

# Brief Report: The Brief Alcohol Social Density Assessment (BASDA): Convergent, Criterion-Related, and Incremental Validity

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**ABSTRACT. Objective:** Alcohol misuse is substantially influenced by social factors, but systematic assessments of social network drinking are typically lengthy. The goal of the present study was to provide further validation of a brief measure of social network alcohol use, the Brief Alcohol Social Density Assessment (BASDA), in a sample of emerging adults. Specifically, the study sought to examine the BASDA's convergent, criterion, and incremental validity in relation to well-established measures of drinking motives and problematic drinking. **Method:** Participants were 354 undergraduates who were assessed using the BASDA, the Alcohol Use Disorders Identification Test (AUDIT), and the Drinking Motives Questionnaire. **Results:** Significant associations were observed between the BASDA index of alcohol-related social density

and alcohol misuse, social motives, and conformity motives, supporting convergent validity. Criterion-related validity was supported by evidence that significantly greater alcohol involvement was present in the social networks of individuals scoring at or above an AUDIT score of 8, a validated criterion for hazardous drinking. Finally, the BASDA index was significantly associated with alcohol misuse above and beyond drinking motives in relation to AUDIT scores, supporting incremental validity. **Conclusions:** Taken together, these findings provide further support for the BASDA as an efficient measure of drinking in an individual's social network. Methodological considerations as well as recommendations for future investigations in this area are discussed. (*J. Stud. Alcohol Drugs*, 74, 810–815, 2013)

ALCOHOL MISUSE PEAKS in emerging adulthood (18–25 years old) and is a major source of morbidity and mortality for this age group (Hingson et al., 2009; Schulenberg and Maggs, 2002). In the United States, rates of alcohol use disorders peak in this cohort (Grant et al., 2004; Li et al., 2004). Heavy drinking during this period can also interfere with important developmental goals, such as educational attainment, beginning a career, and finding a mate (Gotham et al., 2003; Wood et al., 2000), and in turn increases the risk of alcohol use disorders and other negative outcomes throughout later adulthood (Bennett et al., 1999; Green et al., 2011; Jennison, 2004; Merline et al., 2004). Thus, drinking in emerging adulthood appears to lay a substantial foundation for unhealthy alcohol use across the life span (for a full review, see Correia et al., 2012).

Despite the scope of the problem, major gaps remain in understanding emerging adult alcohol misuse, especially

regarding the role of social factors. Social relationships are highly heterogeneous across individuals but can be systematically quantified using social network analysis (SNA) (Borgatti et al., 2009; McPherson et al., 2001; Rosenquist, 2011). This approach systematically characterizes the structure and both person-level and network-level characteristics of interrelationships among people (i.e., social networks). Notably, although both emphasize the importance of social factors, SNA is distinct from a social norms approach (Perkins, 2003), which focuses on identifying and correcting misperceptions individuals have about normative drinking behavior (Perkins, 2003).

A modest number of studies have applied SNA to alcohol misuse and suggest it may provide important insights. For example, early adolescent peers who are central to their social networks have more influence on their friends' alcohol use (Crosnoe and Needham, 2004) and are more likely to use alcohol themselves (Ennett et al., 2006). Importantly, this pertains to social networks in general, not only networks of drinkers (Ennett et al., 2006).

Similarly, in a large social network of middle-aged adults, unhealthy drinkers were found to cluster together, and changes in drinking in the network prospectively predicted greater drinking at the level of the individual (Rosenquist et al., 2010). In addition, a number of recent studies have

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suggested that an important mechanism of Alcoholics Anonymous is fostering a more adaptive nondrinking social network (Groh et al., 2008; Kelly et al., 2011, 2012).

Relatively few studies have used SNA to understand alcohol misuse in emerging adults, which is surprising given how relevant social factors are in this cohort. A large proportion of emerging adults live in group settings in which they are in proximity to similar-aged peers. In this context, alcohol use is often a social event, and the social milieu plays a crucial role (Cooper et al., 2008; MacLean and Lecci, 2000; Martens et al., 2003; Read et al., 2003). Furthermore, drinking to facilitate socialization is commonly reported among emerging adults and is significantly associated with alcohol misuse (Bradizza et al., 1999; Cooper et al., 2008; Kuntsche et al., 2006, 2008; Read et al., 2003).

A crucial challenge in conducting SNA research, which might partially account for its relatively infrequent use, is that formal SNA assessments are lengthy. They require iterative coding of the interrelationships and characteristics of individuals either in a specific social network (e.g., students in a classroom) or in their own self-reported social network. For example, a sociocentric SNA assessment of individuals in a 100-person dormitory would require all 100 people to be assessed for their own drinking and to rate every other person in terms of their interrelationships.

Based on this, recent attempts have been made to develop more efficient measures of how dense a social network is in terms of various addictive behaviors. In an initial validation study, a brief social density measure was used to characterize the estimated level of gambling, drinking, and smoking among the closest social affiliates of 128 frequent gamblers (Fortune et al., 2013). In that study, the resulting density indices for all three domains were significantly associated with the individual's own level of severity ( $r_s = .31-.39$ ), converging with previous studies using more extensive SNA. In addition, the measure exhibited discriminant validity in terms of substantially diminished cross-domain associations.

The current study sought to validate the measure further in a sample of emerging adults, but specifically with regard to drinking behavior. The study sought to validate the Brief Alcohol Social Density Assessment (BASDA) in three ways. Convergent validity was evaluated by examining the relationships between alcohol-related social density and three variables: drinking behavior itself, social drinking motives, and conformity drinking motives; in each case, we predicted significant positive associations. Of note, drinking motives tend to be relatively intercorrelated (e.g., Cooper, 1994). Therefore, we did not predict these would necessarily be the only associations with alcohol-related social density, so much as the key associations in support of the measure. Criterion-related validity was assessed by examining alcohol-related social density in relation to a score of at least 8 on the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 1992), an established criterion for hazardous

drinking. Incremental validity was evaluated by examining whether alcohol-related social density was significantly associated with alcohol misuse above and beyond drinking motives, which are well established as associates of emerging adult alcohol misuse (Kuntsche et al., 2008).

## Method

### Participants

Participants were college undergraduates who received research credit or extra credit. From a cohort of 384, 30 individuals had missing data on at least one of the key measures or reported low estimated confidence (see the *Assessments* section below), resulting in a final sample of 354 (Table 1). Four individuals did not report their gender but were excluded only for analyses including gender.

### Assessments

*Alcohol Use Disorders Identification Test (AUDIT)*. The AUDIT is a psychometrically validated measure of alcohol misuse for which a score of 8 or greater has been validated as a cutoff for hazardous drinking (Babor et al., 1992). Internal reliability was good ( $\alpha = .83$ ), and AUDIT scores were significantly higher for men ( $M = 8.66$ ,  $SD = 5.09$ ) than for women ( $M = 6.00$ ,  $SD = 5.14$ ),  $t = 4.06$ ,  $p < .001$ .

*Drinking Motives Questionnaire-Adolescent (DMQ)*. The DMQ (Cooper, 1994) is a measure of four drinking motives: coping, enhancement, conformity, and social. Internal reliability was very good across all four domains (social  $\alpha = .95$ ; coping  $\alpha = .89$ ; enhancement  $\alpha = .92$ ; conformity  $\alpha = .87$ ).

*Brief Alcohol Social Density Assessment (BASDA)*. The BASDA (Fortune et al., 2013) assesses estimated alcohol consumption among the four individuals closest to the participant, starting with their closest non-biologically related social network member. Each person is rated using the AUDIT quantity-frequency items: "How often does this

TABLE 1. Participant characteristics ( $N = 354$ )

Variable	%/ $M$ ( $SD$ )
Gender, % female	77.43
Age, in years, $M$ ( $SD$ )	19.84 (1.85)
Ethnicity, %	
White	84.38
Black/African American	7.39
American Indian/Alaskan Native	0.28
Asian	3.41
Mixed race	2.27
Other	2.27
Drinks per week, $M$ ( $SD$ )	8.11 (8.50)
AUDIT	6.57 (5.23)
AUDIT $\geq 8$ , % <sup>a</sup>	37.57 (66.17% female)

Notes: AUDIT = Alcohol Use Disorders Identification Test total score.

<sup>a</sup>Percentage with AUDIT total scores of 8 or more.

TABLE 2. Zero-order correlations among BASDA total, AUDIT, and DMQ subscales

Variable	1.	2.	3.	4.	5.	6.
1. BASDA	—					
2. AUDIT	.67**	—				
3. DMQ <sub>Enhance</sub>	.58**	.64**	—			
4. DMQ <sub>Coping</sub>	.34*	.50**	.64**	—		
5. DMQ <sub>Social</sub>	.60**	.62**	.88**	.59**	—	
6. DMQ <sub>Conform</sub>	.33*	.40*	.47**	.57**	.49**	—

Notes: BASDA = Brief Alcohol Social Density Assessment; AUDIT = Alcohol Use Disorders Identification Test; DMQ = Drinking Motives Questionnaire.

\* $p < .001$ ; \*\* $p < .00001$ .

person have a drink containing alcohol?" (0 = *never*, 4 =  $\geq 4$  *times/week*), "How many drinks containing alcohol does this person have on a typical day when they are drinking?" (0 = 1 or 2, 4 = 10 or more), and "How often does this person have six or more drinks on one occasion?" (0 = *never*, 4 = *daily or almost daily*). Participants also trichotomously rate their confidence in their estimates for each person (i.e., "not confident," "confident," "highly confident"), and individu-

als with "not confident" ratings for two or more members are excluded. Total scores were generated for each network member, as was a total network score, which was calculated as the mean across member totals. Internal reliability for each individual social network member was very good ( $\alpha$ 's = .88–.90), and similarly high for the scores of the four social network members ( $\alpha = .90$ ).

### Procedure

All study procedures were approved by the relevant institutional review board. Participants provided informed consent and completed a single 1-hour in-person group assessment session. At the end of the session, participants were debriefed and assigned credit.

### Data analysis

Convergent validity was evaluated using Pearson's  $r$  to examine associations among the BASDA social network total scores, AUDIT scores, and DMQ subscales. A follow-

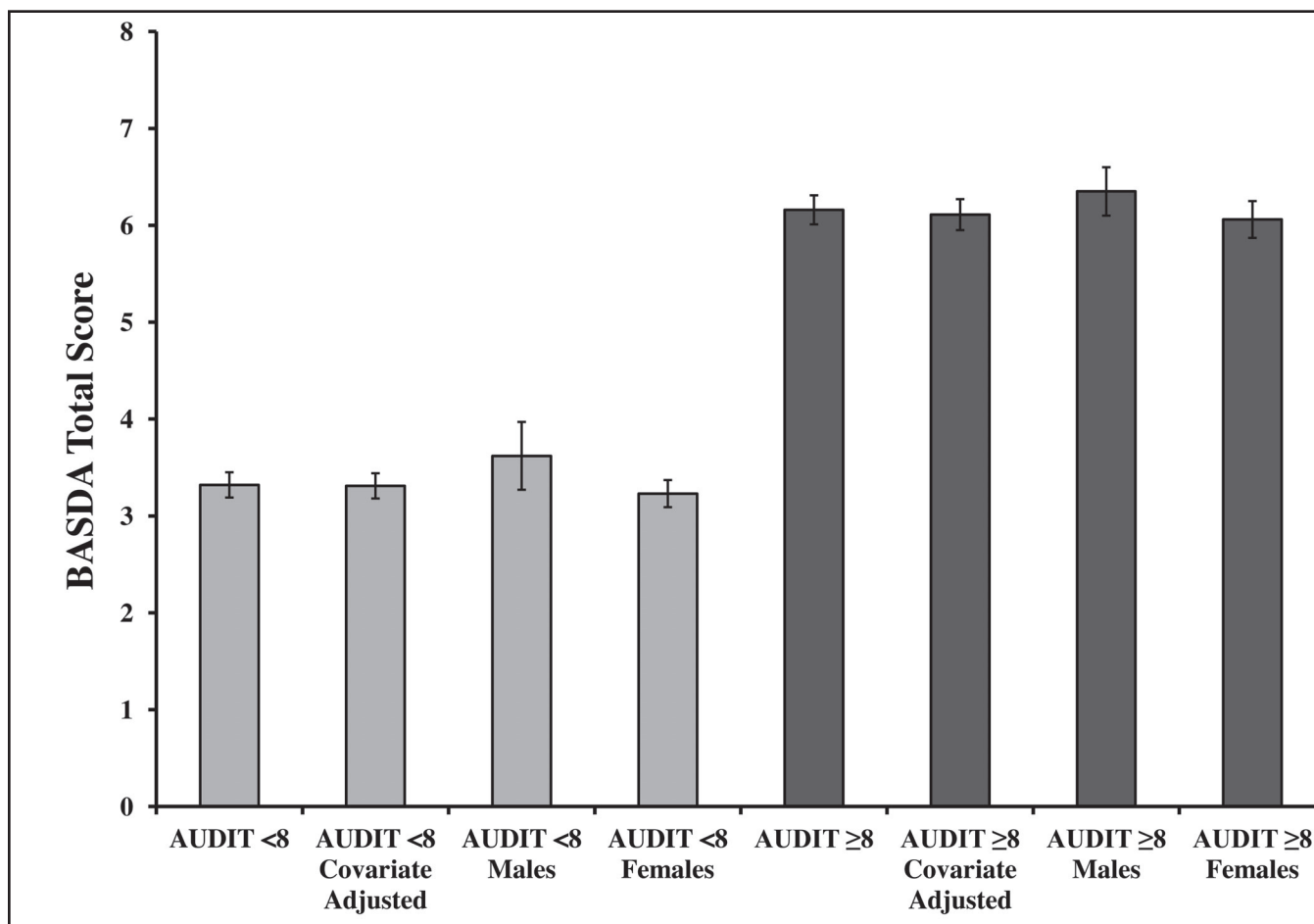


FIGURE 1. Performance on the Brief Assessment of Social Density of Alcohol (BASDA) among individuals with less than 8 (<8) and 8 or more ( $\geq 8$ ) on the Alcohol Use Disorders Identification Test (AUDIT). Adjusted values reflect covariation of gender in the comparisons. Absolute score range for the BASDA is 0 to 12. Differences between groups are all statistically significant ( $ps < .001$ ).

TABLE 3. Hierarchical regression analyses of DMQ subscales, BASDA total scores, and AUDIT

Variable	<i>B</i> ( <i>SE</i> )	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>
<i>BASDA</i>				
Model 1				.38
DMQ <sub>Enhance</sub>	0.09 (0.03)	.26	<.01	
DMQ <sub>Coping</sub>	-0.04 (0.03)	-.10	.10	
DMQ <sub>Social</sub>	0.13 (0.03)	.40	<.001	
DMQ <sub>Conform</sub>	0.03 (0.03)	.06	.24	
<i>AUDIT</i>				
Model 2				.44
DMQ <sub>Enhance</sub>	0.28 (0.07)	.36	<.001	
DMQ <sub>Coping</sub>	0.11 (0.06)	.11	.06	
DMQ <sub>Social</sub>	0.14 (0.06)	.20	<.05	
DMQ <sub>Conform</sub>	0.09 (0.06)	.07	.15	
Model 3				.56
DMQ <sub>Enhance</sub>	0.19 (0.06)	.25	<.01	
DMQ <sub>Coping</sub>	0.15 (0.05)	.15	<.01	
DMQ <sub>Social</sub>	0.02 (0.06)	.02	.76	
DMQ <sub>Conform</sub>	0.05 (0.05)	.05	.32	
BASDA	1.01 (0.10)	.45	<.001	
Model 4				.56
DMQ <sub>Enhance</sub>	0.20 (0.04)	.27	<.001	
DMQ <sub>Coping</sub>	0.17 (0.05)	.17	<.001	
BASDA	1.03 (0.10)	.46	<.001	

Notes: Model 1 reflects the associations of the Drinking Motives Questionnaire (DMQ) subscales with the Brief Alcohol Social Density Assessment (BASDA). Model 2 reflects the associations of the DMQ subscales with the Alcohol Use Disorders Identification Test (AUDIT) total score. Model 3 reflects the addition of the BASDA to Model 2. Model 4 reflects the most parsimonious model, including only the significant variables from Model 3. *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient.

up multiple regression was conducted between the DMQ subscales and the BASDA to assess unique relationships. Criterion-related validity was examined using a one-way, between-subjects analysis of variance comparing BASDA social network total scores of individuals scoring below and above an AUDIT criterion score of 8. To account for gender differences in AUDIT scores, a follow-up analysis of covariance was conducted. Incremental validity of the BASDA was examined via hierarchical regression analyses, with the DMQ subscales entered as independent variables in a first block, the BASDA total scores as an independent variable entered in the second block, and the AUDIT score serving as the dependent variable. Significance of change in *R*<sup>2</sup> was examined as the indicator of incremental validity. A final model retaining only variables that were significantly associated with AUDIT in the concurrent models was also constructed.

**Results**

For convergent validity, zero-order correlations are presented in Table 2. A large-magnitude association was observed between BASDA total score and AUDIT, accounting for 45% of the variance. Correlations between BASDA and the DMQ subscales were all positive, statistically significant, and of medium to large magnitude. Consistent with predictions, the BASDA was significantly

correlated with the social and conformity subscales, with the former being the largest association observed. The DMQ subscales were all significantly correlated with alcohol misuse and each other.

For criterion-related validity, individuals with an AUDIT score of 8 or more exhibited significantly higher density of drinking in their immediate social network compared with those scoring below 8,  $F(2, 352) = 190.29, p < .0001 (\eta_p^2 = .35)$ , even when controlling for gender,  $F(2, 347) = 180.94, p < .0001 (\eta_p^2 = .34)$ . Unadjusted, gender-adjusted, and gender-specific means are shown in Figure 1.

The incremental validity regression coefficients are presented in Table 3. The first combined model revealed that the four DMQ subscales together were associated with a substantial proportion of the variance in alcohol misuse, but only the enhancement and social subscale coefficients were statistically significant. In the second model, the BASDA was significantly associated with the AUDIT above and beyond the DMQ subscales ( $\Delta R^2 = .12, p < .001$ ), with the overall model accounting for more than half of the variance in alcohol misuse.

**Discussion**

The goal of the current study was to examine the validity of a brief measure of alcohol-related social density toward further using SNA to understand alcohol misuse in emerging adults. The measure, the BASDA, was supported in each of the validation domains. The index of alcohol-related social density was significantly associated with each individual's levels of alcohol misuse and his or her relative endorsement of social motives for drinking, indicating convergent validity. Significant differences in BASDA score were evident based on the AUDIT criterion score of 8, indicating criterion-related validity. Finally, the BASDA significantly contributed to predicting alcohol misuse beyond the drinking motives indices, indicating incremental validity. Interestingly, the coefficients for social and conformity motives were no longer statistically significant in the combined model including the BASDA index. This suggests that in this sample the association between these motives and AUDIT score was largely attributable to estimated drinking by close social affiliates as measured by the BASDA, and not the other way around.

The most efficient model comprised enhancement motives, coping motives, and the BASDA index of social density of drinking. In terms of effect sizes, the continuous associations were of medium to large magnitude; the difference between AUDIT groups was similarly substantial and approximately double in the group that scored 8 or more. In the regression analyses, the BASDA contributed an additional 12% of variance beyond drinking motives, and the final model accounted for more than half of the variance in alcohol misuse. Generally speaking, these findings support the construct validity of the BASDA as an ef-



ficient measure of the social density of alcohol use among emerging adults.

The current study's results are consistent with several previous findings. Primarily, they are highly congruent with the previous investigation of the BASDA among gamblers (Fortune et al., 2013). One difference, however, is that the effect sizes for alcohol-related social density were almost twice as large in this study. This may be because social factors are more important among emerging adults, but it also may be a function of other methodological differences. These findings also converge with evidence from middle-aged adults that indicates that individuals with unhealthy drinking behavior aggregate together in social clusters (Rosenquist et al., 2010).

These findings should be considered in light of a number of methodological considerations. First, with regard to the estimation aspect of the measure, further validation of the BASDA will require examining the extent to which individuals' estimates of their close associates' drinking are accurate, as opposed to projections of their own drinking. However, there are several reasons to think that participants would be relatively accurate. The four closest people in a person's life are, by definition, well known to the individual, especially in the context of emerging adults who often cohabit with close friends. Moreover, the BASDA measure directly measures confidence in the individual's estimates, and scoring excludes individuals who report low confidence. Nonetheless, this will ultimately be an empirical question.

Second, with regard to the sampling, it will be important for future studies to validate the BASDA in more diverse samples, in samples with higher proportions of men, and in noncollege individuals of this age cohort. Of particular relevance, as the BASDA specifically excludes biological relatives, it will be important to establish its validity in samples that tend to have close familial ties. Alternatively, augmenting the BASDA to capture peer-age family members may be worth investigating.

More broadly, there are several priorities for future studies using the BASDA, all reflecting elements of the iterative and multifaceted process of construct validation (Cronbach and Meehl, 1955; Strauss and Smith, 2009). First, the BASDA is similar to another measure, the Drinking Norms Ratings Form (DNRF; Baer et al., 1991), although it differs in several ways. Specifically, the DNRF does not assess estimated drinking in specific individuals, uses less precision in the drinking assessment, and does not assess relative confidence in estimations. This means that the BASDA is a higher-resolution assessment of estimated drinking behavior among close friends. As such, a crucial future test will be demonstrating the incremental validity of the BASDA to the DNRF. Second, contextualizing social density of drinking with alcohol-related expectancies is a logical next step. A third priority will be to examine the BASDA's performance in the context of formal SNA,

which also quantifies structural aspects of a person's social network, such as the centrality of the individual to the group. The overlapping and complementary information from the two methodologies is an open question. Finally, because the larger goal is to understand how social factors contribute to the initiation and progression of alcohol misuse, it will be important to examine the predictive validity of the BASDA in longitudinal designs to determine its broader contribution to that research enterprise.

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