

# The Social Network and Alcohol Use\*

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**ABSTRACT. Objective:** Previous research has found that a drinking-supportive social network has a strong influence on heavy drinking and alcohol-related problems over time. The objective of this work was to understand the individual difference and interpersonal factors that predict changes in the social network relevant to alcohol use. **Method:** Data are from a large, ongoing prospective sample of 634 newly married couples in the United States. The current study examined the association between individual, relationship, and partner factors as they relate to changes in the number of drinking buddies in the social network during the first 7 years of marriage. **Results:** After controlling for the number of drinking buddies before marriage, as well as the frequency of heavy drinking,

several individual, relationship, and partner factors were associated with changes in the social network over time. For both husbands and wives, alcohol expectancies and a partner's social network related to changes in the number of drinking buddies over time. Additionally, husbands with higher levels of extroversion and agreeableness had a greater number of drinking buddies over time. Among wives, personality factors were not related to changes in the number of drinking buddies over time. **Conclusions:** This work extends previous research by examining factors that predict changes in the social network that are most influential in alcohol use. Identifying these factors is important for informing prevention and treatment efforts. (*J. Stud. Alcohol Drugs* 69: 906-914, 2008)

A VARIETY OF FACTORS INFLUENCE CHANGES in heavy drinking and alcohol problems in individuals across the life span. Among adolescents, a key factor in the initiation, escalation, and de-escalation of alcohol and drug use involves the influence of the peer network (e.g., Musher-Eizenman et al., 2003; Prinstein et al., 2001; van den Bree and Pickworth, 2005). Peer alcohol use has also been shown to be a strong predictor of alcohol use among young adults. For example, Andrews and colleagues (2002) examined the prospective influence of peers on alcohol use in a sample of 19- to 25-year-old adults and found that peer influence was a significant predictor of heavy episodic drinking and problematic substance use. Although peer use was predictive of heavy episodic drinking, it was not associated with lower levels of alcohol use. Peer influence also extends to young adult problematic drinkers. For example, Delucchi and colleagues (2008) found that a larger social network of heavy drinkers was associated with greater levels of heavy episodic drinking but was not related to lower levels of alcohol consumption. Taken together, these results suggest that peer alcohol use is an important factor to consider for heavy episodic alcohol use among adolescents and young adults.

Although much of the previous research has focused on the average drinking of the social network, recently there has

been an interest in the potential impact of key network members. For example, Leonard and colleagues (2000) focused on the presence of "drinking buddies" in the social network, defined as someone "that you got together with on a regular basis to do activities that centered around drinking and/or going to bars or nightclubs." In this study, the average drinking of the peer network differentiated between regular drinkers and light/infrequent drinkers but did not differentiate heavy drinkers from regular drinkers. However, heavy drinkers reported that nearly 75% of their social network consisted of "drinking buddies," in contrast with regular drinkers who indicated that approximately 30% of their network consisted of "drinking buddies," a difference that was statistically significant. Reifman and colleagues (2006) examined the importance of "drinking buddies" among college students. Participants were asked to report on the drinking levels of their peers and which members could be characterized as a "drinking buddy." After controlling for baseline alcohol use by the peer network, the number of drinking buddies was predictive of alcohol misuse 1 year later. Thus, it was more than simply the amount of alcohol use of the peer network but, rather, the presence of other individuals who engaged in drinking as an integral part of the relationship.

Until recently, the majority of research on peer network influences on drinking has focused on either young adults (i.e., college students) or adolescent samples. Leonard and Mudar (2003) examined the role of peer and partner influences in a sample of couples during the transition into marriage. During this transition, influence was found, but it was limited to the influence of the partner. For instance, husbands' drinking before marriage was longitudinally predictive of wives' drinking at the first anniversary, whereas no evidence was found to suggest that the peer network

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impacted drinking behaviors. It is possible that peer influence was not found because this transition triggers important changes in the peer networks. Kalmijn (2003) found that, among adults, social networks often become smaller, and these changes predominantly occur when people begin dating and at the time of marriage. Similarly, Kearns and Leonard (2004) found that the networks of husbands and wives became more overlapping after marriage than before marriage and that, after marriage, socializing with peers was more likely to include one's spouse than was the case before marriage. In the midst of these reductions and reorganization of the social network, its influence may be substantially reduced. To determine if peer influence were prominent after the transition to marriage, Leonard and Homish (2008) examined the social network of newly married couples during the first 4 years of marriage to determine if the number of drinking buddies were longitudinally predictive of heavy drinking and alcohol problems in men and women after controlling for a variety of individual, relationship, and sociodemographic factors. To allow for changes in the social network membership over time, the number of drinking buddies was modeled as a time-varying predictor. Among husbands and wives, a greater number of drinking buddies was longitudinally predictive of both heavy drinking and alcohol problems over time. Taken together, significant evidence exists in the adolescent and adult populations (both college students and married adults) to suggest that the peer network relates to both heavy drinking and alcohol-related problems, with heavier drinking peers and a greater number of drinking buddies associated with more problematic use. The goal of the present study is to identify factors that predict changes in the social network.

#### *Factors related to changes in social network*

Although there is considerable research on the influence, benefits, and detriments of social networks, much of this work considers the social network as the predictor rather than the outcome. Accordingly, there is a limited amount of past research examining factors related to changes in social network size among adults. It is clear that transition events, such as marriage (Kalmijn, 2003) or the presence of dependent children (Hill and Dunbar, 2003), can impact social network features. However, these studies considered the overall social network rather than the alcohol risk of the social network.

The focus of the current study is on a subset of the social network (i.e., drinking buddies) that has been shown to be predictive of both heavy drinking and alcohol problems in both men and women (Leonard and Homish, 2008). Given this relationship, it is reasonable to consider factors that are specific to alcohol use as possible predictors of changes in the composition of the social network as it relates to alcohol use. For instance, there is evidence that marital satisfaction

and alcohol expectancies are related to both heavy drinking, as well as alcohol problems (Leonard and Homish, 2008). Therefore, it is plausible that these factors may have this effect at least in part through an impact on the social network—specifically changes in the number of drinking buddies. Additionally, there is evidence that personality factors are related to motives for drinking (Kuntsche et al., 2006), as well as heavy drinking (Mortensen et al., 2006); therefore, examining the relationship between personality and the number of drinking buddies in the social network is important. Russell and colleagues (1997) examined the association between personality, social networks, and perceived social support and found that extraversion was positively associated with network size. The current study examined individual, partner, and relationship factors that predict changes in the number of drinking buddies over time in a community sample of 634 newly married couples. Using data from the year before marriage, as well as data from the early years of marriage, this work examined how the number of husbands' and wives' drinking buddies changed through the first 7 years of marriage.

## **Method**

### *Participants*

Participants were involved in a longitudinal study of marriage and alcohol involvement. All participants were at least 18 years old, spoke English, and were literate. Couples were ineligible for the study if they had been previously married. These analyses are based on 634 couples. At the initial assessment, the average (SD) age of the men was 28.7 (6.3) years, and the average age of the women was 26.8 (5.8) years. The majority of the men and women in the sample were white (husbands: 59%; wives: 62%). About one third of the sample was black (husbands: 33%; wives: 31%). The sample also included small percentages (less than 5%) of Hispanic, Asian, and Native American participants. A large proportion of husbands and wives had at least some college education (husbands: 64%; wives: 69%), and most of them were employed at least part time (husbands: 89%; wives: 75%). Consistent with other studies of newly married couples (Chadiha et al., 1998; Crohan and Veroff, 1989; Orbuch and Veroff, 2002), many of the couples were parents at the time of marriage (38% of the husbands and 43% of the wives) and were living together before marriage (70%). The institutional review board of the State University of New York at Buffalo approved the research protocol.

### *Procedures*

After applying for a marriage license, couples were recruited for a 5- to 10-minute paid (\$10) interview. The interview assessed demographic factors (e.g., race, educa-

tion, age), family and relationship factors (e.g., number of children, length of engagement), and substance use questions (e.g., tobacco use, average alcohol consumption, times intoxicated in the past year). Recruitment occurred over a 3-year period, from 1996 to 1999. For interested individuals who did not have time to complete this interview, a telephone interview was conducted later that day or the next day ( $n = 62$ ). Less than 8% of individuals approached declined to participate in the brief recruitment interview. We interviewed 970 eligible couples.

Complete details of the recruitment process can be found elsewhere (Homish and Leonard, 2007; Leonard and Mudar, 2003), but, briefly, couples who agreed to participate in the longitudinal study were given identical questionnaires to complete at home and asked to return them in separate postage-paid envelopes (Wave 1 Assessment). Participants were asked not to discuss their responses with their partners. Each spouse received \$40 for his or her participation. Only 7% of eligible couples refused to participate in the longitudinal study. Those who agreed to participate, compared with those who did not, were more likely to have lower incomes ( $p < .01$ ), and the women were more likely to have children ( $p < .01$ ). No other differences were identified. Of the 887 eligible couples who agreed to participate (13 of the original 900 did not marry), data were collected from both spouses for 634 couples (71.4%). The 634 couples are the basis for this study. Couples who returned the questionnaires were more likely to be living together, compared with couples who did not return the questionnaires (70% vs 62%;  $p < .05$ ), and were more likely to be white. No other sociodemographic differences existed between the couples who responded, compared with those who did not respond. Average past-year alcohol consumption did not differ between couples who returned the questionnaires and those who did not. Husbands in nonrespondent couples consumed six or more drinks or were intoxicated in the past year more often than husbands who completed the questionnaire; however, these differences were small.

At the couples' first, second, fourth, and seventh wedding anniversaries (Waves 2, 3, 4, and 5), they were mailed questionnaires similar to those they received at the first assessments. Wave 6 assessments (ninth anniversary) are currently being completed. As with the first assessment, they were asked to complete the questionnaires and return them in the postage-paid envelopes. Each spouse received \$40 for his or her participation for the second assessment, \$40 for the third, \$50 for the fourth, and \$50 for the fifth. At the fifth assessment, 68.1% ( $N = 432$ ) of the original sample of husbands completed the questionnaires. Husbands who did not participate in the fifth assessment did not differ from other husbands on the basis of Wave 1 number of drinking buddies, frequency of heavy drinking, alcohol expectancies, marital satisfaction, or any of the personality variables, with the exception of neuroticism. Husbands who did not

complete the fifth assessment had slightly higher levels of neuroticism at Wave 1, compared with husbands who completed the fifth assessment (mean [SD] 2.6 [0.8] vs 2.5 [0.9],  $p < .05$ ). At the fifth assessment, 79.7% ( $n = 505$ ) of women completed the questionnaire. Wives who did not complete the fifth assessment did not differ from other wives in terms of Wave 1 number of drinking buddies, frequency of heavy drinking, alcohol expectancies, marital satisfaction, or any of the personality measures.

#### *Measures: Outcome variable*

*Number of drinking buddies.* At each assessment, husbands and wives were asked to provide a list of members in their social networks. These individuals were defined as people who provided emotional support to the participants, people who helped with practical or financial matters, or people with whom they socialized. For each identified person, participants were asked to report on a variety of general factors (e.g., demographics, rate/type of contact), as well as specific alcohol-related questions (e.g., person's general drinking pattern, whether the person would be considered a "drinking buddy"). Participants were provided with a definition of "drinking buddy" and asked to identify members of their social network who were "drinking buddies."

#### *Measures: Predictor variables*

*Personality.* Personality was assessed using the Big Five Inventory (BFI; John and Srivastava, 1999). This measure was designed to allow for quick assessment of the Big Five personality dimensions: (1) extroversion, (2) agreeableness, (3) conscientiousness, (4) neuroticism, and (5) openness. It is composed of 44 items that are worded as short phrases about various personality characteristics. Respondents indicated the extent to which they agree or disagree (1 = disagree strongly to 5 = agree strongly) that each item characterized them. The BFI's reliability and validity are well documented. Watson et al. (2000) reported  $\alpha$ 's ranging from .76 to .85 for the five scales. In addition, the BFI scales are highly correlated with other Big Five measures. For instance, Watson and Hubbard (1996) reported convergence between the scales of the BFI and the NEO-PI (personality inventory scales assessing neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness), with correlations ranging from .68 (openness) to .85 (conscientiousness).

*Alcohol expectancies.* Items comprising the Social/Physical Pleasure factor of the Alcohol Effects Questionnaire (Rohsenow, 1983) were used in this study. The true/false response format of the original measure was modified to a 5-point agree/disagree scale, and participants responded according to their own personal beliefs about the effects of alcohol. The scales had good reliabilities for husbands and wives ( $\alpha$ 's for husbands = .87;  $\alpha$ 's for wives = .86). Alcohol

expectancies were modeled as time-varying predictors in the analysis.

*Relationship quality.* At each assessment, overall marital quality was assessed with the 15-item Marital Adjustment Test (MAT; Locke and Wallace, 1959). Higher scores indicated greater relationship quality (range: 2-158). The MAT had an adequate reliability for the study ( $\alpha = .81$  for husbands;  $\alpha = .80$  for wives). The MAT score was standardized for the regression models and was entered as a time-varying predictor in the analysis.

*Heavy drinking.* At each wave, heavy drinking was assessed with two items. Frequency of past year intoxication was assessed on a 9-point scale that ranged from “didn’t get drunk last year” (coded 0) to “every day” (coded 8). The frequency of drinking six or more drinks on an occasion in the past year was also assessed using the same 9-point scale. Following our earlier work (Homish and Leonard, 2007), heavy drinking was defined as the maximum of these two responses. Heavy drinking was modeled as a time-varying covariate.

*Demographic factors.* At the initial in-person interview, each spouse reported his or her age, race/ethnicity, income, highest level of education obtained, employment status, if they had children before the current marriage, and the number of months of cohabitation. These variables were modeled as time-invariant covariates in the regression model.

### Analysis

Descriptive statistics were used to characterize the outcome variables for husbands and wives at each wave. Correlations were used to assess the relationship between the predictor variables and the outcome variables at baseline. Because longitudinal datasets contain repeated observations of the same participants over time, data are often correlated—thus requiring more specialized analytic tools. For this study, we used multilevel regression models to identify time-varying and time-invariant predictors of drinking buddies over time. Multilevel modeling is used to study nested data (e.g., students within schools), but it can also be applied to longitudinal studies (Homish et al., 2006; Hox, 2002). In this study, the repeated assessment of the couples is considered nested within the couple. Application of multilevel modeling in longitudinal studies has many advantages over traditional analyses. A complete discussion of these advantages is available elsewhere (Hox, 2002; Raudenbush and Bryk, 2002); but, briefly, the use of multilevel modeling in longitudinal studies is particularly beneficial in terms of dealing with missing data. With many other methods, participants who did not provide data for each assessment would be considered missing; however, multilevel modeling allows participants with only information from one assessment to be included in the analyses (Raudenbush and Bryk, 2002). Multilevel modeling also allows for the inclusion of time-varying or time-invariant predictors (Hox, 2002).

For this study, two multilevel regression models were analyzed. The outcome variable for the first model was the number of husbands’ drinking buddies over time, and the outcome variable for the second model was the number of wives’ drinking buddies over time. Because the outcome variables were count variables (i.e., number of buddies), multilevel Poisson regression models were used (instead of multilevel linear regression models). For each outcome, changes in drinking buddies were being examined for Wave 2 (first year of marriage) through Wave 5 (seventh wedding anniversary) after considering the impact of the number of drinking buddies, personality factors, and sociodemographic factors before marriage. Additionally, time-varying, lagged levels of individual and partner marital satisfaction and heavy drinking—as well as partner number of drinking buddies—were also included in the models. The time-varying, lagged predictors meant that the predictors were allowed to vary over time and that the assessment of the predictor was conducted in the assessment before the outcome. Time was modeled as a linear factor. Random effect terms were included for the intercept (i.e., baseline level of drinking buddies). The inclusion of random terms allows for modeling of interindividual heterogeneity (i.e., the models are not population averaged or marginal models, as is the case with generalized estimating equation regression models). All models were analyzed with Stata, Version 9.0 (StataCorp LP, College Station, TX).

## Results

Descriptive statistics were used to characterize the two outcome variables of interest: (1) number of husbands’ drinking buddies and (2) number of wives’ drinking buddies. At each assessment, husbands had more drinking buddies, compared with wives (Table 1). Both husbands and wives experienced declines through the first three assessments, with slight increases noted by the fourth and fifth assessments (Table 1). Husbands’ and wives’ number of drinking buddies was significantly correlated with each other at the first assessment ( $r = .35, p < .001$ ). At the first assessment, individual’s and partner’s alcohol expectancies and heavy drinking were positively associated with the number of drinking buddies (Table 2). Additionally, wives’ extroversion was positively related to husbands’ drinking buddies, and husbands’ conscientiousness was negatively related to the number of drinking buddies. For wives, husbands’ openness was negatively related to wives’ number of drinking buddies, whereas none of wives’ personality factors was related to the number of her drinking buddies.

### *Number of husbands’ drinking buddies*

The first model was used to examine individual and partner factors that related to changes in the number of drinking



TABLE 1. Descriptive statistics, mean (SD)

Variable	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Husband no. of drinking buddies	1.34 <sup>a</sup> (2.42)	1.01 (2.09)	0.88 <sup>b</sup> (1.97)	0.91 <sup>b</sup> (1.91)	0.97 (2.01)
Wife no. of drinking buddies	1.05 <sup>a</sup> (2.13)	0.81 <sup>a</sup> (1.91)	0.71 <sup>a</sup> (1.76)	0.73 <sup>a</sup> (1.73)	0.68 <sup>a</sup> (1.67)

Note: Different superscripted letters represent within subjects significant differences at  $p < .05$ .

buddies from the first year of marriage through the seventh wedding anniversary. Premarital, time-invariant factors (husbands' drinking buddies and personality)—as well as time-varying factors (husbands' and wives' alcohol expectancies, marital satisfaction, and heavy drinking)—were modeled as predictors of changes in drinking buddies over time. The impact of these individual and partner effects was examined after considering the impact of time and husbands' sociodemographic variables. In the model predicting the number of husbands' drinking buddies over time, husbands who engaged in more frequent heavy drinking were significantly more likely to have a greater number of drinking buddies (regression coefficient [ $B$ ] = 0.23,  $p < .001$ ; Table 3). In addition, the number of drinking buddies before marriage ( $B = 0.25$ ,  $p < .001$ ) was positively associated with the number of drinking buddies during the first 7 years of marriage.

After we accounted for the number of premarital drinking buddies and levels of heavy drinking, a variety of individual and partner factors were significantly related to changes in the number of drinking buddies over time. Husbands' alcohol expectancies before marriage ( $B = 0.26$ ,  $p < .001$ ) were significantly associated with the number of drinking buddies over time. Three husband personality factors were positively related to the number of drinking buddies. Higher levels of extroversion ( $B = 0.19$ ,  $p < .01$ ; Table 3) and higher levels of

agreeableness ( $B = 0.21$ ,  $p < .05$ ) before marriage were associated with a greater number of drinking buddies during the first 7 years of marriage. Additionally, lower levels of conscientiousness were associated with more drinking buddies over time ( $B = -0.18$ ,  $p < .05$ ). Husbands who reported lower levels of marital satisfaction reported significantly more drinking buddies over time ( $B = -0.17$ ,  $p < .001$ ). In terms of wives' factors, a greater number of drinking buddies in the wives' network was positively associated with the number of drinking buddies in the husbands' network ( $B = 0.08$ ,  $p < .001$ ). Additionally, wives' heavy drinking was associated with significantly more drinking buddies in the husbands' network ( $B = 0.06$ ,  $p = .08$ ). Higher wives' marital satisfaction was significantly associated with a greater number of drinking buddies in the husbands' social network ( $B = 0.11$ ,  $p < .05$ ).

TABLE 2. Correlations between Wave 1 predictors and the number of drinking buddies

Variable	Husband drinking buddies	Wife drinking buddies
H extroversion	.06	.02
W extroversion	.09*	.07
H agreeableness	.00	-.04
W agreeableness	-.03	-.04
H conscientiousness	-.09*	-.01
W conscientiousness	-.04	-.07 <sup>§</sup>
H neuroticism	-.06	.01
W neuroticism	.01	.04
H openness	.00	-.09*
W openness	-.04	-.04
H AEQ-soc	.34 <sup>‡</sup>	.21 <sup>‡</sup>
W AEQ-soc	.18 <sup>‡</sup>	.30 <sup>‡</sup>
H MAT	-.07 <sup>§</sup>	-.02
W MAT	.01	-.05
H heavy drinking	.35 <sup>‡</sup>	.24 <sup>‡</sup>
W heavy drinking	.22 <sup>‡</sup>	.32 <sup>‡</sup>

Notes: H = husband; W = wife; AEQ-soc = Alcohol Expectancy Questionnaire—social behaviors; MAT = Marital Adjustment Test.

<sup>§</sup> $p < .08$ ; \* $p < .05$ ; <sup>‡</sup> $p < .001$ .

TABLE 3. Predicting husbands' number of drinking buddies over time

Fixed effects	Regression coefficient (SE)	95% Confidence interval
Time	-0.01 (0.01)	(-0.04-0.02)
<b>T1 H extroversion</b>	<b>0.19 (0.07)<sup>‡</sup></b>	<b>(0.05-0.34)</b>
<b>T1 H agreeableness</b>	<b>0.21 (0.08)*</b>	<b>(0.05-0.38)</b>
<b>T1 H conscientiousness</b>	<b>-0.18 (0.09)*</b>	<b>(-0.35- -0.01)</b>
T1 H neuroticism	0.10 (0.07)	(-0.04-0.23)
T1 H openness	0.05 (0.08)	(-0.11-0.21)
<b>T1 H AEQ-soc</b>	<b>0.26 (0.05)<sup>‡</sup></b>	<b>(0.16-0.36)</b>
T1 W AEQ-soc	0.08 (0.05)	(-0.02-0.17)
<b>H MAT</b>	<b>-0.17 (0.05)<sup>‡</sup></b>	<b>(-0.27- -0.08)</b>
<b>W MAT</b>	<b>0.11 (0.05)*</b>	<b>(0.01-0.20)</b>
<b>H heavy drinking</b>	<b>0.23 (0.03)<sup>‡</sup></b>	<b>(0.18-0.28)</b>
<b>W heavy drinking</b>	<b>0.06 (0.03)<sup>§</sup></b>	<b>(-0.01-0.13)</b>
<b>T1 H drinking buddies</b>	<b>0.25 (0.03)<sup>‡</sup></b>	<b>(0.18-0.31)</b>
<b>W drinking buddies</b>	<b>0.08 (0.01)<sup>‡</sup></b>	<b>(0.05-0.10)</b>
Covariates		
H age	-0.03 (0.02) <sup>§</sup>	(-0.06-0.00)
H race/ethnicity	0.29 (0.20)	(-0.10-0.68)
H education	-0.16 (0.19)	(-0.53-0.21)
H employment	-0.41 (0.15) <sup>‡</sup>	(-0.71- -0.12)
H parent before marriage	0.07 (0.21)	(-0.34-0.48)
Months of cohabitation w/current partner	0.00 (0.00)	(-0.00-0.01)
Random effects intercept		Variance component .67 <sup>‡</sup>

Notes: *Italicized* variables were modeled as time-varying, lagged predictors. **Bolded** variables are statistically significant. T1 = Time 1 (before marriage) time invariant predictors; H = husband; W = wife; AEQ-soc = Alcohol Expectancy Questionnaire—social behaviors; MAT = Marital Adjustment Test.

<sup>§</sup> $p < .1$ ; \* $p < .05$ ; <sup>‡</sup> $p < .01$ ; <sup>‡</sup> $p < .001$ .

TABLE 4. Predicting wives' number of drinking buddies over time

Fixed effects	Regression coefficient (SE)	95% Confidence interval
Time	-0.03 (0.02)	(-0.07-0.00)
<b>T1 W extroversion</b>	<b>0.24</b> (0.09) <sup>†</sup>	(0.07-0.41)
T1 W agreeableness	-0.09 (0.09)	(-0.27-0.09)
T1 W conscientiousness	-0.09 (0.10)	(-0.29-0.10)
T1 W neuroticism	-0.00 (0.07)	(-0.15-0.14)
T1 W openness	-0.02 (0.09)	(-0.21-0.16)
<b>T1 W AEQ-soc</b>	<b>0.47</b> (0.06) <sup>‡</sup>	(0.35-0.59)
T1 H AEQ-soc	0.09 (0.05)	(-0.02-0.19)
<b>W MAT</b>	<b>-0.15</b> (0.05) <sup>†</sup>	(-0.26- -0.05)
<b>H MAT</b>	<b>0.20</b> (0.06) <sup>‡</sup>	(0.09-0.30)
<b>W heavy drinking</b>	<b>0.23</b> (0.03) <sup>‡</sup>	(0.17-0.30)
<b>H heavy drinking</b>	<b>0.10</b> (0.03) <sup>‡</sup>	(0.04-0.16)
<b>T1 W drinking buddies</b>	<b>0.28</b> (0.04) <sup>‡</sup>	(0.21-0.36)
<b>H drinking buddies</b>	<b>0.08</b> (0.01) <sup>‡</sup>	(0.05-0.10)
<b>Covariates</b>		
W age	-0.02 (0.02)	(-0.06-0.01)
W race/ethnicity	-0.34 (0.21)	(-0.76-0.07)
W education	-0.20 (0.21)	(-0.61-0.21)
W employment	-0.17 (0.12)	(-0.41-0.06)
W parent before marriage	0.33 (0.22)	(-0.11-0.77)
Months of cohabitation w/current partner	0.00 (0.00)	(-0.00-0.01)
	Variance component	
Random effects intercept		2.41 <sup>‡</sup>

Notes: *Italicized* variables were modeled as time-varying, lagged predictors. **Bolded** variables are statistically significant. T1 = Time 1 (before marriage) time invariant predictors; H = husband; W = wife; AEQ-soc = Alcohol Expectancy Questionnaire-social behaviors; MAT = Marital Adjustment Test.

<sup>†</sup>*p* < .01; <sup>‡</sup>*p* < .001.

*Number of wives' drinking buddies*

As with the model predicting husbands' drinking buddies during the first 7 years of marriage, the second model examined individual and partner premarital and time-varying predictors of the number of drinking buddies while controlling for the effects of time and wives' sociodemographic covariates. Heavier drinking wives were more likely to have larger networks of drinking buddies (*B* = 0.23, *p* < .001; Table 4). In addition, the number of drinking buddies in the wives' network before marriage was positively associated with the number of drinking buddies during the first 7 years of marriage (*B* = 0.28, *p* < .001).

After considering the impact of heavy drinking and the number of drinking buddies before marriage, wives' alcohol expectancies before marriage were positively associated with the number of wives' drinking buddies in the social network (*B* = 0.47, *p* < .001). Wives with higher levels of extroversion had greater numbers of drinking buddies (*B* = 0.24, *p* < .01). None of the other personality factors were significant predictors of wives' drinking buddies. Wives who reported lower levels of marital satisfaction had a greater number of drinking buddies (*B* = -0.015, *p* < .01). In terms of partner effects, three husband predictors were associated with the number of drinking buddies in the wives' network. A greater

number of drinking buddies in the husbands' network was positively associated with the number of drinking buddies in the wives' network (*B* = 0.08, *p* < .001), and husbands' heavy drinking was significantly associated with greater numbers of drinking buddies in the wives' network (*B* = 0.10, *p* < .001). Higher marital satisfaction from husbands was significantly associated with a *greater* number of drinking buddies in the wives' social network (*B* = 0.20, *p* < .001).

**Discussion**

Previous research has found a strong prospective association between the social network and heavy alcohol use and alcohol problems. However, it is not the overall social network that is involved in the relation with alcohol use but, rather, aspects of the social network that are associated with heavy drinking and alcohol-related problems (e.g., alcohol use of the network, association with network members solely for activities related to drinking). Given the evidence linking social network influences and heavy alcohol use, the current report examined individual, partner, and relationship factors that were predictive of changes in the number of drinking buddies over time.

In the year before marriage, husbands reported a slightly greater number of drinking buddies than did wives. This finding is consistent with a review of peer relationships and alcohol use that found that men are more likely to have drinking buddies compared with women (Borsari and Carey, 2001). This finding should be considered in light of the findings by Westermeyer and colleagues (2004) that the total social network size for men and women was comparable. This suggests that these differences—with respect to the number of drinking buddies—are not the result of differential network size of men and women. Instead, it supports the notion that the social networks of men are more supportive of drinking and drinking-related activities than the social network of women. Among men and women in this study, the number of drinking buddies declined over time. This decline in drinking buddies is not unexpected, given the decline of heavy drinking and alcohol problems among adults making the transition into marriage (Bachman et al., 2002; Homish et al., 2006). Additionally, Kalmijn (2003) found that overall social networks become smaller with time and transition events, such as marriage.

A number of individual, partner, and relationship factors were prospectively related to the number of drinking buddies. First, as might be expected, the number of drinking buddies at baseline was strongly related to the number of drinking buddies later in marriage. Also, higher levels of heavy drinking were positively associated with more drinking buddies at subsequent assessments over time for both husbands and wives. This provides additional evidence that heavy drinkers maintain and shape their social environment in ways that support drinking. This is consistent with other work that

found more evidence of selection effects, compared with influence effects with respect to social network and drinking (Leonard and Mudar, 2003).

A consistent predictor for both husbands' and wives' number of drinking buddies over time was the number of drinking buddies that the partner reported. It is important to note that this finding persisted after considering an individual's number of drinking buddies in the year before marriage. Additionally, because the number of partners' drinking buddies, as well as the frequency of heavy drinking, were entered into the model as time-varying, lagged predictors, the impact of changes in these variables over time was accounted for in the model. That these variables were lagged means their assessment occurred before changes in the outcomes; thus, a temporal relationship can be established. The fact that an individual's number of drinking buddies is influenced by a partner's social network member suggests that the social networks of the husbands and wives interact—a finding that is consistent with other work (Kalmijn, 2003). Thus, it would be possible for a partner's social network member to influence changes in one's own network.

Individuals who had a stronger belief that alcohol was related to positive social functioning at baseline had a greater number of drinking buddies over time. This was true for both men and women. Although previous research has found a positive relationship between alcohol expectancies and drinking, our study extended this work by finding evidence of a prospective link between expectancies and the number of drinking buddies. In addition, the predictive value of expectancies and changes in drinking buddies over time persisted even after considering the role of heavy drinking and the number of drinking buddies, thus suggesting that the social function of drinking motivates the maintenance of social network that is supportive of drinking.

There was evidence of a relationship between personality and the number of drinking buddies. Among husbands, more agreeableness and less conscientiousness were associated with more drinking buddies, whereas extroversion was positively associated with drinking buddies for both husbands and wives. Previous research has found a positive association between extroversion and *overall* network size among men and women (Russell et al., 1997). Therefore, the association between extroversion and a subset of the social network (i.e., drinking buddies) may reflect the impact of these personality factors on the ability and motivation to maintain a group of friends.

The relationship between marital satisfaction and the number of drinking buddies was complex. One's own satisfaction was negatively related to drinking buddies at subsequent assessments (i.e., more satisfaction associated with fewer drinking buddies); however, there was positive association for a partner's level of marital satisfaction and the number of drinking buddies. This finding suggests the integration of alcohol use into the couples' social network could

be a measure of increased social interaction for the couple. Research has found that how couples integrate alcohol use into their relationship was important in terms of overall marital satisfaction. For example, couples who reported similar levels of alcohol use, but reported more often drinking in the presence of their partner, reported greater levels of marital satisfaction, compared with couples who drank similar levels of alcohol but without their partners present (Homish and Leonard, 2005).

Although this study has focused on the manner in which alcohol-related constructs lead to differential modification of the social network (an example of social selection effects), it is important to recognize that previous research has also provided some evidence for social influence effects among adults. Specifically, although two longitudinal studies of adults have failed to find evidence that peer drinking has an influence on one's own aridity (Bullers et al., 2001; Labouvie, 1996), Reifman et al. (2006) found that the average drinking of the social network and the number of drinking buddies had a longitudinal influence on drinking during the first year of college. In our earlier analyses of the current sample, we found evidence that a partner's drinking had an influence on one's own drinking during the transition to marriage and through the early years of marriage (Leonard and Homish, 2008; Leonard and Mudar, 2003). Given that the peer network changed substantially during the transition to marriage, we found evidence for peer influence in the early years of marriage (Leonard and Homish, 2008), but not in the transition to marriage (Leonard and Mudar, 2003). Taken together, the results of our earlier work and the present study suggest that the relationship between one's drinking and the alcohol characteristics of the social network is a dynamic, bidirectional relationship throughout the early years of marriage—that is, individuals “select” social networks that are consistent with their drinking behavior and with the drinking behavior and social networks of their intimate partner. These social networks, which are moderately stable with respect to drinking characteristics over time, then serve to maintain existing drinking patterns. It is clear that this process has the potential to consolidate high-risk drinking among couples. However, this process may be interrupted by other factors, including pressures for prosocial behaviors, external life events, or treatment interventions. To the extent that these factors serve to reorganize aspects of the social network, they may have a more potent and long-lasting influence.

There are several limitations to the current study that should be considered when interpreting the findings. First, we did not ask members of the social network to provide information about their drinking levels. However, the participants were endorsing this member of their social network in which their association with the person was focused on drinking or drinking-related events (e.g., going to bars, clubs). From other analyses (e.g., Leonard and Homish, 2008), we compared the predictive value of drinking buddies

and heavy drinking network members on heavy drinking and alcohol problems. The construct of drinking buddies had a more predictive value of both heavy drinking and drinking problems, compared with simply the number of heavy drinkers. Others have also found that drinking buddies and heavy drinkers are measuring different constructs (Reifman et al., 2006). A second limitation to this study is attrition. During the 7 years of follow-up, we maintained more wives in the study, compared with husbands. However, differences between individuals who completed the fifth assessment and those who did not were minimal. It is possible, however, that they differed on other factors that we did not consider. Finally, it is important to note that this study focused on newly married couples. The relationship between the social network and alcohol use may be different for other intimate partnerships (e.g., cohabiting, nonmarried adults).

Despite these limitations, this study provided important information about individual, partner, and relationship factors that impact the social network. Understanding what factors modify the social network is vitally important for prevention and treatment issues as they relate to heavy alcohol use and problems related to substance use. For example, Litt and colleagues (2007) found that treatment that involved a modification to a problem drinker's social network contributes to improved drinking outcomes. Others have also been considering the role of the social network as a component of treatment for alcoholism (Copello et al., 2002). Future work will need to consider additional components of the social network (e.g., characteristics of members of the social network who are either lost from the network or added to the social network). The role of conflict in the social network is also important to understand. In illicit drug networks, for instance, conflictual relationships among social network members was a risk factor for drug use resulting in nonfatal overdoses (Tobin et al., 2007). Understanding the complexities of the social network, especially changes that relate to drinking in the social network, is of great value for prevention and intervention efforts.

## References

- ANDREWS, J.A., TILDESLEY, E., HOPS, H., AND LI, F. The influence of peers on young adult substance use. *Health Psychol.* **21**: 349-357, 2002.
- BACHMAN, J.G., O'MALLEY, P.M., SCHULENBERG, J.E., JOHNSTON, L.D., BRYANT, A.L., AND MERLINE, A.C. *The Decline of Substance Use in Young Adulthood: Changes in Social Activities, Roles, and Beliefs*, Mahwah, NJ: Lawrence Erlbaum, 2002.
- BORSARI, B. AND CAREY, K.B. Peer influences on college drinking: A review of the research. *J. Subst. Abuse* **13**: 391-424, 2001.
- BULLERS, S., COOPER, M.L., AND RUSSELL, M. Social network drinking and adult alcohol involvement: A longitudinal exploration of the direction of influence. *Addict. Behav.* **26**: 181-199, 2001.
- CHADHA, L.A., VEROFF, J., AND LEBER, D. Newlywed's narrative themes: Meaning in the first year of marriage for African American and white couples. *J. Compar. Fam. Stud.* **29**: 115-130, 1998.
- COPELLO, A., ORFORD, J., HODGSON, R., TOBER, G., AND BARRETT, C. Social behaviour and network therapy: Basic principles and early experiences. *Addict. Behav.* **27**: 345-366, 2002.
- CROHAN, S.E. AND VEROFF, J. Dimensions of marital well-being among white and black newlyweds. *J. Marr. Fam.* **51**: 373-383, 1989.
- DELUCCHI, K.L., MATZGER, H., AND WEISNER, C. Alcohol in emerging adulthood: 7-year study of problem and dependent drinkers. *Addict. Behav.* **33**: 134-142, 2008.
- HILL, R.A. AND DUNBAR, R.I.M. Social network size in humans. *Human Nature* **14**: 53-72, 2003.
- HOMISH, G.G. AND LEONARD, K.E. Marital quality and congruent drinking. *J. Stud. Alcohol* **66**: 488-496, 2005.
- HOMISH, G.G. AND LEONARD, K.E. The drinking partnership and marital satisfaction: The longitudinal influence of discrepant drinking. *J. Cons. Clin. Psychol.* **75**: 43-51, 2007.
- HOMISH, G.G., LEONARD, K.E., AND KEARNS-BODKIN, J.N. Alcohol use, alcohol problems, and depressive symptomatology among newly married couples. *Drug Alcohol Depend.* **83**: 185-192, 2006.
- HOX, J.J. *Multilevel Analysis: Techniques and Applications*, Mahwah, NJ: Lawrence Erlbaum, 2002.
- JOHN, O.P. AND SRIVASTAVA, S. The big five trait taxonomy: History, measurement, and theoretical perspectives. In: PERVIN, L.A. AND JOHN, O.P. (Eds.) *Handbook of Personality: Theory and Research*, 2nd Edition, New York: Guilford Press, 1999, pp. 102-138.
- KALMIJN, M. Shared friendship networks and the life course: An analysis of survey data on married and cohabiting couples. *Social Networks* **25**: 231-249, 2003.
- KEARNS, J.N. AND LEONARD, K.E. Social networks, structural interdependence, and marital quality over the transition to marriage: A prospective analysis. *J. Fam. Psychol.* **18**: 383-395, 2004.
- KUNTSCHKE, E., KNIBBE, R., GMEL, G., AND ENGELS, R. Who drinks and why? A review of socio-demographic, personality, and contextual issues behind the drinking motives in young people. *Addict. Behav.* **31**: 1844-1857, 2006.
- LABOUIE, E. Maturing out of substance use: Selection and self-correction. *J. Drug Issues* **26**: 457-476, 1996.
- LEONARD, K.E. AND HOMISH, G.G. Predictors of heavy drinking and drinking problems over the first 4 years of marriage. *Psychol. Addict. Behav.* **22**: 25-35, 2008.
- LEONARD, K.E., KEARNS, J., AND MUDAR, P. Peer networks among heavy, regular and infrequent drinkers prior to marriage. *J. Stud. Alcohol* **61**: 669-673, 2000.
- LEONARD, K.E. AND MUDAR, P. Peer and partner drinking and the transition to marriage: A longitudinal examination of selection and influence processes. *Psychol. Addict. Behav.* **17**: 115-125, 2003.
- LITT, M.D., KADDEN, R.M., KABELA-CORMIER, E., AND PETRY, N. Changing network support for drinking: Initial findings from the Network Support Project. *J. Cons. Clin. Psychol.* **75**: 542-555, 2007.
- LOCKE, H.J. AND WALLACE, K.M. Short marital-adjustment prediction tests: Their reliability and validity. *Marr. Fam. Living* **21**: 251-255, 1959.
- MORTENSEN, E.L., JENSEN, H.H., SANDERS, S.A., AND REINISCH, J.M. Associations between volume of alcohol consumption and social status, intelligence, and personality in a sample of young adult Danes. *Scand. J. Psychol.* **47**: 387-398, 2006.
- MUSHER-EIZENMAN, D.R., HOLUB, S.C., AND ARNETT, M. Attitude and peer influences on adolescent substance use: The moderating effect of age, sex, and substance. *J. Drug Educ.* **33**: 1-23, 2003.
- ORBUCH, T.L. AND VEROFF, J. A programmatic review: Building a two-way bridge between social psychology and the study of the early years of marriage. *J. Social Pers. Relat.* **19**: 549-568, 2002.
- PRINSTEIN, M.J., BOERGERS, J., AND SPIRITO, A. Adolescents' and their friends' health-risk behavior: Factors that alter or add to peer influence. *J. Pediatr. Psychol.* **26**: 287-298, 2001.
- RAUDENBUSH, S.W. AND BRYK, A.S. *Hierarchical Linear Models: Applications and Data Analysis Methods*, 2nd Edition, Thousand Oaks, CA: Sage, 2002.



- REIFMAN, A., WATSON, W.K., AND McCOURT, A. Social networks and college drinking: Probing processes of social influence and selection. *Pers. Social Psychol. Bull.* **32**: 820-832, 2006.
- ROHSENOW, D.J. Drinking habits and expectancies about alcohol's effects for self versus others. *J. Cons. Clin. Psychol.* **51**: 752-756, 1983.
- RUSSELL, D.W., BOOTH, B., REED, D., AND LAUGHLIN, P.R. Personality, social networks, and perceived social support among alcoholics: A structural equation analysis. *J. Pers.* **65**: 649-692, 1997.
- TOBIN, K.E., HUA, W., COSTENBADER, E.C., AND LATKIN, C.A. The association between change in social network characteristics and non-fatal overdose: Results from the SHIELD Study in Baltimore, MD, USA. *Drug Alcohol Depend.* **87**: 63-68, 2007.
- VAN DEN BREE, M.B.M. AND PICKWORTH, W.B. Risk Factors predicting changes in marijuana involvement in teenagers. *Arch. Gen. Psychiat.* **62**: 311-319, 2005.
- WATSON, D. AND HUBBARD, B. Adaptational style and dispositional structure: Coping in the context of the Five-Factor Model. *J. Pers.* **64**: 737-774, 1996.
- WATSON, D., HUBBARD, B., AND WIESE, D. General traits of personality and affectivity as predictors of satisfaction in intimate relationships: Evidence from self- and partner-ratings. *J. Pers.* **68**: 413-449, 2000.
- WESTERMEYER, J., THURAS, P., AND WAALER, A. Size and complexity of social networks among substance abusers: Childhood and current correlates. *Amer. J. Addict.* **13**: 372-380, 2004.