Romantic Relationship Status and Alcohol Use and Problems Across the First Year of College

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ABSTRACT. Objective: We examined the associations between romantic relationship status and alcohol use and problems in a large sample of first-year college students. Method: Participants ($n = 2,056$) came from a longitudinal study of college students who answered questions about relationship status (single, in an exclusive relationship, or dating several people), alcohol use, and alcohol problems at two time points across their first year. Results: After we controlled for a number of covariates (parental alcohol problems, high school conduct problems, peer deviance, and extraversion), we found that dating several people was associated with higher alcohol use and problems, compared with being single or being in an exclusive relationship, at the follow-up assessment only, with modest effect sizes. Being in an exclusive relationship was not associated with lower alcohol use or problems compared with being single. Relationship dissolution was associated with a modest longitudinal increase in alcohol problems. Conclusions: It is important to consider alternative relationship statuses (e.g., dating several people) for understanding the association of romantic status with alcohol use and problems in college-aged samples. Involvement in an exclusive romantic relationship (vs. being single) in this age group is not associated with the behavioral health benefits documented in older-adult samples. College students dating several people may be at risk for high levels of alcohol use or problems and may benefit from targeted interventions. Those who have recently experienced a breakup also may be at risk for increases in alcohol problems, although the clinical relevance of this finding should be tempered by the small observed effect size. (*J. Stud. Alcohol Drugs, 75,* 580–589, 2014)

THE FIRST YEAR OF COLLEGE marks the beginning of the protracted period of social, behavioral, and occupational exploration and identity consolidation—"emerging adulthood" (Arnett, 2000)—that occurs between ages 18 and 25. Romantic involvement continues to increase during this period (Carver et al., 2003; Montgomery, 2005), and, at the same time, alcohol access becomes relatively easy (Wechsler et al., 2002). Individuals begin to increase their alcohol use and to establish more regular alcohol use patterns (White et al., 2006), and some begin to develop alcohol problems (Hingson et al., 2006) during this time. Despite the co-occurrence of these social and behavioral changes, there is limited empirical information on how romantic relationship status during this period fits into a broader pattern of alcohol use and problems (for exceptions, see Braithwaite et al., 2010; Whitton et al., 2013).

The literature on romantic relationship status and alcohol use and problems tends to focus on marital status (Fischer and Wiersma, 2012; Whitton et al., 2013). For example, the transition to marriage is associated with reductions in alcohol use (Curran et al., 1998; Fleming et al., 2010a; Schulenberg et al., 1996), and being married is associated with lower levels of alcohol consumption and fewer alcohol problems, compared with being single or divorced (Cranford et al., 2011; Dick et al., 2006; Kearns-Bodkin and Leonard, 2005; Leonard and Rothbard, 1999; Marshal, 2003; Miller-Tutzauer et al., 1991). In addition, transitions out of marriage (i.e., marital dissolution) also are associated with higher levels of alcohol use and problems (Keyes et al., 2011; Temple et al., 1991), although this association appears to be less consistent in women (Wilsnack et al., 1991).

Studies of nonmarital romantic relationships

By comparison, relatively little is known about the associations between nonmarital romantic relationship statuses and alcohol use and problems during emerging adulthood. National estimates indicate that 70% of men and 75% of women have been involved in a special romantic relationship by age 18 (Carver et al., 2003), but the median age at first marriage is 28.7 for men and 26.5 for women (U.S. Census Bureau, 2011). This finding suggests a crucial need for research that considers dating relationships—the most common type of college relationship (Arnett, 2000)—to understand how alcohol use and problems differ as a function of romantic relationship involvement during the first year of college, which marks the beginning of the highest risk period for the onset of alcohol dependence (Hingson et al., 2006).

In the few studies that consider nonmarital relationship status and alcohol/other substance use in emerging adults, one found that individuals in cohabiting relationships did less heavy drinking compared with singles (Fleming et al., 2010a). Another study, however, did not find differences in substance abuse/dependence as a function of romantic involvement (Simon and Barrett, 2010). Cross-sectional studies of nonmarital relationships in college students find that those in committed relationships drink less often and are less likely to engage in heavy episodic drinking (Braithwaite et al., 2010). They also are less likely to have alcohol use problems (Whitton et al., 2013) compared with singles.

The small extant literature on nonmarital relationship statuses and alcohol/other substance use in emerging adults leaves a number of crucial questions unanswered. First, because these studies have typically compared those who are "committed/exclusive/cohabiting" with those who are "single," it is unknown whether additional relationship statuses that are likely to be salient for this age group are related to alcohol use. We were specifically interested in whether individuals who were dating several people differed in terms of their alcohol use and problems compared with those who were single or in an exclusive relationship. Exploration and experimentation in social relationships—including romantic relationships—are defining features of emerging adulthood (Arnett, 2000). This experimentation can take a number of forms (Shulman et al., 2013). Some people may be involved in exclusive relationships, and others may date several people simultaneously without making a commitment. Identifying whether the pattern of alcohol use and problems of those who date several people is similar to or different from that of those who are single or in an exclusive relationship is important because it may suggest a need for more nuanced relationship status categories for understanding how alcohol use and problems map onto relationship status during this period of the life span.

The second key limitation in this literature concerns the question of whether changes in relationship status predict changes in alcohol problems across time in this age group. As noted earlier, marital dissolution is associated with increases in alcohol use and problems in older-adult samples, but whether the same is true for romantic relationships in emerging adulthood is less clear. Relationship problems are one of the top three reasons that college students seek university counseling services (Mistler et al., 2012), and retrospective data indicate that experiencing a breakup in emerging adulthood is associated with elevated levels of substance use (Fleming et al., 2010b). Identifying whether relationship dissolution is associated with prospectively measured changes in alcohol problems is of particular importance for understanding the potential clinical relevance of breakups for preventing or intervening with alcohol problems in this age group.

Current study

We examined the associations among romantic relationship status and alcohol use and problems during the first year of college. Based on the prior literature, we hypothesized that people in exclusive romantic relationships would have lower alcohol use (frequency and quantity) and fewer alcohol problems (alcohol-dependence symptoms) compared with those who were single or dating several people and that romantic relationship dissolution would predict increases in alcohol problems. Whether those who were single and those dating several people were likely to differ from one another in terms of alcohol use and problems was not immediately clear from the prior literature, and we did not make a priori hypotheses for differences between these two groups. We also tested for potential sex differences, although we did not make any a priori hypotheses.

Method

Participants, procedure, and measures

Participants came from a large, ongoing longitudinal study of the behavioral and emotional health of college students at a public university in the mid-Atlantic states. Baseline and follow-up data were collected during the fall and the spring, respectively, of participants' first year of college via online surveys. This study was approved by Virginia Commonwealth University's Institutional Review Board. Participants read through an online consent document and indicated that they understood the potential risks and benefits of participating. They were paid $10 for each survey.

For the baseline assessment, incoming first-year students 18 years of age or older were invited via email to complete the survey, starting 1 week before their arrival on campus up until the 10th week of the fall semester. Of the 3,623 individuals who were eligible to complete the study's baseline assessment, 2,056 participated (57% response rate; 39% male, 60% female, 1% declined to identify sex). The sample reflected the population from which it was drawn: 51% White, 19% African American, 15% Asian, 6% Hispanic/Latino, and 9% other/multiracial/unknown/declined to respond. Those who completed the baseline survey were subsequently invited via email to complete a follow-up assessment between weeks 7 and 14 of the spring semester. Of those who completed the baseline assessment and who were still enrolled at the university (1,964 participants), 1,559 also completed the follow-up assessment (79% retention). On average, 28.57 weeks (SD = 3.10, range: 18.57–41.86) separated the baseline and follow-up assessments.

Alcohol frequency and quantity (baseline and follow-up). At baseline, alcohol frequency was measured with a question about the number of days participants had drunk one or more alcoholic beverages in the past 30 days. Alcohol

quantity was measured with a question about the number of drinks that had been consumed on drinking days in the past 30 days. At follow-up, alcohol frequency and quantity were measured using two ordinal items ("How often do you have a drink containing alcohol?" and "How many drinks containing alcohol do you have on a typical day when you are drinking?") from the Alcohol Use Disorders Identification Test (Bush et al., 1998). The alcohol frequency options were *never, monthly or less, 2–4 times a month, 2–3 times a week, and 4 or more times a week.* The alcohol-quantity response options (number of drinks) were 1 or 2; 3 or 4; 5 or 6; 7, 8, or 9; 10 or more. Participants who declined to respond (54 [3%] for frequency and 63 [4%] for quantity) were coded as missing. Participants who had not yet initiated alcohol use (defined as one full drink) were coded as "never" for alcohol frequency and "0" for alcohol quantity. Participants who declined to indicate whether they had initiated alcohol use at follow-up were coded as missing.

Alcohol problems (baseline and follow-up). We measured alcohol problems with seven questions adapted from the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA; Bucholz et al., 1994) that correspond to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* alcohol-dependence criteria (American Psychiatric Association, 1994). Lifetime alcohol-dependence symptoms were assessed at baseline; alcohol-dependence symptoms since starting college were assessed at follow-up. Separate prorated total symptom counts for baseline and follow-up were calculated for participants who had initiated alcohol use before either their baseline or follow-up assessment and who responded to at least three of the items for each assessment, respectively. Participants who had not yet initiated alcohol use were coded as 0, and participants who declined to indicate whether they had initiated alcohol use at baseline or follow-up were coded as missing for the respective alcohol problems measure.

Relationship status (baseline and follow-up). Participants reported which of the following best described their current relationship status: not dating, dating several people, dating one person exclusively, engaged, married, married but separated, divorced, widowed, or partnered. The *divorced, widowed,* and *partnered* options were omitted from the follow-up survey because of low endorsement at baseline. For these analyses, we condensed these options into three categories: single, dating several people, and in an exclusive relationship (exclusive/engaged/married/partnered).

Covariates

We included the following covariates in our analyses to test the distinctiveness of romantic relationship status in predicting alcohol use and problems above and beyond four well-known alcohol risk factors: parental alcohol problems (McGue, 1997), high school conduct problems (Pardini et

al., 2007), peer deviance (Duncan et al., 1998), and extraversion (Martsh and Miller, 1997). All covariates were measured at baseline. Peer deviance also was measured at follow-up and was accordingly used in the follow-up analyses.

Parental alcohol problems (baseline). Participants reported whether they believed that their biological mother or father ever had a drinking problem. Response options were *yes, no, I don't know,* and *I choose not to respond.* We combined maternal and paternal information into a two-category variable: 0 (neither parent with an alcohol problem) or 1 (either parent with an alcohol problem).

High school conduct problems (baseline). Participants were asked 11 items adapted from the Conduct Disorder section of SSAGA about how frequently they had engaged in a range of problem behaviors as teenagers (e.g., skipping school, stealing) on a 4-point scale coded 0 (*never*), 1 (*one to two times*), 2 (*three to five times*), and 3 (*six or more times*). Prorated sum scores were calculated for those who responded to six or more of the questions.

Peer deviance (baseline and follow-up). Peer deviance was measured using items from the Virginia Adult Twin Study of Psychiatric and Substance Use Disorders (Kendler et al., 2008). At baseline, participants were asked 12 items about how many of their friends in the past year had used drugs other than alcohol, had used alcohol, or had engaged in antisocial behavior. At follow-up, participants responded to a reduced set of six items for friends that they had spent time with since starting college. Response options included 1 (*none*), 2 (*a few*), 3 (*some*), 4 (*most*), and 5 (*all*). Separate sum scores for baseline and follow-up were calculated for participants who responded to at least half of the items for each assessment, respectively.

Extraversion (baseline). Extraversion was measured using eight items from the Big Five Inventory (John and Srivastava, 1999) tapping talkativeness, sociability, energy, enthusiasm, assertiveness, inhibition (reverse coded), reservation (reverse coded), and quietness (reverse coded). Response options included 1 (*disagree strongly*), 2 (*disagree a little*), 3 (*neither agree nor disagree*), 4 (*agree a little*), and 5 (*agree strongly*). An extraversion sum score was calculated for participants who responded to at least half of the items.

Analytic plan

Our baseline alcohol frequency, quantity, and problems measures were count variables, and preliminary analyses indicated that a negative binomial model would be most appropriate for the data because of overdispersion (i.e., variances greater than the means) in the three measures. The intercept for negative binomial models is equivalent to the log of the expected count for the outcome variable when all other predictors in the model are set to zero. The regression coefficients for negative binomial models indicate the degree

and direction of the difference in the logs of the expected counts for the outcome variable for each one-unit change in the predictor variable. Effect sizes for negative binomial models are reported as incidence rate ratios (IRRs). The IRR indicates the factor by which a one-unit change in a predictor variable increases (for IRR > 1) or decreases (for IRR < 1) the expected count.

Relationship status was a three-category variable, and for our primary analyses we set "exclusive" as the reference group because we were interested in whether and how participants in romantic relationships differed from singles and those dating several people. Other covariates in our analyses included sex, parental alcohol problems, high school conduct problems, peer deviance, and extraversion. We also included a dichotomous variable indicating whether the participant had completed his or her survey before arriving on campus for official university orientation activities to account for potential differences in baseline alcohol use and problems as a function of starting college. This variable was coded 0 (survey completed before arrival to campus, which included 361 [18%] participants in the sample) or 1 (survey completed after arrival to campus, which included 1,651 [80%] participants in the sample). Survey time-stamp data were not available for the remaining 44 (2%) participants because of a software error.

Our follow-up alcohol frequency and quantity measures were ordinal, and we used proportional odds models for these analyses. Proportional odds models (also called cumulative logit models) are similar to logistic regression, and they permit the simultaneous regression of ordinal data onto predictors. Proportional odds models include multiple intercepts, which correspond to the series of possible dichotomous splits of the ordinal outcome's categories. Using alcohol frequency as an example, there are five intercepts, and we describe the first two to illustrate their construction and interpretation. The first intercept is the logit for endorsing "never" versus any greater category (e.g., "monthly or less," "two to four times per month," etc.). The second intercept is the logit for endorsing "never" or "monthly or less" versus any greater category (e.g., "two to four times per month," "two to three times a week," etc.). The odds associated with these logits are equivalent to their exponent.

All other parameters in the proportional odds models are equivalent to their weighted averages across the series of dichotomous splits of the ordinal outcome's categories. Effect sizes for proportional odds models are reported as ordinal odds ratios ($OR_{Ordinal}$). $OR_{Ordinal}$ can be interpreted like odds ratios from logistic regression, and these represent the weighted average of the predictor's effect across the series of dichotomous splits of the ordinal outcome's categories. For example, an $OR_{Ordinal}$ of 1.50 for parental alcohol problems in the alcohol frequency model would indicate that having a history of parental alcohol problems is associated with 1.50 times the odds of moving from the "never" category to any

greater category (e.g., "monthly or less," "two to four times per month," etc.). Likewise, having a history of parental alcohol problems is associated with 1.50 times the odds of moving from the "never" or "monthly or less" categories to any greater category (e.g., "two to four times a month," "two to three times a week," etc.).

Our follow-up alcohol problems measure was a count variable, and we again used a negative binomial model for these analyses to account for overdispersion. Parallel to our baseline analyses, relationship status was a three-category variable, and we set "exclusive" as the reference group for our follow-up analyses. Covariates for the follow-up models included sex, parental alcohol problems, high school conduct problems, peer deviance, and extraversion.

We used a two-way analysis of variance (ANOVA) to test whether changes in relationship status predicted changes in alcohol problems from baseline to follow-up. We focused on alcohol problems because the same measure was used at baseline and follow-up, which was not the case for alcohol frequency or quantity. Only individuals who were single and/or in an exclusive relationship at both time points were examined in order to have adequate cell sizes; those who were dating several people at either assessment were removed from the analyses. We used residualized change scores—that is, the saved residuals from the regression of follow-up alcohol problems onto baseline alcohol problems. Positive residuals indicate that a participant's alcohol problems increased between baseline and follow-up, and negative residuals indicate that a participant's alcohol problems decreased between baseline and follow-up. Residualized change scores are more reliable than difference scores and are less correlated with the scores that create them (Cohen and Cohen, 1983). Thus, change in alcohol problems was captured in a single variable, which we then used as the dependent variable in a two-way ANOVA.

We note that our sample sizes vary by each analysis because some participants chose not to respond to particular questions. We maximized our sample size for each analysis by including all participants who had complete case-wise data on the relevant measures. Finally, we centered all continuous covariates on their means to lend to the interpretability of the intercepts.

Results

Descriptive statistics and zero-order correlations for the continuous and count study variables are presented in Table 1. At baseline, 549 (27%) participants had not initiated alcohol use, 1,449 (70%) had initiated alcohol use, and 58 (3%) declined to respond. At follow-up, 322 (21%) participants had not initiated alcohol use, 1,193 (77%) had initiated alcohol use, and 44 (2%) declined to respond. The follow-up alcohol frequency and quantity measures were on ordinal scales. The frequencies and percentages for each alcohol

TABLE 1. Descriptive statistics and zero-order correlations for continuous and count study variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.
Observed minimum	11.00	12.00	8.00	0.00	0.00	0.00	6.00	0.00
Observed maximum	39.60	55.00	40.00	30.00	80.00	7.00	36.00	6.00
M	15.53	23.99	27.09	2.44	1.91	0.38	15.64	0.47
SD	3.49	8.09	6.22	4.33	3.70	0.90	6.13	0.95
n	2,022	2,017	2,043	1,731	1,692	1,982	1,559	1,507
1. High school conduct problems	–							
2. Baseline peer deviance	*.47*	–						
3. Extraversion	*.07*	*.12*	–					
4. Baseline alcohol frequency	*.33*	*.43*	*.20*	–				
5. Baseline alcohol quantity	*.21*	*.32*	*.16*	*.42*	–			
6. Baseline alcohol problems	*.30*	*.36*	*.14*	*.52*	*.31*	–		
7. Follow-up peer deviance	*.29*	*.45*	*.13*	*.28*	*.19*	*.22*	–	
8. Follow-up alcohol problems	*.24*	*.28*	*.13*	*.38*	*.23*	*.43*	*.26*	–

Notes: **Bold italic** type indicates $p < .01$.

frequency category were *never* ($n = 460$; 30%), *monthly or less* ($n = 413$; 26%), *two to four times a month* ($n = 390$; 25%), *two to three times a week* ($n = 194$; 12%), *four or more times a week* ($n = 27$; 2%), and *missing* ($n = 75$; 5%). The frequencies and percentages for each alcohol-quantity category were 0 ($n = 460$; 30%); 1 or 2 ($n = 287$; 18%); 3 or 4 ($n = 378$; 24%); 5 or 6 ($n = 226$; 14%); 7, 8, or 9 ($n = 95$; 6%); 10 or more ($n = 28$; 2%); and missing ($n = 85$; 6%). As noted previously, participants who declined to respond to the alcohol-initiation question at baseline or follow-up were coded as missing for the alcohol frequency, quantity, and problems measures for the respective assessment.

The frequencies for the relationship status categories at baseline and follow-up and changes between relationship status categories between baseline and follow-up are shown in Figure 1. We note that those who were married but separated, divorced, or widowed (four [<1%] at baseline, two [<1%] at follow-up) were coded as missing and were excluded from subsequent analyses because of small cell sizes. With respect to parental alcohol problems, 533 (26%) participants indicated that one or both parents had an alcohol problem. Participants who did not know or declined to respond for both parents ($n = 96$; 5%) or who did not know or declined to respond for one parent and indicated that the other parent did not have a suspected drinking problem ($n = 185$; 9%) were coded as missing.

We examined sex differences in baseline alcohol frequency, quantity, and problems and follow-up alcohol problems using Welch's t tests (Welch, 1947), which adjusts the degrees of freedom to account for potential variance differences between groups. Males and females did not differ in terms of baseline alcohol frequency, baseline alcohol problems, or follow-up alcohol problems (all ps > .05). Males did report higher baseline alcohol quantity than females, $t(943.29) = 2.99$, $p < .01$, Cohen's $d = 0.16$. We used proportional odds models to examine potential sex differences (coded 0 = male, 1 = female) in the ordinal follow-up alcohol frequency and quantity measures. At follow-up, females reported lower alcohol frequency ($B = -0.20$; $n = 1,473$; $z = -2.02$; $OR_{Ordinal} = 0.82$) and quantity ($B = -0.34$; $n = 1,463$; $z = -3.54$; $OR_{Ordinal} = 0.71$) compared with males.

Attrition analyses

We ran a series of logistic regressions to examine whether those who completed the follow-up assessment differed systematically from those who did not complete the follow-up. We did not observe any differences between these groups in terms of parental alcohol problems; high school conduct problems; extraversion; or baseline peer deviance, alcohol frequency, alcohol quantity, or alcohol problems (all ps > .05). Some differences emerged for sex and race. Females were more likely to complete the follow-up assessment compared with males ($B = 0.39$; $n = 2,041$; $z = 3.77$; OR = 1.48), and White participants were less likely to complete the follow-up assessment compared with non-White participants ($B = -0.22$; $n = 2,027$; $z = -2.10$; OR = 0.80).

Alcohol use and problems as a function of baseline relationship status

The negative binomial results for the baseline alcohol measures are presented in Table 2. In these primary analyses, we set those in exclusive relationships as the reference group. This provided two direct contrasts for relationship status: in an exclusive relationship versus single and in an exclusive relationship versus dating several people. Neither of these contrasts was significant with respect to alcohol frequency, quantity, or problems after the covariates in the model were accounted for. Similarly, the single versus dating several people contrast was not significant for alcohol frequency, quantity, or problems in a series of supplementary analyses where we set those who were single as the reference group. Although there were no main effects for baseline relationship status, we examined potential sex differences in a series of exploratory analyses. One significant ($p = .04$) sex moderation effect emerged, and it indicates
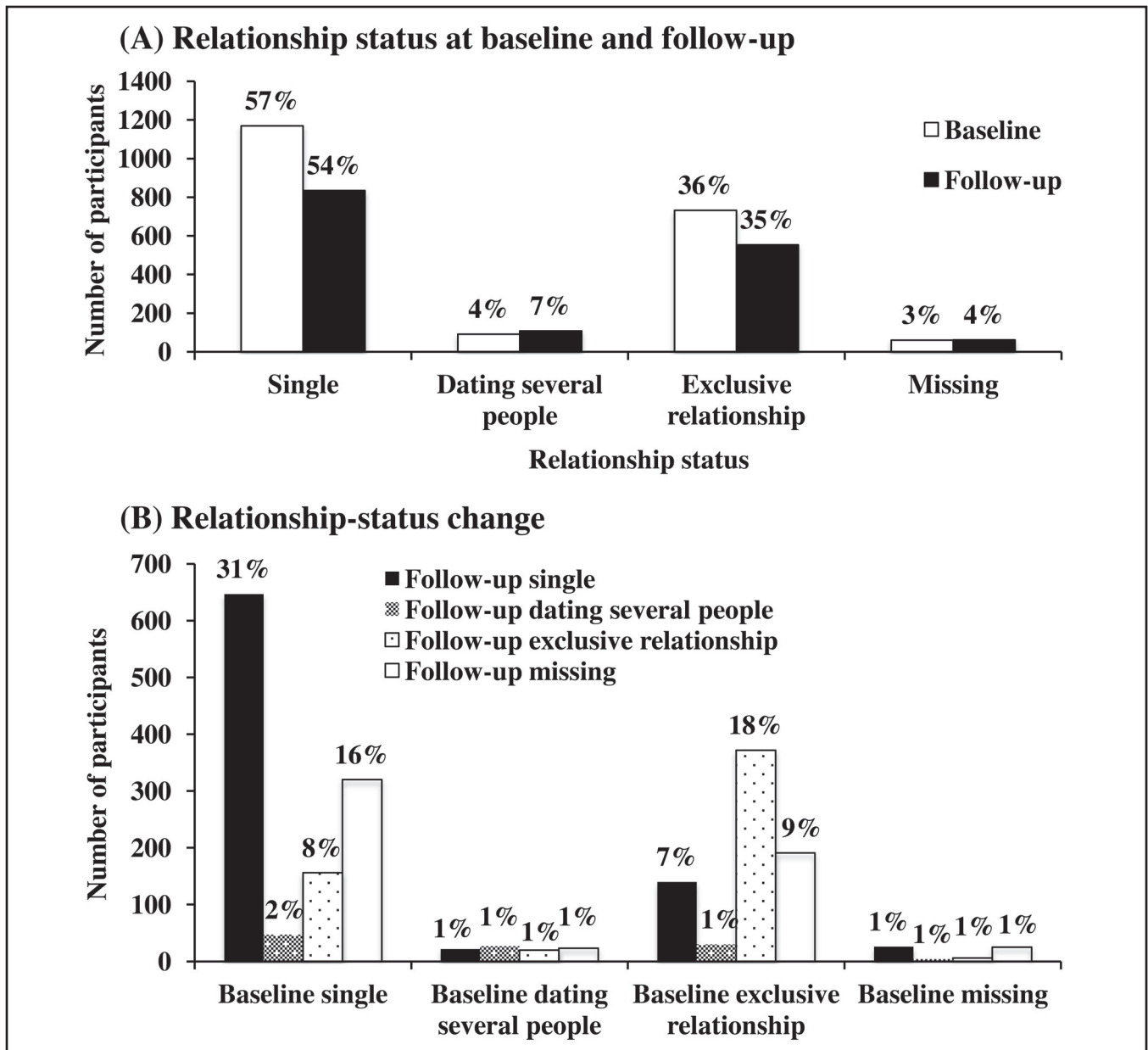
(A) Relationship status at baseline and follow-up

(B) Relationship-status change

FIGURE 1.   (A) Baseline and follow-up romantic relationship status. Along the *x*-axis are the category labels, and along the *y*-axis is the number of partici-pants who endorsed each category. (B) Changes in romantic relationship between baseline and follow-up. The bars represent configurations of baseline and follow-up romantic-relationship status. The *y*-axis is the number of participants who endorsed each category. In both figures, the numbers above the bars are the percentages for each category.

that males in exclusive relationships drank approximately one more drink per drinking day compared with single males. Full results for these supplementary and exploratory analyses are available on request from the first author.

Alcohol use and problems as a function of follow-up relationship status

The results from the proportional odds models for follow-up alcohol frequency and quantity are presented in Table 3.

The results from the negative binomial model for follow-up alcohol problems are presented in Table 4. Parallel to the baseline analyses, those in exclusive relationships were set as the reference group in the primary proportional odds and negative binomial models, providing two contrasts (exclusive vs. single and exclusive vs. dating several people).

Those who were dating several people had higher alcohol frequency ($OR_{Ordinal} = 1.99$) and quantity ($OR_{Ordinal} = 1.79$) compared with those who were in an exclusive relationship. Dating several people also was associated with an increase

TABLE 2. Negative binomial regression results of baseline alcohol frequency, quantity, and problems as a function of baseline relationship status and covariates

Variable	Frequency ($n = 1,462$)			Quantity ($n = 1,420$)			Problems ($n = 1,634$)		
	B (IRR)	SE	z	B (IRR)	SE	z	B (IRR)	SE	z
Intercept	*0.51 (1.67)*	*0.13*	*4.00*	*0.46 (1.58)*	*0.13*	*3.41*	*-1.59 (0.20)*	*0.18*	*-8.92*
Sex (1 = female)	-0.12 (0.89)	0.09	-1.34	*-0.23 (0.79)*	*0.09*	*-2.53*	-0.09 (0.91)	0.11	-0.79
When took survey (1 = after school started)	0.11 (1.12)	0.11	1.05	**0.22 (1.25)**	**0.11**	**1.98**	**0.31 (1.36)**	**0.15**	**2.05**
Parental alcohol problems (1 = yes)	0.18 (1.20)	0.09	1.92	0.04 (1.04)	0.10	0.46	**0.23 (1.26)**	**0.11**	**2.07**
High school conduct problems	*0.05 (1.05)*	*0.01*	*3.24*	0.02 (1.02)	0.01	1.31	*0.08 (1.08)*	*0.02*	*4.91*
Peer deviance (past year)	*0.09 (1.09)*	*0.01*	*15.62*	*0.09 (1.09)*	*0.01*	*14.43*	*0.08 (1.08)*	*0.01*	*10.51*
Extraversion	*0.05 (1.05)*	*0.01*	*6.65*	*0.04 (1.04)*	*0.01*	*5.68*	*0.04 (1.04)*	*0.01*	*4.08*
Baseline relationship status: Exclusive				Set as reference					
Baseline relationship status: Single	-0.09 (0.91)	0.09	-1.01	-0.13 (0.88)	0.09	-1.37	-0.09 (0.91)	0.11	-0.78
Baseline relationship status: Dating several	0.17 (1.19)	0.20	0.86	-0.03 (0.97)	0.22	-0.15	0.07 (1.07)	0.22	0.31

Notes: **Bold** type indicates $p < .05$. ***Bold italic*** type indicates $p < .01$. B = unstandardized regression coefficient; IRR = incidence rate ratio; SE = standard error of unstandardized regression coefficient; $z = z$ score associated with the coefficient. The intercept for negative binomial models is equivalent to the log of the expected count for the outcome variable when all other predictors in the model are set to zero. The regression coefficients for negative binomial models indicate the degree and direction of the difference in the logs of the expected counts for the outcome variable for each one-unit change in the predictor variable. Thus, positive coefficients denote that a one-unit change in a predictor variable is associated with an increased expected count, and negative coefficients denote that a one-unit change in a predictor variable is associated with a decreased expected count. The IRR indicates the factor by which a one-unit change in a predictor variable increases (for IRR > 1) or decreases (for IRR < 1) the expected count. The IRR for the intercept is the expected count for the outcome variable when all other predictors in the model are set to zero.

in alcohol problems by a factor of 1.72 compared with those who were in an exclusive relationship. Those who were single did not statistically differ from those who were in an exclusive relationship in terms of alcohol frequency, quantity, and problems. Those who were dating several people also had higher alcohol frequency ($OR_{Ordinal} = 1.92$, $p < .01$) and quantity ($OR_{Ordinal} = 1.77$, $p < .01$) compared with those who were single, according to supplementary analyses where we set those who were single as the reference group. Dating several people also was associated with an increase in alcohol problems by a factor of 1.57 ($p = .01$) compared with those who were single. Full results for these supplementary analyses are available on request from the first author.

A number of the covariates were related to follow-up alcohol use and problems in the expected directions. Extraversion and high school conduct problems (both measured

TABLE 3. Proportional odds model of follow-up alcohol frequency and quantity as a function of follow-up relationship status and covariates

Variable	Frequency ($n = 1,263$)			Quantity ($n = 1,256$)		
	B ($OR_{ordinal}$)	SE	z	B ($OR_{ordinal}$)	SE	z
Intercept (F: Never) (Q: 0)		Set as reference				
Intercept (F: Monthly or less) (Q: 1 or 2)	*1.11 (3.03)*	*0.13*	*8.57*	*1.22 (3.39)*	*0.13*	*9.51*
Intercept (F: 2–4 times a month) (Q: 3 or 4)	*-0.37 (0.69)*	*0.13*	*-2.94*	0.18 (1.20)	0.12	1.45
Intercept (F: 2–3 times a week) (Q: 5 or 6)	*-2.04 (0.13)*	*0.14*	*-14.56*	*-1.22 (0.30)*	*0.13*	*-9.46*
Intercept (F: ≥4 times a week) (Q: 7, 8, or 9)	*-4.53 (0.01)*	*0.24*	*-18.72*	*-2.58 (0.08)*	*0.15*	*-17.07*
Intercept (F: Not applicable) (Q: ≥10)	–	–	–	*-4.25 (0.01)*	*0.23*	*-18.30*
Sex (1 = Female)	-0.08 (0.92)	0.11	-0.74	*-0.31 (0.73)*	*0.11*	*-2.86*
Parental alcohol problems (1 = yes)	0.11 (1.12)	0.12	0.96	0.19 (1.21)	0.12	1.65
High school conduct problems	*0.07 (1.07)*	*0.02*	*3.95*	*0.06 (1.06)*	*0.02*	*3.95*
Peer deviance	*0.18 (1.20)*	*0.01*	*15.39*	*0.16 (1.17)*	*0.01*	*14.55*
Extraversion	*0.05 (1.05)*	*0.01*	*5.11*	*0.04 (1.04)*	*0.01*	*4.51*
Follow-up relationship status: Exclusive		Set as reference				
Follow-up relationship status: Single	0.04 (1.04)	0.11	0.34	0.01 (1.01)	0.11	0.10
Follow-up relationship status: Dating several	*0.69 (1.99)*	*0.22*	*3.19*	*0.58 (1.79)*	*0.21*	*2.73*

Notes: ***Bold italic*** type indicates $p < .01$. Proportional odds models have multiple intercepts. F = the response options for the alcohol frequency question; Q = the response options for the alcohol-quantity question. The coefficients for the proportional odds models can be interpreted as logit regression coefficients where B = unstandardized coefficient, $OR_{ordinal}$ = ordinal odds ratio, SE = standard error of the coefficient, and $z = z$ score associated with the coefficient. Using the first two alcohol frequency intercepts as an example, Intercept (F: monthly or less) is the logit coefficient for endorsing Never vs. any greater alcohol frequency category (e.g., monthly or less, two to four times a month). Intercept (F: two to four times per month) is the logit coefficient for endorsing Never or monthly or less vs. any greater alcohol frequency category (e.g., two to four times per month, two to three times a week). Positive intercept coefficients indicate a higher probability of endorsing the higher alcohol frequency and quantity responses; negative intercept coefficients indicate a lower probability of endorsing the higher alcohol frequency and quantity responses. Each of the non-intercept coefficients also can be interpreted as a logit coefficient; thus, positive values correspond to higher alcohol frequency and quantity, and negative values correspond to lower alcohol frequency and quantity. $OR_{ordinal}$ can be interpreted like odds ratios from logistic regression.

TABLE 4. Negative binomial of follow-up alcohol problems as a function of follow-up relationship status and covariates

| Variable | Problems ($n = 1,278$) | | |
	B (IRR)	SE	z
Intercept	*-1.02 (0.36)*	*0.12*	*-8.25*
Sex (1 = female)	-0.14 (0.87)	0.11	-1.24
Parental alcohol problems (1 = yes)	0.16 (1.17)	0.11	1.46
High school conduct problems	*0.09 (1.09)*	*0.01*	*6.02*
Peer deviance	*0.10 (1.11)*	*0.01*	*9.49*
Extraversion	*0.03 (1.03)*	*0.01*	*3.25*
Follow-up relationship status: Exclusive	Set as reference		
Follow-up relationship status: Single	0.09 (1.09)	0.11	0.80
Follow-up relationship status: Dating several	*0.54 (1.72)*	*0.18*	*2.99*

Notes: **Bold italic** type indicates $p < .01$. B = unstandardized regression coefficient; IRR = incidence rate ratio; SE = standard error of unstandardized regression coefficient; z = z score associated with the coefficient. The intercept for negative binomial models is equivalent to the log of the expected count for the outcome variable when all other predictors in the model are set to zero. The regression coefficients for negative binomial models indicate the degree and direction of the difference in the logs of the expected counts for the outcome variable for each one-unit change in the predictor variable. Thus, positive coefficients denote that a one-unit change in a predictor variable is associated with an increased expected count, and negative coefficients denote that a one-unit change in a predictor variable is associated with a decreased expected count. The IRR indicates the factor by which a one-unit change in a predictor variable increases (for IRR > 1) or decreases (for IRR < 1) the expected count. The IRR for the intercept is the expected count for the outcome variable when all other predictors in the model are set to zero.

at baseline) and follow-up peer deviance were associated with higher alcohol frequency, quantity, and problems; and females reported a lower quantity of alcohol use compared with males. Exploratory analyses indicated that sex did not modify the relationship-status main effects at follow-up.

Longitudinal changes in alcohol problems as a function of changes in relationship status

Alcohol problems increased significantly for the sample as a whole, according to a paired *t* test of baseline and follow-up alcohol problems, $t(1452) = 3.59$, $p < .001$, Cohen's $d = -0.09$. We used an ANOVA to examine longitudinal changes in alcohol problems as a function of changes in relationship status. After sex and the main effects of relationship status at baseline and follow-up were controlled for, a significant Baseline × Follow-Up relationship-status interaction predicted changes in alcohol problems, $F(1, 1238) = 4.09$, $p = .04$, partial $\eta^2 = .04$. Post hoc univariate ANOVAs indicated that alcohol problems increased for those who were in an exclusive relationship at baseline but single at follow-up ($n = 135$; $M = 0.11$) and decreased slightly for those who were single at both baseline and follow-up ($n = 603$; $M = -0.04$); $F(1, 735) = 4.48$, $p = .03, .01$. Baseline and follow-up alcohol problems were not significantly different for those who were single at baseline but in an exclusive relationship at follow-up ($n = 150$; $M = 0.02$) or who were in an exclusive relationship at both baseline and follow-up ($n = 355$; $M = -0.06$); $F(1, 502) = 0.74$, $p = .39$. We also tested whether there were sex differences

in this effect using a three-way ANOVA. However, sex did not modify the Baseline × Follow-Up relationship-status interaction.

Discussion

The goal of the present study was to examine the interrelations among romantic-relationship status and alcohol use and problems in a sample of first-year college students for whom we had two time points of data—a baseline assessment at the beginning of the fall semester and a follow-up assessment during the spring semester. We note that the rates of alcohol use reported by participants in this sample closely mirror those from other large samples of college students in the United States: 70% of participants in the present study reported lifetime alcohol use at the baseline assessment, which maps onto the 72% of 18-year-olds who reported lifetime alcohol use in the Monitoring the Future Study (Johnston et al., 2010). Approximately 21% of the participants in the present study endorsed one or more alcohol-dependence criteria at baseline. This percentage is somewhat lower than the 28% of participants who endorsed one or more alcohol-dependence criteria in the College Alcohol Study (Knight et al., 2002), which may be because our study included only freshmen, whereas the College Alcohol Study included undergraduates at all class levels.

Romantic-relationship status during the first year of college was associated with alcohol use and problems at the follow-up assessment but not at the baseline assessment. This pattern of findings is consistent with theory and evi-

dence that romantic relationships become more developmentally salient during college (and emerging adulthood more generally) (Arnett, 2000). At follow-up, alcohol frequency, quantity, and problems were lower for singles and those in exclusive relationships compared with those dating several people. In contrast to other studies in college samples that only distinguish between single versus committed/exclusive relationship status (e.g., Bogg, 2011; Braithwaite et al., 2010; Whitton et al., 2013), singles did not differ from those in exclusive relationships in terms of alcohol frequency, quantity, or problems at follow-up. Our decision to separate out those who were dating several people from those who were single may explain this divergence and highlights the usefulness of considering nontraditional relationship statuses for understanding alcohol use in this age group (Pedersen et al., 2009).

We also found that alcohol problems increased for those who went from being in an exclusive relationship to being single. This is consistent with findings that relationship dissolution in emerging adults is associated with increases in substance use, including heavy drinking (Fleming et al., 2010b), and that divorce is associated with increases in alcohol use and problems in adults (Horwitz et al., 1996; Overbeek et al., 2006; Power et al., 1999). Although we are unable to establish the direction of causality for this association, our findings suggest that individuals experiencing relationship dissolution during the first year of college may be at an elevated risk for alcohol problems. We caution, however, that we observed only a small effect size for this effect. Thus, additional research is needed for a more complete understanding of the potential clinical utility of targeting alcohol prevention and intervention efforts for college students who have recently experienced a relationship dissolution.

Our results should be interpreted in the context of three main limitations. First, we relied on self-report measures; results may be different if independent sources of information—including data from partners—were available. Second, we did not explicitly examine "hooking up" (i.e., sexual contact without the expectation of commitment) as a relationship status, although recent findings suggest that this practice may be an important correlate of alcohol use during college (Fielder et al., 2013). Finally, we do not have information on cohabiting status for this sample and thus cannot add to the mixed literature on whether cohabiting status is a risk factor or protective factor for alcohol-related outcomes at this age (Fleming et al., 2010b; Horwitz and White, 1998).

In summary, we found that involvement in an exclusive romantic relationship was not associated with a protective profile of lower alcohol use or problems compared with being single during the first year of college. Instead, we found that those who are dating several people are likely to be at an elevated risk for higher levels of alcohol use or problems, although this effect emerges only during the latter half of the first year of college. Thus, there may be a potential

role for drinking-related preventive interventions targeting individuals with several dating partners. We also found that experiencing the dissolution of an exclusive relationship was associated with prospectively measured increases in alcohol problems. However, we note that the efficacy of targeting individuals who have experienced relationship dissolution for preventive intervention efforts may be limited because of the small effect size observed.

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