker because I want to be viewed positively among my friends | .61 | .55 | .57 |
| 8. I DO NOT identify as a safe drinker because I enjoy getting "blackout drunk" | .70 | .65 | .82 |
| 11. I DO NOT identify as a safe drinker because I want to be viewed as "the life of the party" | .62 | .65 | .66 |
| 16. I DO NOT identify as a safe drinker because my close group of friends DO NOT identify as a safe drinker | .62 | .71 | .73 |

*Note*. PARDI = Personal Assessment of Responsible Drinking Identity; EFA = exploratory factor analysis.

## Discussion

The primary aim of Study 1 was the development and factor testing of a measure of safe drinking identity, the PARDI, among college students. Data were collected among a national sample of moderate to heavy college student drinkers. The EFA identified a four-factor model. Following an iterative process of removing items, all factors had five items. The final measure consisted of 20 items that accounted for the majority of measure variance. The four factors, based on the content of the items, were labeled Personal Identity, Goal Identity, Social Identity, and Counter Identity. While item 14 had lower thresholds compared to other items for measure inclusion, the item was retained due to the best model fit consistent with suggestions by Finch (2020).[1]

Next, we examined the incremental predictive validity of the PARDI as a predictor of alcohol pathology over and above safe drinking behaviors (i.e., PBS use). The results show that the PARDI accounts for considerable variance in alcohol pathology, with PBS use only adding an additional 1% variance accounted for, after partialling out collinearity between the two. Further, the PARDI was a stronger predictor of alcohol pathology, relative to PBS use, indicating that safe drinking identity may be more important than safe drinking behaviors.

A limitation of this specific study was gender differences in the sample (i.e., the sample was a little over 70% female). Indeed, sex differences exist in alcohol consumption and problems. In particular, males tend to drink more alcohol and be more risky with their use (i.e., using less protective strategies; Nolen-Hoeksema & Hilt, 2006). However, recent research suggests that the gender gap of alcohol use and consequences appears to be shrinking (White, 2020). Nonetheless, identity as a construct (i.e., how someone views oneself), rather than alcohol use as a construct, may not be impacted by gender differences (Bekker, 1993; Waterman, 1982). For example, males may have heavier drinking practices, but this does not necessarily mean that (a) items assessing safe drinking identity would not differ between genders or (b) the associations between identity factors and outcomes would differ across genders (Foster et al., 2014). In Study 2, we further examine this through invariance testing. However, the results of this specific study should be interpreted in the context of the gender imbalance.

[1] It is worth noting our rationale for using model fit to remove two items and retain one item. Finch (2020) actually propose using model fit indices to identify the number of factors to retain. However, a contrasting view to this can be found in Montoya and Edwards (2021), which notes that model fit, as a mechanism of factor selection in EFA, tends to over-factorize (produce more factors than necessary) factor selection. There are no guides (to our knowledge) in using model fit to retain or remove items and this is further complicated by the fact that removal of items results in nonnested models and precludes model comparisons. Thus, in the case of the three items that used model fit as a guide (one retained and two removed items), we used a qualitative examination of "better fit" that was neither comparative nor cutoff driven. Further, including the two removed items produced a series of robust modification indices, which may indicate considerable theta overlap (an issue also addressed by Montoya and Edwards [2021]). The retained item (Item 14) with a low factor loading in Study 1 appears to have loaded similar to other items in Studies 2 and 3, without high correlated errors. Future research using item response theory techniques to evaluate item performance of the retained item may yield some important information about this item, though, this goes beyond the scope of this manuscript. Each item, rationale from removal and/or inclusion, as well as the raw data, are all available at https://osf.io/k4hbr/ for anyone that would like to further examine these items.

## Study 2

Study 2 examined the measure developed in Study 1 at a single Southeastern University of college students who endorse alcohol use ($n$ = 1,118) to conduct a confirmatory factor analysis (CFA) of the PARDI to confirm the factor structure and test internal consistency (A2a). Correlations were examined between the PARDI and other measures of identity and alcohol motivations to establish convergent (A2b) and discriminant (A2c) validity. Correlations between the PARDI and other measures of alcohol and PBS use were assessed to establish concurrent (A2d) and incremental validity over PBS use in predicting alcohol outcomes (A2e). Finally, analysis of measurement invariance was conducted to examine invariance across biological sex.

### Method

#### Procedure

Data for Study 2 were collected from college students who endorse alcohol use at The University of Central Florida from September 2020 to May 2021. Participants were recruited through the university's research pool, social media ads, flyers, and campus-wide emails to complete a survey titled "Alcohol Use and Protective Strategies, Phase I." Participants provided information on alcohol-related behaviors and various measures of identity, as well as assessments to evaluate concurrent, divergent, convergent, and incremental validity of the PARDI. Thus, the PARDI was examined relative to existing measures of responsible alcohol use and identity. Missing data were rare (covariance coverage across items: 97.6%–99.7%) and were handled using full-information maximum likelihood estimation with robust standard errors.

#### Participants

Participants were ($n$ = 1,118) college student drinkers from a large Southeastern University with an average age of 21.59 years ($SD$ = 5.00). Demographic characteristics can be found in Table 3. Participants who did not pass a majority of validity checks (i.e., 7 or more out of 13; $n$ = 22) were removed, resulting in an analysis sample of $n$ = 1,096.

#### Measures

**Demographic Variables.** Age, sex assigned at birth, gender identity, year in school, race, ethnicity, and sexual orientation were all self-reported.

**Responsible Drinking Identity.** The PARDI, using the 20-item version developed in Study 1, was used for the Confirmatory Factor Analysis (CFA). The PARDI (α = .90) consisted of four factors: Personal Identity (α = .91), Future-Oriented Identity (α = .88), Social Identity (α = .81), and Counter Identity (α = .76). Items were self-reported from 1 (*not at all true*) to 5 (*completely true*). A full-scale score was obtained by reverse scoring the counteridentity items prior to forming a mean standardized score.

**Validity Checks.** Similar to Study 1, validity checks were used to control for response bias and respondent fatigue. Validity checks instructed participants to respond in a certain way at random points throughout the survey (i.e., "Please select 'yes'"). If participants passed at least six of the 13 validity checks, they were included in the analysis for the study. In total, $n$ = 22 participants were removed from Study 2's analysis for failing to pass at least six validity checks. In addition, these participants were removed from the random selection for Study 3.

#### Convergent Validity

**Treatment Self-Regulation Questionnaire for Responsible Drinking (TSRQ).** The TSRQ assesses motivation of individuals to engage in health-promoting behaviors, including responsible drinking, particularly with PBS use (Richards et al., 2020). The TSRQ was recently developed and found to have sound reliability and validity among college students (Richards et al., 2020). The TSRQ consists of 15 items (α = .86) that assess autonomous motivation (α = .90), controlled motivation (α = .77), and amotivation (α = .50). Note that this measure assesses motivation to use PBS and/or engage in responsible drinking but does not assess the extent to which a person considers themselves *to be* a "responsible drinker." Participants rate statements on a 7-point scale ranging from 1 (*not at all true*) to 7 (*very true*).

**Characteristics of Responsible Drinking Survey (CHORDS-Motivations).** The CHORDS is a 78-item measure that assesses an individual's beliefs, motivations, intentions, and behaviors surrounding responsible alcohol use (Barry & Goodson, 2011). For the present study, we only use the Motivations scale (α = .92), which consists of 21 items, and measures motivations. Questions related to motivations are rated on a 5-point scale from 1 (*never*) to 5 (*always*). The CHORDS has been found to be a valid and reliable measure of college student's responsible drinking characteristics (Barry & Goodson, 2011).

#### Discriminant Validity

**Social and Personal Identity (SIPI).** The SIPI consists of 16 items assessing social (α = .79) and personal identities (α = .81) at 7-point scale ranging from 1 (*not at all important to who I am*) to 7 (*extremely important to who I am*; Nario-Redmond et al., 2004). This assessment has shown sound reliability (α = .86) and validity as a measure of both social and personal identity and was originally normed in college students (Nario-Redmond et al., 2004).

**Dispositional Index of Autonomous Functioning Scale (IAF).** The IAF is a measure of trait autonomy (Weinstein et al., 2012). The IAF consists of 15 items assessing autonomy across three factors: authorship/self-congruence (α = .91), interest-taking (α = .88), and low susceptibility to control (α = .81). Respondents rated "how true" statements are on a 5-point scale ranging from 1 (*not at all true*) to 5 (*completely true*). The IAF has been shown to be a valid and reliable measure (α = .84) of trait autonomy (Weinstein et al., 2012).

**The Aspects of Identity Questionnaire (AIQ, 4th Ed.).** The AIQ is a measurement of personal (α = .39), social (α = .84), collective (α = .79), and relational (α = .92) aspects of identity across 45 items (J. M. Cheek & Briggs, 2013; J. M. Cheek et al., 2002). This measure asks participants to rate various statements on a 5-point scale ranging from 1 (*not important to my sense of who I am*) to 5 (*extremely important to my sense of who I am*). This measure (α = .94 here) has been found to have good psychometric properties investigating four factors of identity (N. N. Cheek & Cheek, 2018).

**Table 3**
*Descriptive Statistics of Study 2*

| Variable | *M* (*SD*) | Skewness | Range |
|---|---|---|---|
| Age | 21.59 (5.00) | 3.07 | 18.00–57.00 |
| PARDI | 2.06 (0.70) | −0.27 | 1.00–5.00 |
| PBS avg | 4.15 (1.21) | −0.86 | 1.00–6.00 |
| YAACQ total | 6.67 (8.03) | 1.66 | 0.00–42.00 |
| AUDIT score | 5.81 (4.91) | 1.63 | 1.00–34.00 |
| Monthly drinks consumed | 24.25 (169.84) | 18.53 | 0–200 |

| Variable | *n* (% of sample) | Variable | *n* (% of sample) |
|---|---|---|---|
| Year in school | | Gender identity | |
| Traditional FITC | 313 (28.56%) | Male | 301 (27.51%) |
| Nontraditional FTIC | 11 (1.00%) | Female | 763 (69.74%) |
| Sophomore | 103 (9.04%) | Agender | 3 (0.27%) |
| Junior | 106 (9.67%) | Pangender | 1 (0.09%) |
| Senior | 121 (11.04%) | Nonbinary | 17 (1.55%) |
| 5+ years, not a graduate student | 23 (2.10%) | Transgender (MTF) | 3 (0.27%) |
| Graduate student | 93 (8.49%) | Transgender (FTM) | 5 (0.46%) |
| Transfer student–first year | 79 (7.21%) | Other | 1 (0.09%) |
| Transfer student–beyond first Year | 247 (22.54%) | Latino/a | |
| Race | | Yes | 315 (28.82%) |
| White/Caucasian | 787 (71.94%) | No | 775 (70.91%) |
| Black/African American | 91 (8.32%) | | |
| Indigenous American | 2 (0.18%) | | |
| Asian/Pacific Islander | 70 (6.40%) | | |
| Biracial/multiracial | 144 (13.16%) | | |
| Sexual orientation | | | |
| Heterosexual/straight | 809 (73.81%) | | |
| Homosexual/gay/lesbian | 53 (4.48%) | | |
| Bisexual | 175 (15.97%) | | |
| Pansexual | 30 (2.74%) | | |
| Other/do not wish to respond | 29 (2.64%) | | |

*Note.* PARDI = Personal Assessment of Responsible Drinking Identity; PBS = Protective Behavioral Strategies; YAACQ = Young Adult Alcohol Consequences Questionnaire; AUDIT = Alcohol Use Disorders Identification Test; FTIC = first time in college; MTF = male to female; FTM = female to male.



### *Concurrent Validity*

**Timeline Follow-Back (TLFB) for Alcohol Consumption.** A TLFB approach was used to assess alcohol use over the past month. The TLFB is reliable when completed on a computer (Sobell et al., 1996) and is shown to have good validity and reliability among college students (Bernhardt et al., 2009). Participants in the present study were given a monthly calendar and asked to retrospectively report their alcohol use on given dates for the past month.

**Alcohol Use Disorders Identification Test (AUDIT).** The AUDIT is a 10-item measure of assessing for a possible presence of an alcohol use disorder (Saunders et al., 1993). The measure showed good internal consistency in this sample ($\alpha = .83$). The AUDIT is a valid and reliable measure of alcohol pathology in college students (DeMartini & Carey, 2012).

**Young Adult Alcohol Consequences Questionnaire (YAACQ).** The YAACQ is a 48-item measure of alcohol-related consequences (Read et al., 2006). The YAACQ assesses eight categories of consequences: Social–Interpersonal ($\alpha = .75$), Impaired Control ($\alpha = .80$), Self-Perception ($\alpha = .85$), Self-Care ($\alpha = .81$), Risk Behaviors ($\alpha = .75$), Academic/Occupational ($\alpha = .69$), Physical Dependence ($\alpha = .59$), and Blackout Drinking ($\alpha = .87$). Previous research has found the YAACQ to be valid and reliable among college students (Read et al., 2007). In the present study, participants recorded alcohol-related consequences using a dichotomous response scale (1 = *yes*, 0 = *no*). The overall scale showed good internal consistency ($\alpha = .95$).

**Protective Behavioral Strategies–20 (PBS-20).** The PBS-20 (Treloar et al., 2015) was used to assess PBS use and has been shown to be valid and reliable ($\alpha = .96$). The PBS-20 consists of 20 items that examine protective strategies within three subtypes: Manner of Drinking (MD; $\alpha = .94$), Stopping/Limiting Drinking (SLD; $\alpha = .95$), and Serious Harm Reduction (SHR; $\alpha = .96$). Frequency of each PBS is assessed on a 5-point scale from 1 (*never*) to 5 (*always*).

## Results

### *Descriptive Statistics*

Descriptive statistics are shown in Table 3. Participants consumed an average of 24.25 ($SD = 169.84$) alcoholic beverages in the last month, with an average score of 5.81 ($SD = 4.91$) on the AUDIT, suggesting low-risk consumption among most participants (Bohn et al., 1995). Participants endorsed an average of 6.67 ($SD = 8.03$) alcohol consequences over the past month. Across subscales, females endorsed higher PARDI scores than males ($r = .08–.12$, $p \leq .007$).

### *Confirmatory Factor Analysis (A2a)*

The four-factor model showed good fit to the data, $\chi^2(164) = 610.51$, $p < .001$, CFI = .95, RMSEA = .05, 90% CI [.05, .05], SRMR = .05. The final items of the PARDI, and their factor loadings, are in Table 2. There were no correlated errors among items.

### *Convergent (A2b), Discriminant (A2c), and Concurrent (A2d) Validity of the PARDI*

Correlations between various measures and the PARDI are shown in Table 4. The PARDI had strong, positive correlations with the CHORDS ($r = .55$, $p < .001$) and TSRQ ($r = .54$, $p < .001$), indicating convergent validity with other measures of responsible drinking. The PARDI had weaker correlations with the SIPI ($r = .16$, $p < .001$), IAF ($r = .13$, $p < .001$), and AIQ ($r = .13$, $p < .001$), indicating discriminant validity with pure measures of identity. Among college students who endorse alcohol use ($n = 1{,}096$), the PARDI had a moderate positive correlation with Protective Behavioral Strategies–20 (PBS-20; $r = .30$, $p < .001$), and moderate negative correlations with alcohol use (TLFB; $r = -.24$, $p < .001$), AUDIT scores ($r = -.44$, $p < .001$), and alcohol-related consequences (YAACQ; $r = -.38$, $p < .001$), indicating concurrent validity with measures that indicate responsible drinking behaviors, alcohol use, and alcohol-related consequences.

### *Incremental Validity of PARDI Beyond PBS (A2e)*

As in Study 1, we examined incremental validity of the PARDI as a predictor of alcohol pathology above and beyond PBS. Alcohol pathology (assessed via the AUDIT) was regressed onto the PARDI total score, $F(1, 1{,}094) = 259.33$, $p < .001$, $R^2 = .19$. Next the PBS total score was added to the model, $F(2, 1{,}093) = 130.31$, $p < .001$, $R^2 = .19$, $\Delta R^2 = .00$, $p < .001$. In this model, PARDI scores ($\beta = -0.45$, $t = -15.84$, $p < .001$) were again a more robust predictor of alcohol pathology than PBS scores (assessed via PBS-20, $\beta = 0.03$, $t = 1.11$, $p = .267$), which was nonsignificant in the model. As in Study 1, the PARDI explains incremental variance over PBS. Interestingly, if AUDIT scores are only regressed onto PBS scores, $F(1, 1{,}094) = 7.93$, $p = .005$, $R^2 = .01$, PBS is a significant predictor of AUDIT scores ($\beta = -0.08$, $t = -2.82$, $p = .005$); thus, much of the protective effects of PBS appear to be subsumed by identity at the global level.

### *Predictive Utility of Three- Versus Four-Factor Model*

The inclusion of counteridentity as a factor is somewhat peculiar. This factor was negatively correlated with personal and future identity but positively correlated with social identity. However, prior research has also indicated that counteridentity may represent an important and distinct aspect of both social and personal domains (Oyserman & James, 2011). Indeed, some theories of social influence posit that deviating from the norm is important under specific social contexts (Blanton & Christie, 2003). Thus, we were hesitant to remove this subscale. To justify inclusion of counteridentity, we examined a mean standardized total score that included the four subscales versus a mean standardized total score that omitted the counteridentity subscale as predictors of PBS (four factors: $\beta = 0.29$, $t = 10.54$, $p < .001$; three factors: $\beta = 0.30$, $t = 10.76$, $p < .001$), alcohol use (four factors: $\beta = -0.36$, $t = -14.93$, $p < .001$; three factors: $\beta = -0.32$, $t = 13.93$, $p < .001$), and alcohol-related problems (four factors: $\beta = -0.33$, $t = 13.48$, $p < .001$; three factors: $\beta = -0.28$, $t = 11.26$, $p < .001$). As can be observed, the predictive validity of the three- and four-factor models is nearly identical across outcomes. However, we retained the four-factor model in the event that this factor finds utility in future research.

### *Invariance Testing*

Indices of invariance testing are in Table 5. We used a stepped approach to test for invariance. First, the highest loading on each factor was set to 1 with factor means in each group set to 0 (configural invariance). Configural invariance is achieved if model fit is adequate. For metric invariance, all factor loadings were constrained to be equal across groups, and subsequent changes in model fit were compared to the configural invariance model. Lastly, factor loadings and intercepts were constrained to be equivalent across groups (scalar invariance) and fit was tested by comparing this model to the metric invariance model. Chen (2007) notes that use of $\chi^2$ tests for invariance testing is sensitive to sample size and violations of normality, and consequently, a minor/trivial discrepancy may result in model rejection. Thus, in larger samples, and especially with unequal groups, and/or nonnormal data, Chen outlined guidelines for determining invariance that rely on residual-based fit indices. Specifically, a change of $\leq -0.005$ in CFI and a change of $\geq 0.010$ in RMSEA *OR* a change of $\geq 0.025$ in SRMR, when comparing configural to metric models, would indicate metric noninvariance. For scalar invariance (comparing the scalar to metric model), a change in CFI $\geq -0.005$ and a change in RMSEA of $\geq 0.010$ *OR* a change in SRMR $\geq 0.005$ indicates scalar noninvariance. The configural invariance models examined if the factor structure was similar across biological sex. This model fits the data well with significant factor loadings for all items. Constraining

**Table 4**
*Correlations of PARDI and Other Measures From Study 2*

| Variable | Correlation with PARDI |
|---|---|
| 1. CHORDS (+) | .55 |
| 2. TSRQ (+) | .54 |
| 3. SIPI (−) | .16 |
| 4. IAF (−) | .13 |
| 5. AIQ (−) | .13 |
| 6. TLFB (#) | −.24 |
| 7. YAACQ (#) | −.38 |
| 8. AUDIT (#) | −.44 |
| 9. PBS-20 (#) | .30 |

*Note*. + indicates convergent validity, − indicates discriminate validity, and # indicates concurrent validity. PARDI = Personal Assessment of Responsible Drinking Identity; CHORDS = Characteristics of Responsible Drinking Survey; TSRQ = Treatment Self-Regulation Questionnaire for Responsible Drinking; SIPI = Social and Personal Identity; IAF = Dispositional Index of Autonomous Functioning Scale; AIQ = The Aspects of Identity Questionnaire; TLFB = timeline follow-back; YAACQ = Young Adult Alcohol Consequences Questionnaire; AUDIT = Alcohol Use Disorders Identification Test; PBS-20 = Protective Behavioral Strategies–20.

factor loadings to be equivalent across sex did not result in changes to fit, relative to the configural model (metric invariance). Finally, there were no decreases in model fit, relative to the metric model, after constraining factor loadings and item intercepts to be identical and allowing factor means to vary across sex (scalar invariance).

## Discussion

The primary aim of the second study was to conduct a CFA of the PARDI and to establish internal consistency as well as convergent, discriminant, concurrent, and incremental validity among college students ($n$ = 1,096) confirming the factor structure identified in Study 1 (Aim 2a). Results suggest the PARDI has strong internal consistency. In addition, results show the PARDI has convergent validity with the CHORDS and TSRQ, two other assessments of responsible drinking, supporting Aim 2b. Results also indicate the PARDI had discriminant validity with the SIPI, IAF, and AIQ, three measures assessing aspects of identity more broadly, supporting Aim 2c. Among college students who endorse alcohol use ($n$ = 1,096) results show the PARDI has concurrent validity with the PBS-20, YAACQ, AUDIT, and TLFB, supporting Aim 2d. Next, the PARDI has incremental validity over PBS use in predicting alcohol pathology, supporting Aim 2e. Last, this study found gender differences in the PARDI, with men reporting lower levels of safe drinking identity than women. The literature clearly shows gender differences in alcohol use, problems, and PBS (Dvorak, et al., 2020); thus, it is no surprise that safe drinking identity is also different across gender. Breslau et al. (2008) point out that differential functioning across groups can take two forms, benign and adverse. Adverse occurs when differences are due to underlying issues with the metrics of the tool, while benign is associated with true differences in the underlying construct. Given that research consistently shows differences in alcohol-related variables across gender, we might predict benign differences in safe drinking identity. Despite differences in overall levels of the PARDI, invariance testing indicated that the measure itself, to include the means across the latent constructs, was invariant across gender. This suggests that, despite overall gender differences in the total score, the differences are neither adverse (i.e., not related to underlying metrics of the tool) nor are they so dramatic as to be considered noninvariant based on empirical benchmarks of model fit indices.

# Study 3

Study 3 used follow-up data of college students who endorsed alcohol use, from a subset of the Study 2 sample, to investigate test–rest reliability (A3a), as well as test predictive validity of PBS use (A3b). Furthermore, follow-up data ($n$ = 194) were utilized to specify a structural equation model (SEM) using past PARDI score as a predictor of future PBS use, which was then related to future alcohol use and alcohol-related consequences (A3b).

## Method

### *Procedure*

Study 3 served as a 1-month follow-up to Study 2. A random sample of $n$ = 521 participants that endorsed alcohol use were invited to complete a survey titled "Alcohol Use and Protective Strategies, Phase II,," which used a timeline follow-back approach to collect data for each day of the week, for the past 4 weeks. This study consisted of the PARDI, YAACQ, PBS-20, and the alcohol TLFB, as described above in Study 2. Of the 521 participants invited to complete Study 3, $n$ = 228 participants enrolled and $n$ = 194 completed the PARDI and endorsed past-month alcohol use. Participants were either awarded university research class credit or received a 5-dollar Amazon gift card for the follow-up portion of the study. Missing data were rare (covariance coverage across items: 97.1%−100%) and were handled using full-information maximum likelihood estimation with robust standard errors.

### *Participants*

Participants ($n$ = 194) were current college students who endorsed alcohol use from a large Southeastern University with an average age of 20.45 years ($SD$ = 2.45). Participant demographics are located in Table 5.

### *Measures*

**Responsible Drinking Identity (Time 1).** The 20-item PARDI (assessed at Time 1) was used to examine test–retest and predictive validity. Internal consistency of the PARDI total score was similar at both Time 1 (α = .90) and Time 2 (α = .89). We used the PARDI total score from Time 1 in the prospective analysis. Test–retest is reported below.

**Protective Behavioral Strategies–20 (Time 2).** The PBS-20 (Treloar et al., 2015) was again used to assess PBS use. Instructions were modified to assess PBS use over the past 30 days to facilitate prospective analysis (α = .96). The PBS-20 has been previously used as a measure of modified to reflect PBS use across distinct time points (Dvorak et al., 2015, 2016; Dvorak et al., 2018; Leary et al., 2021). We used the PBS total score in the prospective analysis.

**Timeline Follow-Back (TLFB) for Alcohol Consumption (Time 2).** A TLFB approach was again used to evaluate alcohol consumption over the past month (see above for psychometrics of this measure). Participants in Study 3 were given a monthly calendar and asked to retrospectively report their alcohol use on given dates for the past month. We use the total number of drinks consumed in the past month in the prospective analysis.

**Young Adult Alcohol Consequences Questionnaire (Time 2).** The YAACQ is a 48-item measure of alcohol-related consequences (Read et al., 2006). The YAACQ instructions were modified to assess if any of the 48 alcohol consequences had been experienced in the past month (yes/no). The overall scale

**Table 5**
*Measurement Invariance by Biological Sex*

| Variable | RMSEA | CFI | TLI | SRMR |
|---|---|---|---|---|
| Configural invariance | .056 | .948 | .940 | .051 |
| Metric invariance | .055 | .947 | .941 | .054 |
| Δ from configural | −.001 | −.001 | .001 | .003 |
| Scalar invariance | .055 | .945 | .944 | .055 |
| Δ from metric | .000 | .002 | .003 | .001 |

*Note*. RMSEA = root-mean-square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root-mean-squared residual.

showed good internal consistency (α = .94). The sum of alcohol consequences experienced in the past month was used in the prospective analysis.

## Results

### Descriptive Statistics

Descriptive statistics are shown in Table 6. In this sample, at Time 1 (Study 2), participants endorsed consuming an average of 11.32 (*SD* = 19.92) alcoholic beverages per month and an average of 5.56 (*SD* = 7.58) alcohol-related consequences. At Time 2 (Study 3), these participants endorsed consuming an average of 9.17 (*SD* = 16.19) alcoholic beverages and experiencing 5.22 (*SD* = 7.38) alcohol-related consequences. Additionally, participants had mean scores of 2.23 (*SD* = 0.68) on the PARDI at Time 1 and 2.31 (*SD* = 0.68) at Time 2.

### Confirmatory Factor Analysis (A2a)

The four-factor model showed adequate fit to the data, $\chi^2(164) = 271.06$, $p < .001$, CFI = .93, RMSEA = .06, 90% CI [.05, .07], SRMR = .08. The final items of the PARDI, and their factor loadings, are listed in Table 3. There were no correlated errors among items.

### Test–Retest Reliability (A3a)

The correlation between PARDI total scores for Studies 2 and 3 evinced excellent test–retest reliability ($r = .72$, $p < .001$). The correlations of scores for the factors of Personal Identity ($r = .72$, $p < .001$), Future-Oriented Identity ($r = .72$, $p < .001$), Social Identity ($r = .61$, $p < .001$), and Counter Identity ($r = .56$, $p < .001$) also had adequate test–retest reliability.

### Predictive Validity (A3b)

The correlation between Time 2 PBS-20 scores and Time 1 PARDI scores was significant, albeit not as strong as hypothesized ($r = .29$, $p < .001$). Regardless, this finding indicates the PARDI has a positive association with the PBS-20 1 month later, suggesting predictive validity. It was also hypothesized that the PARDI would predict future PBS use, which mediates the relation with alcohol use and alcohol-related consequences, suggesting responsible or safe drinking identity is the driver of engagement in future protective behaviors. Sex and age were controlled for in the model. Only those who reported alcohol use during the past month were included in the analysis, as PBS and alcohol-related consequences cannot occur without the use of alcohol. Alcohol use and alcohol-related consequences were treated as negative binomial

**Table 6**
*Descriptive Statistics of Study 3*

| Variable | *M* (*SD*) | Skewness | Range |
|---|---|---|---|
| Age | 21.50 (4.95) | 2.87 | 18–47 |
| PARDI (Month 1) | 2.23 (0.67) | −0.59 | 1–5 |
| PARDI (Month 2) | 2.31 (0.69) | −0.52 | 1–5 |
| PBS-20 average (Month 2) | 4.09 (1.48) | −0.70 | 1–6 |
| YAACQ average (Month 2) | 0.97 (2.09) | 2.87 | 0–11 |
| Alcoholic beverages consumed in month 2 | 8.46 (13.22) | 2.38 | 0–56 |

| Variable | *n* (% of Sample) | Variable | *n* (% of Sample) |
|---|---|---|---|
| Year in school | | Gender identity | |
| Traditional FITC | 55 (28.35%) | Male | 44 (22.68%) |
| Nontraditional FTIC | 1 (0.52%) | Female | 147 (75.77%) |
| Sophomore | 21 (10.82%) | Agender | — |
| Junior | 22 (11.34%) | Pangender | — |
| Senior | 28 (14.43%) | Nonbinary | 1 (0.52%) |
| 5+ years, not a graduate student | 3 (1.55%) | Transgender | 2 (1.03%) |
| Graduate student | 22 (11.34%) | Other | — |
| Transfer student–first year | 8 (4.12%) | Latino/a | |
| Transfer student–beyond first year | 34 (17.53%) | Yes | 54 (27.84%) |
| Race | | No | 139 (71.65%) |
| White/Caucasian | 142 (73.20%) | Did not respond | 1 (0.52%) |
| Black/African American | 10 (5.15%) | | |
| Indigenous American | — | | |
| Asian/Pacific Islander | 14 (7.22%) | | |
| Biracial/multiracial | 14 (7.22%) | | |
| Other/did not respond | 14 (7.22%) | | |
| Sexual orientation | | | |
| Heterosexual/straight | 138 (71.13%) | | |
| Homosexual/gay/lesbian | 9 (4.64%) | | |
| Bisexual | 39 (20.10%) | | |
| Pansexual | 3 (1.55%) | | |
| Other/did not respond | 5 (2.58%) | | |

*Note.* PARDI = Personal Assessment of Responsible Drinking Identity; PBS-20 = Protective Behavioral Strategies–20; YAACQ = Young Adult Alcohol Consequences Questionnaire; FTIC = first time in college.

count outcomes precluding the use of model fit statistics. We specified a SEM, with maximum likelihood estimation, robust standard errors, and Monte Carlo integration, to test the relationships between alcohol use (Time 2), alcohol problems (Time 2), PBS (Time 2), and PARDI (Time 1). This analysis was conducted using Mplus 8.11 (Muthén & Muthén, 2021). Past (Time 1) PARDI score was strongly associated with future month's (Time 2) PBS use ($B$ = 0.90, $p < .001$), but not with Time 2 alcohol use (IRR [incident rate ratio] = 0.87, $p = .165$) or problems (IRR = 0.91, $p = .638$). Time 2 PBS was negatively associated with alcohol use (IRR = 0.42, $p < .001$) and alcohol problems (IRR = 0.51, $p < .001$) at Time 2. Alcohol use was associated with alcohol problems (IRR = 1.03, $p < .001$) at Time 2. Age was not associated with PARDI score ($B = 0.01$, $p = .304$), alcohol use ($B = -0.01$, $p = .645$), or alcohol problems ($B = 0.01$, $p = .854$) but was associated with PBS use ($B = -0.08$, $p = .011$). Sex was not associated with PARDI score ($B = -0.04$, $p = .680$), PBS use ($B = 0.58$, $p = .082$), alcohol use ($B = 0.01$, $p = .921$), or alcohol problems ($B = 0.41$, $p = .238$). A test of indirect effects was then calculated using bias-corrected 95% confidence intervals (CI) from 5,000 bootstrap draws. PARDI at Time 1 had a strong, negative indirect relationship to Time 2 alcohol use ($IND = -0.792$, 95% CI [−1.204, −0.388]) and alcohol problems ($IND = -0.661$, 95% CI [−1.094, −0.330]) via Time 2 PBS use as well total combined indirect effects to Time 2 problems ($IND = -0.680$, 95% CI [−1.113, −0.344]). These associations are shown in Figure 1.

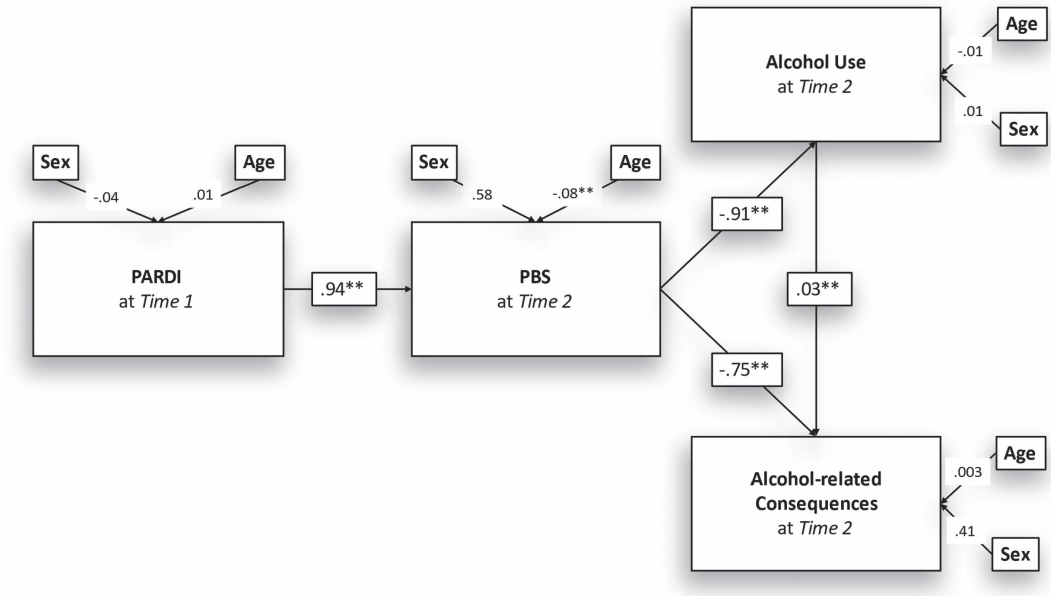
## Discussion

The third study's aim was to establish test–retest reliability and predictive validity of the PARDI. Participants ($n$ = 194) were college student drinkers who also participated in Study 2. Participants completed Study 3 1 month after completing Study 2. Results suggest the PARDI has strong test–retest reliability and good predictive validity. The PARDI at Time 1 was associated with PBS at Time 2, which mediated the relationship between the PARDI at Time 1 and both alcohol use and alcohol problems at Time 2. These results highlight the importance of a safe and/or responsible drinking identity as a driver of behaviors usually associated with alcohol-related interventions, such as protective behavior strategies, which in turn are related to lower levels of alcohol use and consequences. Note that in contrast to Studies 1 and 2, which showed PBS was either weakly (or no longer) associated with alcohol pathology after controlling for the PARDI, in the present study, the association between the PARDI and both alcohol use and alcohol problems in the past was fully mediated by use of PBS over the past month. This suggests that the PARDI adds considerably more information in the prediction of global alcohol pathology than PBS use in general. However, when predicting discrete alcohol use and problems over a specific time-period, the PARDI appears to predict the amount of behavioral engagement in PBS during that specific period that resulted in reductions in adverse alcohol outcomes.

## Broader Conclusions

Recent research supports the importance of identity change, in addition to behavioral change, in interventions (Caldwell et al., 2018); however, no explicit assessment of responsible drinking identity currently exists. Herein, we detail three studies that were completed to develop and assess the psychometric properties of the PARDI, a novel assessment of safe and responsible drinking identity. In Study 1, an EFA was conducted using a national sample, resulting in a four-factor model among 20 items. In Study 2, college

**Figure 1**
*PARDI (T1) Predicting PBS (T2), Alcohol Use (T2), and Alcohol Problems (T2)*




*Note.* PARDI = Personal Assessment of Responsible Drinking Identity; PBS = Protective Behavioral Strategies.

student drinkers attending at a Southeastern University were used to conduct a CFA, which confirmed a four-factor structure. In addition, Study 2 assessed convergent, discriminant, concurrent, and incremental validity as well as measurement invariance across biological sex. Finally, Study 3 was a 1-month follow-up of a subset of Study 2 participants, which assessed test–retest reliability and predictive validity.

The first aim was to evaluate the factor structure of safe drinking identity. An exploratory analysis identified four factors, and this was confirmed in a later analysis. The final factor structure included factors assessing Personal Identity, Future-Oriented Identity, Social Identity, and Counter Identity. In addition, we confirmed the factor structure and established convergent, concurrent, discriminant, and incremental validity (Aims 2a–2e), as well as test–retest reliability (Aim 3a). Last, predictive validity was established, given the associations between the Time 1 PARDI from Study 2 and PBS with alcohol use and consequences 4 weeks later (Aim 3b).

There are several important takeaways from these results. Strongly associating drinking, particularly overconsumption, with one's identity is associated with higher risk of alcohol-related consequences (Ramirez et al., 2017). Present findings imply that the inverse is also true, that a safe or responsible drinking identity, as assessed by the PARDI, is predictive of fewer adverse alcohol-related outcomes. Safe or responsible drinking identity was strongly related to future PBS use, which then was associated with decreased alcohol use and fewer alcohol consequences. This suggests changing responsible drinking identity could have subsequent changes on alcohol-related consequences, and these changes may be due to enduring effects on PBS use behaviors.

## Limitations, Ethical Considerations, and Diversity Issues

This study is not without its limitations. First, data were collected during the COVID-19 pandemic (Fall 2020 and Spring 2021 semesters), during which students were not as physically present on college campuses as they otherwise would be. The pandemic has influenced alcohol consumption among college students, but current findings are mixed regarding the effect (Lechner et al., 2020; Dumas et al., 2020; Graupensperger et al., 2021). In addition, COVID-19 has uniquely led to identity changes (Liu et al., 2021). Identity itself is often in flux (Marcia, 1966, 1980), and as the pandemic continues, or indeed, subsides, findings may differ. Second, Study 3 assessed alcohol use, consequences, and PBS in the past month, which may be subject to retrospective recall bias. Future research should use weekly diaries, daily diaries, or in situ momentary assessments to control for retrospective recall bias. In the same vein, we used an explicit measure of responsible drinking identity rather than an implicit measure as is frequently used with measures of drinking identity (i.e., Lindgren, Foster, et al., 2013). Future research should consider attempting to create an implicit measure of responsible drinking identity and compare it to our current explicit measure. Continuing, participants in these studies were predominantly white, cisgender females who did not meet criteria for an alcohol use disorder. Therefore, findings may not be generalizable to all college students, particularly racial or ethnic minorities, males, and/or gender minorities. Future research should aim to use stratified random sampling with a more diverse racial/ethnic sample. For Study 3, a 1-month follow-up was included to assess for test–retest reliability and predictive validity. This is in part due to time restrictions related to college semesters and the need to distribute credit within a semester. Future research should assess test–retest reliability and predictive validity at timepoints beyond 1 month. Also, the test–retest reliability for the Social Identity and Counter Identity subscales are lower, relative to the Personal Identity and Future-Oriented Identity subscales and the PARDI total score. We recommend the use of the total score for future research purposes. While the Counter Identity subscale was included in the final PARDI and provided sound psychometric properties, it may be possible that this factor is an artifact of method as the items were all reverse coded. Thus, future research should assess the usefulness of this subscale. Also, the validity checks used throughout these studies were attention checks with many of the checks (more than 50%) passed. These checks may be a limitation to our study as we failed to investigate other possible checks of careless response, as outlined by Baker and Kleijnen (2000) internal inconsistencies and high level of item nonresponses. The results of the current studies should be interpreted with the understanding that the threshold for participant removal for careless response was low. Next, the PARDI does not attempt to define what a "safe drinker" is; instead allowing the participants to apply their own definition to the phrase. While this may allow for various definitions of what a "safe drinking identity" is, it ultimately allows the participant to provide their own self-concept of a responsible drinker and apply it to themselves, further assessing their own safe drinking identity. Finally, if the PARDI is to be used in other samples (i.e., noncollege student samples), future research should assess the psychometric properties across those samples, as this measure is presently only normed within a college student sample.

## "It's PARDI Time!" Research, Clinical, and Future Implications

Although there are many existing interventions to address alcohol-related consequences, effectiveness of these interventions is usually measured solely via behavior change. While these interventions may produce short-term behavior change, many do not exhibit long-term effectiveness (Cronce & Larimer, 2011; Foxcroft, et al., 2003; Marlatt, et al., 1998). Small changes in behavior may affect short-term outcomes but may fail to create lasting changes, for what we might consider safe or responsible drinking habits. For example, personalized normative feedback (PNF) interventions, considered a "gold standard" for alcohol interventions, may not be as effective as once thought at reducing long-term consumption and consequences (Huh et al., 2015). These findings may be due to a failure to account for, or engage, identity and changes (or lack thereof) in identity over time. In contrast, recent interventions that leverage theories of identity may be better suited to lasting and enduring change. For example, deviance regulation theory (DRT) is grounded in social and personal identity theory (Blanton & Christie, 2003) and interventions incorporating DRT have shown efficacious long-term outcomes (Dvorak et al., 2015, 2017; Leary et al., 2020), perhaps due to identity change. Similarly, Caldwell et al. (2018) suggested assessing changes in identity, rather than changes in behavior, will ultimately predict long-term outcome within interventions. Building on these recent findings, the PARDI may serve as a novel and vital resource for researchers to both assess and target changes in identity to predict long-term outcomes

of responsible drinking interventions. Finally, drinking identity has been shown to predict future alcohol consumption and consequences (Lindgren et al., 2016). Theoretically, the PARDI should also predict these factors, but with inverse associations, given the negative relationship found in this study between the PARDI and the AUDIT. Future research should aim to measure the psychometric properties among individuals with more problematic alcohol use to corroborate these findings.

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## Appendix

## Personal Assessment of Responsible Drinking Identity

### Instructions

Below is a collection of statements about your general experiences with alcohol use. Please indicate how true each statement is of your experiences overall. Remember that there are no right or wrong answers. Please answer according to what really reflects your experiences and identity with alcohol use rather than what you think your experiences with alcohol use should be.

### Response Scale

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all true | A bit true | Somewhat true | Mostly true | Completely true |

1. My decision to be a safe drinker represents my most important values and feelings.
2. I identify as a safe drinker because I want to be the best version of myself.
3. Being a safe drinker is NOT important to me.
4. I am a safe drinker so my social group (such as my friends) will like me.
5. My actions when I use alcohol responsibly are congruent with who I really am.
6. I DO NOT identify as a safe drinker because I want to be viewed positively among my friends
7. I am a safe drinker because I want to be responsible for my own health.
8. I DO NOT identify as a safe drinker because I enjoy getting "blackout drunk."
9. I identify as a safe drinker because I would feel bad if I acted irresponsibly.
10. People view me as a safe drinker.
11. I DO NOT identify as a safe drinker because I want to be seen as "the life of the party."
12. I am a safe drinker because of my morals.
13. Being a safe drinker is important to me because it is important to my social group.
14. Being a safe drinker is very important to my social status.
15. I identify as a safe drinker because I also identify as a mindful person.
16. I DO NOT identify as a safe drinker because my close group of friends DO NOT identify as safe drinkers.
17. My whole self stands behind my decision to be a safe drinker.
18. I am a safe drinker because my friends are also safe drinkers.
19. I strongly identify as a safe drinker because I use alcohol responsibly.
20. I am a safe drinker because it is my responsibility to watch out for my friends.

### Scoring

Personal Identity: Items 1, 5, 10, 17, and 19.
Future-Oriented Identity: Items 2, 7, 9, 12, and 15.
Social Identity: Items 4, 13, 14, 18, and 20.
Counter Identity (reverse coded): Items 3, 6, 8, 11, and 16.

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