

# Romantic Relationship Status Changes and Substance Use Among 18- to 20-Year-Olds\*

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**ABSTRACT. Objective:** Changes in romantic relationship status are common in emerging adulthood and may be linked to changes in substance use. This study tested the hypothesis that entry into relationships or transitioning to a more committed status leads to decreases in substance use and that dissolution of relationships or transitioning to a less committed status results in increases in substance use. **Method:** Data were from a community sample of 939 individuals. Substance use (heavy drinking, marijuana use, and cigarette smoking) and relationship status (single, in a romantic relationship but not cohabiting, cohabiting, or married) were assessed at the beginning and end of three 6-month intervals between the ages of 18 and 20 years. Models were estimated to assess the association between transitions in relationship status and substance use, adjusting for prior levels of use. **Results:** There were increases in heavy drinking, marijuana use, and cigarette smoking asso-

ciated with dissolution of a romantic relationship, as well as increases in marijuana use and cigarette smoking associated with switching partners within a 6-month interval. Mediation analyses found some support for increases in both depressive symptoms and exposure to substance-using peers partially accounting for these associations. Decreases in substance use were not found for individuals entering into a new relationship or transitioning to a more committed relationship status. In fact, cigarette smoking increased among those who went from being single to being in a romantic relationship compared with those whose relationship status did not change. **Conclusions:** Emerging adults who experience dissolution of romantic relationships or quickly move from one relationship to another experience increased substance use. Both depressive symptoms and changes in peer environments may partially account for these changes in use. (*J. Stud. Alcohol Drugs*, 71, 847-856, 2010)

RATES OF HEAVY EPISODIC DRINKING, cigarette smoking, and marijuana use peak during the developmental period after high school and decline after about age 21 (Bachman et al., 1997; White et al., 2005, 2006, 2009). The period after high school, referred to as emerging adulthood, is characterized by heterogeneity and instability in romantic relationships that may influence substance use (Arnett, 2004; Bachman et al., 1997). Although the trend with increasing age is toward involvement in more committed relationships, it is common for emerging adults to move into and out of relationships with different partners, sometimes in fairly quick succession, before committing to marriage (Cohen et al., 2003; Foxman et al., 2006). Also, there are transitions in status within relationships, both toward more committed statuses (i.e., moving in with or getting married to a partner) or sometimes toward a less committed status (i.e., moving apart but not ending the relationship). The current study attempts to capture the complexity of this aspect of emerging adulthood and examine how transitions in ro-

matic relationship status are related to short-term changes in substance use during the period from approximately age 18 to age 20.

Prior research gives us clues as to what to expect to find. Numerous studies have found that entry into marriage is associated with reductions in substance use (Bachman et al., 1997; Horwitz et al., 1996; Labouvie, 1996; Leonard and Rothbard, 1999; Miller-Tutzauer et al., 1991; Temple et al., 1991). Studies have also shown that these changes are accompanied by other mental health benefits, such as lower levels of depression (Horwitz et al., 1996), as well as reductions in exposure to social environments (e.g., bars and social gatherings) where peer use and availability of substances is heightened (Bachman et al., 2002). Our prior study, using the same data set used in the current study, found that more committed relationship statuses had stronger protective effects across the transition from adolescence into emerging adulthood (Fleming et al., 2010). We thus hypothesized that, within the emerging-adulthood period, transitioning from being single to being in a relationship or from a less committed status to a more committed status (e.g., moving in with a boyfriend or girlfriend) would be associated with decreases in substance use. We note, however, that little research has been done on the short-term effects of entry into noncohabiting romantic relationships (i.e., “dating relationships”), and some earlier studies have found evidence that entry into cohabiting relationships increased substance use (Bachman et al., 1997; Horwitz and White, 1998).

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Research has consistently found that divorce is associated with increases in substance use, particularly alcohol use (Bachman et al., 1997; Temple et al., 1991). There is also extensive research showing that stressful life events are related to higher levels of substance use (e.g., King and Chassin, 2008), with some indices of stressful events including breakups of romantic relationships (e.g., Newcomb and Bentler, 1988). Studies of adolescents (Monroe et al., 1999) and adults (Maciejewski et al., 2001) indicate that breakups increase the risk for onset of depression. This finding suggests a possible link with substance use, given that depressive symptoms and substance use are commonly correlated (Degenhardt et al., 2003; Weinberg et al., 1998; White et al., 2001), possibly because substance use serves as a form of self-medication (Khantzian, 1985; Pandina et al., 1992). Also, as documented in work by Bachman et al. (2002), the effects of divorce on substance use are largely accounted for by increases in time spent in social gatherings where individuals are exposed to substance-using peers. We expect this mechanism (exposure to substance-using peers) to operate for individuals experiencing dissolution of dating or cohabiting relationships, which would similarly result in increases in substance use.

In emerging adulthood, breakups of nonmarital relationships are common. There is a gap in empirical research on whether breakups of nonmarital relationships are related to changes in substance use. Given the literature cited previously, we expected to find increases in substance use associated with breakups of romantic relationships. We again note, however, that some prior studies have found a heightened risk for substance use associated with cohabiting, and it may be that transitioning from cohabiting to being single or to a noncohabiting dating relationship may lead to reductions in substance use.

Another type of relationship transition that is common for emerging adults involves relatively quick changing of romantic partners (Foxman et al., 2006). At the beginning and end of a short time interval, an individual may be in a dating or a cohabiting relationship but with different people, a transition involving both the dissolution of the old relationship and the start of a new one. It is unclear whether the heightened risk resulting from ending the first relationship outweighs the potentially protective effect of starting the new relationship.

The current study used longitudinal data from a community panel as they experienced the 2 years after high school (ages 18-20). We first examined the prevalence of different relationship combinations across three 6-month intervals and then tested whether changes in relationship status were associated with changes in heavy drinking, marijuana use, and cigarette smoking. These analyses were done in two stages: first, attending to the specificity of different relationship statuses and, second, collapsing combinations of relationship statuses into categories consonant with our guiding hypotheses. As a secondary analysis, we considered mechanisms

that may account for associations between change in relationship status and change in substance use. Based on prior studies that have found relationship transitions associated with change in depressive symptoms and exposure to peer environments, we examined changes in these two variables as potentially mediating factors.

## Method

### *Design and sample*

Data were from the Raising Healthy Children project, a longitudinal study of social development as well as an experimental evaluation of an intervention to reduce drug use and other problem behaviors (Brown et al., 2005; Haggerty et al., 2006). Experimental condition was not significantly associated with the measures of substance use or relationship status considered in this study, nor with demographic variables (e.g., gender and race) or measures of socioeconomic status (e.g., family household income and parent education), and tests of interaction terms in the analysis models showed no evidence that associations between change in relationship status and substance use differed by intervention condition. We therefore combined data from participants in both conditions for the current study.

In 1993 and 1994, 1,040 students (76% of those eligible) from 10 suburban public elementary schools in a Pacific Northwest school district enrolled in the Raising Healthy Children project. At recruitment, 52% were in first grade and 48% were in second grade. Before baseline data collection, parents provided written consent for their children's participation. After age 18, the youths provided written consent for subsequent data collection. All procedures were approved by a university institutional review board.

Data were organized by age in the current study. Surveys have been completed annually every spring since the beginning of the project and at two additional fall time points in the age 18-20 time period (which for most participants was their first 2 years after high school). Data from the four time points (6 months apart) in this 2-year period (Fall 1 [F1], Spring 1 [S1], Fall 2 [F2], Spring 2 [S2]) were used and were the basis for studying relationship status and substance-use change across three 6-month intervals. We refer to these time points as "post-high school," although 18% of the sample had dropped out of school by the spring of what should have been their 12th-grade year, and 5% reported still being enrolled in high school at the first fall time point (F1). By S2, less than 1% was in high school.

To be included in the current study, participants had to have completed surveys for at least one set of adjacent time points in the study period. This excluded 101 participants who had dropped out of the study by the beginning of the post-high school period, leaving an analysis sample of 939. There were no significant ( $p < .05$ ) differences between

attriters and the analysis sample with respect to gender, ethnicity, experimental condition, or family low-income status at the beginning of the project. Of the 939 included in the sample, 823 (88%) had data on relationship status and substance use at the beginning and end of the first 6-month interval (from F1 to S1), 866 (92%) had complete data for the second interval (from S1 to F2), and 874 (93%) had data for the third interval (from F2 to S2). The analysis sample was 53% male. The ethnic/racial composition was 81% White, 5% Hispanic, 7% Asian or Pacific Islander, 4% Black, and 3% Native American. At F1, the average age was 18.69 years ( $SD = 0.34$ ). The percentage of students enrolled in college across the four post-high school time points ranged from 44% at F1 to 38% at S2. Sixty percent were living with their parents at F1, dropping to slightly below 48% at later time points. An increasing percentage of the sample was employed, ranging from 62% at F1 to 76% at S2. Also, a small percentage became parents, with 2% living with a child of their own at F1 and 5% at S2.

### Measures

At each of the four post-high school time points, participants reported on their substance use in the prior month. Heavy drinking was defined as four or more drinks in a row for women and five or more for men (Wechsler et al., 2000). Frequency of heavy drinking and marijuana use were reported on a 7-point scale (ranging from 1 = *never* to 7 = *more than 40 times*). Smoking was assessed as the number of cigarettes smoked daily (from 1 = *none* to 7 = *two packs or more per day*). For the older grade cohort, the item regarding smoking quantity was not asked at F1, resulting in missing smoking data on the first interval in the post-high school time period for these participants. The response options for each type of substance use were collapsed because of sparse frequencies for some response categories. Heavy drinking was collapsed as 1 = none, 2 = one or two times, 3 = three to five times, and 4 = six or more times. Frequency of marijuana use was collapsed as 1 = none, 2 = 1-9 times, and 3 = 10 or more times. Daily cigarette smoking was collapsed as 1 = none, 2 = less than six cigarettes, and 3 = about half a pack a day or more.

At each post-high school time point, participants reported on their marital status, their relationships with the people with whom they lived, and whether they had "a boyfriend or girlfriend." Based on this information, relationship status at each time point was divided into single, dating, cohabiting, and married. A dating relationship was defined as having a boyfriend or girlfriend but not living with that person. Based on these categories, for each interval there were 16 possible combinations of relationship status between two time points (what we refer to as T1 and T2, based on either F1 and S1, S1 and F2, or F2 and S2). In addition, we determined if individuals who were in a romantic relationship at both time

points had a different partner at the second time point (T2) than they had at the first (T1). This was based on information participants provided at T2 on length of their relationship as well as the exact number of days between T1 and T2 (based on the interview dates). There were an additional nine possible combinations for individuals who were in a relationship at both time points but with different partners. As shown later, some combinations were rare or not represented at all (e.g., married to different partners at two adjacent time points).

A measure of depressive symptoms, derived from the short form of the Hamilton Depression Inventory (Reynolds and Kobak, 1995), was based on the presence and severity of nine depressive symptoms, with the time frame for items being either the prior 2 weeks or current symptoms. The measure had a range from 0 to 30. Across the four time points, the mean ranged from 3.43 to 4.25 ( $SD = 3.78$  to 4.07, skewness = 1.56 to 1.76, kurtosis = 3.16 to 4.08, Chronbach's  $\alpha = .83$  to .84).

At the fall time points, participants were asked how often the 5-10 people they hang out with most "get drunk" and "use marijuana," with response options ranging from 1 = *never* to 5 = *very often*. At the spring time points, respondents were asked if each of their three best friends "got drunk" and "used marijuana or another illegal drug" in the prior year. Based on these items, the proportion of close friends who got drunk and who used marijuana or other illegal drugs (presumably primarily marijuana) was computed. *Z* scores were computed for both the fall and spring measures to create measures of peer heavy drinking and peer marijuana use, with consistent metrics across time points (peer heavy drinking skewness = -0.56 to 0.21 and kurtosis = -1.13 to -1.00; peer marijuana use skewness = 0.47 to 0.81 and kurtosis = -1.23 to -0.98).

Gender, coded 1 for male and 0 for female, was included as a covariate in the primary analysis models, as well as being tested as a potential moderator of the association between changes in substance use and relationship status. In auxiliary analyses we included a covariate to represent the sequence of the three 6-month intervals (coded 0, 1, 2) and capture potential age differences in growth in substance use across the age 18-20 time period. This covariate was not significantly related to substance use, reflecting that mean levels of use for the sample remained fairly stable during this study period (see Fleming et al., 2010). Also, including this covariate did not change estimates for the relationships tested. Therefore, we chose to omit this covariate from the models presented here. In auxiliary analyses we also included controls for life circumstances (i.e., educational status, residential status, parenthood, and employment status; see Fleming et al., 2010). Although these controls were related to levels of use and overlapped with relationship status (e.g., living with parents was related to less substance use and people in cohabiting or married relationships were less likely to be

living with their parents), they did not have strong relationships with within-individual change in substance use during this time period. Because inclusion of these controls did not change the results, we chose to omit these controls from the models presented.

### Analysis

We examined the prevalence of the 25 relationship combinations for 2,563 intervals for the 939 individuals. Contrasts between different relationship combinations with respect to change in substance use were assessed using multilevel models, estimated with HLM 6.0 (Raudenbush et al., 2004), in which intervals were nested within individuals. Some individuals lacked data for one or two intervals and some models were run only on cases of intervals that shared the same relationship status at the starting point. Thus, there were often fewer than three intervals present for each individual. This pattern of data, however, is accommodated by the multilevel modeling strategy (Raudenbush et al., 2004).

In these models, measures of substance use at the end of 6-month intervals (T2) were the dependent variables, treated as ordered categorical distributions with a cumulative probability model (Raudenbush and Bryk, 2002). The general form of these models is:

Level 1 model:  $Y' = \beta_0 + \beta_1 \times (\text{T1 sub.}) + \beta_{2-k} \times (\text{rel. comb.})$

Level 2 model:  $\beta_0 = \gamma_{00} + \gamma_{01} \times (\text{gender}) + u_0$

$\beta_1 = \gamma_{10}$

$\beta_{2-k} = \gamma_{(2-k)0}$

where  $\gamma_{(2-k)0}$  are the effects of relationship transitions on T2 substance use ( $Y'$ , the latent response variable for substance use treated as an ordered categorical variable), adjusting for the effects of gender ( $\gamma_{01}$ ), the random effects for individuals ( $u_0$ ), and prior use of the given type of substance ( $\gamma_{10}$ ) (sub. = substance use; rel. comb. = relationship combination dummy variables). Both gender and substance use at T1 were grand-mean centered so that the model intercept represents sample mean probabilities for the relationship combination reference category.

The first set of analyses included nine models that attended to heterogeneity of specific transitions. In this set of analyses, separate models were run for person-intervals where individuals were single, dating, or cohabiting at the first time point and estimated the effect of status transitions on each type of substance use, with those who remained in the initial status as the reference category. These models used specific relationship combinations that were populated by at least 25 person-intervals. Because few individuals transitioned out of marriage, contrasts with remaining married were not examined.

A second set of three models used all available person-intervals and combined relationship combinations into six

types consistent with research questions concerning the effects of entering or exiting a relationship, transitioning to a more or less committed status, or switching partners. The six types were (a) stable (same status at T1 and T2), (b) started relationship (from single to either dating, cohabiting, or married), (c) more committed relationship (from dating to cohabiting or married, or from cohabiting to married), (d) ended relationship (from any type of relationship to being single), (e) less committed relationship (from cohabiting to dating), and (f) switched partners (in a relationship at both time points but with a different partner). The models were estimated with the stable category as the reference category and thus compared the change in substance use for five different types of relationship transitions with the change in substance use among those whose relationship status remained unchanged across time points.

Tests for mechanisms that may account for associations between relationship transitions and change in substance use were done in two steps. First, using all person-intervals and the six categories of relationship combination types described above, multilevel models tested whether relationship transitions predicted depressive symptoms, peer heavy drinking, and peer marijuana use, adjusting for measures of these variables 6 months earlier and again contrasting individuals experiencing a change in status with those whose relationship status did not change. In the second step, change scores (T2 minus T1 score) for the potentially mediating variables, as well as covariates for the level of these variables at T1 (to adjust for ceiling and floor effects and regression to the mean), were added to models predicting change in substance use. The information from these two sets of models provided a test of mediation consistent with the criteria of joint significance (MacKinnon et al., 2002), that is, whether relationship status change was associated with a change in the potentially mediating variables and whether, in turn, a change in the mediating variables was associated with a change in substance use. Because there was no measure of peer cigarette smoking, mediation analyses for changes in cigarette smoking were confined to examining depressive symptoms as a potential mediator.

## Results

### Relationship status combinations

The frequency distributions for the 25 possible relationship combinations are shown by gender in Table 1. All combinations involving moving into or out of marriage had few or no cases, and there were only a small number of instances of cohabiting with two different persons within one interval. There were, however, 48 instances where individuals were in a dating relationship at the beginning and end of an interval but had switched partners. There were some gender differ-

TABLE 1. Prevalence of relationship combination types by gender among all intervals of data in the analysis sample

Variable	Female (n = 1,190) n (%) <sup>a</sup>	Male (n = 1,373) n (%) <sup>a</sup>
Single to		
Single	314 (26)	665 (48)
Dating	112 (9)	142 (10)
Cohabiting	24 (2)	22 (2)
Married	1 (<1)	1 (<1)
Dating to		
Single	92 (8)	130 (10)
Dating	278 (23)	227 (17)
Cohabiting	71 (6)	48 (4)
Married	12 (1)	3 (<1)
Dating new partner	31 (3)	17 (1)
Cohabiting w/new partner	7 (1)	2 (0)
Married to new partner	0 (0)	0 (0)
Cohabiting to		
Single	15 (1)	14 (1)
Dating	40 (3)	22 (2)
Cohabiting	121 (10)	67 (5)
Married	8 (1)	1 (<1)
Dating new partner	10 (1)	2 (<1)
Cohabiting w/new partner	2 (<1)	1 (<1)
Married new partner	0 (0)	0 (0)
Married to		
Single	0 (0)	2 (<1)
Dating	0 (0)	0 (0)
Cohabiting	0 (0)	0 (0)
Married	51 (4)	7 (1)
Dating new partner	0 (0)	0 (0)
Cohabiting w/new partner	1 (<1)	0 (0)
Married to new partner	0 (0)	0 (0)

<sup>a</sup>Percentages are of the total person-intervals for a given gender.

ences across transitions. For instance, men were more likely than women to be in the stable single category (odds ratio [OR] = 3.3, *p* < .01).

*Relationship status transitions and change in substance use*

For descriptive representation of substance-use patterns, we converted categories to the midpoint number of times for heavy drinking and marijuana use and number of cigarettes per day. Table 2 displays means for each type of substance use at T1 and T2 for the 11 relationship combinations that were populated by at least 25 cases. Although combinations varied considerably in levels of use at both T1 and T2, the focus of the current study is on change from T1 to T2. All of the stable combinations (i.e., where T1 and T2 statuses were the same) displayed little mean change in substance use across time points. No combination had a clear decrease in any type of substance use, but each type of substance use appeared to increase from T1 to T2 for “dating to single” cases, and heavy drinking and marijuana use increased considerably for the small number of “cohabiting to single” cases.

Table 3 shows the estimates for models of relationship transitions and change in substance use. The model coefficients are in logit units and can be converted to ORs that represent the relative odds of being in the next higher category of substance use. For example, an OR of 2 for a given contrast indicates that individuals from one relationship combination have twice the chance of being in the next higher category of substance use than individuals in the reference category.

For individuals who were single at T1, the only significant effect of relationship transition was for entering into a dating relationship on cigarette smoking. The OR indicates that individuals who went from being single to being in a dating relationship were 1.6 times more likely to report a higher category of smoking than those who stayed single. This effect was partially a result of adjusting for gender, because

TABLE 2. Descriptive information on past-month substance use before and at the end of 6-month intervals for the 11 most common relationship combinations

Variable	Heavy drinking episodes		Times used marijuana		No. of cigarettes per day <sup>a</sup>	
	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>
Single to						
Single ( <i>n</i> = 979)	1.68 (2.72)	1.68 (2.70)	2.33 (4.27)	2.38 (4.36)	2.61 (5.10)	2.70 (5.17)
Dating ( <i>n</i> = 254)	2.54 (3.13)	2.32 (3.05)	2.89 (4.55)	2.48 (4.31)	3.22 (5.37)	3.71 (5.79)
Cohabiting ( <i>n</i> = 46)	3.00 (3.14)	2.72 (3.51)	5.04 (5.77)	4.65 (5.63)	7.76 (7.22)	6.22 (6.85)
Dating to						
Single ( <i>n</i> = 222)	2.20 (2.97)	2.58 (3.13)	2.65 (4.13)	3.33 (4.65)	3.91 (5.80)	4.41 (5.98)
Dating ( <i>n</i> = 505)	2.01 (2.82)	1.82 (2.66)	2.18 (4.13)	1.95 (3.93)	2.22 (4.65)	2.30 (4.77)
Cohabiting ( <i>n</i> = 119)	1.28 (2.19)	1.72 (2.71)	2.78 (4.61)	2.64 (4.74)	3.73 (6.01)	3.93 (6.22)
Dating new partner ( <i>n</i> = 48)	2.40 (2.82)	2.32 (2.90)	1.75 (3.52)	2.60 (4.18)	3.16 (5.36)	3.16 (5.36)
Cohabiting to						
Single ( <i>n</i> = 29)	1.24 (2.18)	2.90 (3.20)	4.52 (5.32)	5.59 (5.48)	6.92 (7.14)	6.69 (6.80)
Dating ( <i>n</i> = 62)	2.00 (3.06)	1.22 (2.05)	2.89 (5.32)	3.02 (5.48)	6.93 (7.16)	6.83 (7.24)
Cohabiting ( <i>n</i> = 188)	1.61 (2.66)	1.33 (2.32)	2.66 (4.45)	2.70 (4.63)	4.81 (6.60)	4.93 (6.62)
Married to						
Married ( <i>n</i> = 58)	0.84 (2.14)	0.97 (2.37)	0.34 (1.29)	0.26 (1.12)	2.62 (5.26)	1.78 (4.38)

Notes: Time 1 = prior to 6-month interval; Time 2 = end of 6-month interval. <sup>a</sup>Data on smoking not available at the first interval for the older cohort in the sample. Thus, means for smoking are based on approximately 12% fewer person-intervals than means for other types of substance use.

TABLE 3. Estimates for models of the associations between relationship status transitions and change in substance use

Effect	Heavy drinking Coefficient (SE)	Marijuana use Coefficient (SE)	Cigarette smoking Coefficient (SE)
Models for cases with shared status at T1			
Single at T1 <sup>a</sup>			
Intercept	-2.41** (0.11)	-2.94** (0.14)	-3.33* (0.19)
Male	0.18 (0.12)	0.39** (0.15)	0.49** (0.16)
T1 use	1.14** (0.07)	2.31* (0.13)	3.18** (0.17)
To dating	0.17 (0.15)	-0.04 (0.19)	0.45* (0.19)
To cohabiting	0.03 (0.34)	0.29 (0.37)	0.16 (0.59)
Dating at T1 <sup>b</sup>			
Intercept	-2.47** (0.13)	-3.12** (0.17)	-3.24 (0.22)
Male	-0.06 (0.13)	-0.02 (0.17)	0.07 (0.17)
T1 use	1.10** (0.07)	2.06** (0.14)	2.94** (0.20)
To single	0.50** (0.16)	0.84** (0.19)	0.68** (0.22)
To cohabiting	0.24 (0.22)	0.22 (0.25)	0.21 (0.29)
Dating new partner	0.29 (0.31)	0.83* (0.37)	0.35 (0.41)
Cohabiting at T1 <sup>c</sup>			
Intercept	-3.45** (0.33)	-2.81** (0.32)	-1.59** (0.27)
Male	-0.17 (0.29)	-0.05 (0.31)	0.27 (0.34)
T1 use	1.15** (0.15)	2.33** (0.26)	2.84** (0.28)
To single	1.78** (0.43)	0.99* (0.48)	0.21 (0.70)
To dating	-0.10 (0.34)	0.30 (0.31)	0.14 (0.37)
Combined models <sup>d</sup>			
Intercept	-2.21** (0.08)	-2.97** (0.11)	-3.01** (0.13)
Male	0.05 (0.08)	0.22* (0.09)	0.30** (0.10)
T1 use	1.11** (0.05)	2.22** (0.10)	3.00** (0.12)
Started relationship	0.16 (0.13)	0.07 (0.16)	0.38* (0.18)
More committed	0.22 (0.19)	0.01 (0.24)	0.15 (0.26)
Ended relationship	0.66** (0.13)	0.71** (0.16)	0.56** (0.19)
Less committed	-0.33 (0.29)	0.41 (0.25)	0.53 (0.34)
Switched partners	0.45 (0.25)	1.06** (0.30)	0.77* (0.30)

Notes: T1: Prior to interval. <sup>a</sup>*n* = 1,277 intervals for 615 individuals; <sup>b</sup>*n* = 894 intervals for 517 individuals; <sup>c</sup>*n* = 279 intervals for 188 individuals; <sup>d</sup>*n* = 2,563 intervals for 939 individuals.

\**p* < .05; \*\**p* < .01.

men were more likely to increase their cigarette smoking (as well as their marijuana use) and were relatively less likely to change from single to a dating relationship compared with women (Table 1).

Among those in a dating relationship at T1, each type of substance use significantly increased for individuals who went from dating to being single compared with individuals who remained in a dating relationship. The ORs for increases in substance use linked to breaking up with a dating partner were 1.7 for heavy drinking and 2.0 for both marijuana use and cigarette smoking. Switching dating partners also had a significant positive association with marijuana use (OR = 2.3). Moving into a cohabiting relationship was not significantly associated with a change in substance use. For those who started out cohabiting, breaking up with a cohabiting partner was positively associated with increases in heavy drinking (OR = 5.9) and marijuana use (OR = 2.7) compared with remaining in a stable cohabiting relationship.

The results for the models in which all person-intervals were used and relationship combination types were collapsed into six categories mirror the results for the more specific models. Increases were found in each type of substance use

for ending a relationship (OR = 1.9 for heavy drinking, 2.0 for marijuana use, and 1.8 for cigarette smoking). Switching partners was related to an increase in marijuana use (OR = 2.9) and cigarette smoking (OR = 2.2). As shown for transitions from being single to dating, there was also a significant increase in cigarette smoking among individuals who transitioned from being single to being in any type of relationship compared with those who remained in the same relationship status. Transitions between being in less and more committed relationship statuses, in either direction, were not related to increases or decreases in substance use relative to stable relationship status. As an illustration of changes in substance use for different types of transitions, Figure 1 shows the change in mean frequency of marijuana use between T1 and T2 for individuals who ended relationships, who switched partners, and who stayed in the same status with the same partner.

We added cross-level interaction terms between gender and relationship combination types to the models of change in substance use that used all person-intervals. None of the interaction effects was significant at the *p* < .05 level; thus, the associations between relationship status change and change in substance use did not differ by gender.

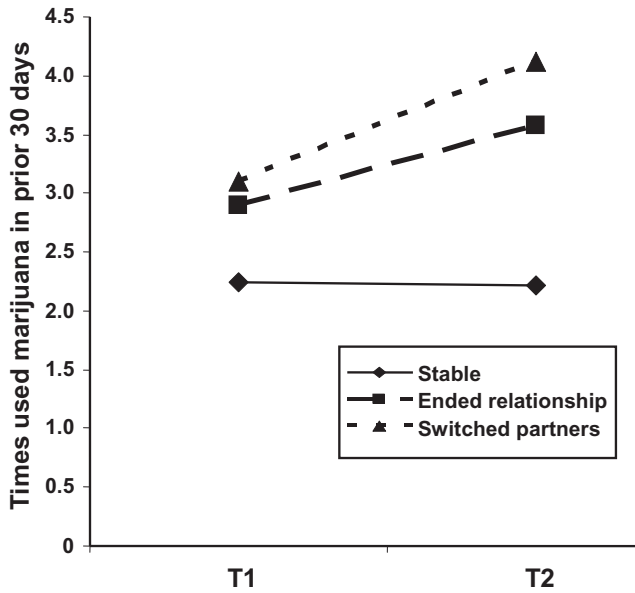


FIGURE 1. Change in mean frequency of marijuana use by type of relationship transition. T1 = before interval; T2 = end of interval.

Mediation analysis

The results for tests of potential mechanisms are shown in Table 4 and provide some support for increases in depressive symptoms and increases in exposure to peer substance use as mediating variables that partially account for the positive associations between change in substance use and both relationship dissolution and switching partners. Ending a relationship was related to increases in depressive symptoms, peer heavy drinking, and peer marijuana use compared with remaining in the same relationship status. Also, switching partners, compared with stability in relationship status, was related to increases in both types of peer substance use. In

the second step in the mediation models, increases in depressive symptoms were significantly related to increases in marijuana use and cigarette smoking, and exposure to more substance-using peers was related to increases in heavy drinking and marijuana use. The coefficients for the effects of relationship dissolution on each type of substance use and for switching partners on marijuana use and cigarette smoking were diminished slightly compared with models without the mediating mechanisms added. However, the estimated effects of these types of relationship transitions were still statistically significant at the  $p < .05$  level, with the exception of the effect of switching partners on change in marijuana use.

Discussion

During the ages of 18 to 20, almost half of the sample were in dating relationships or living with a partner, and many moved into and out of dating and cohabiting relationships. This heterogeneity and amount of change is consistent with the research on emerging adulthood that focuses on sexual partnering (Foxman et al., 2006), romantic relationship status (Scott et al., 2009), and transitions to adulthood (Cohen et al., 2003).

We hypothesized that transitioning from being single to being in a relationship or transitioning to a more committed relationship status would be associated with reductions in substance use. None of these types of transitions showed statistically significant relationships with either heavy drinking or marijuana use when contrasted with stability in relationship status. However, group sizes for the transitions to more committed relationship statuses were small. For example, only 26 individuals got married during the period examined in the study, and thus the power to detect an effect of this transition was low. It may also be that protective effects of

TABLE 4. Estimates for models testing mediation by change in depressive symptoms and change in peer heavy drinking and peer marijuana use

Effect	Depression Coeff. (SE)	Peer heavy drinking Coeff. (SE)	Peer marijuana use Coeff. (SE)	Heavy drinking Coeff. (SE)	Marijuana use Coeff. (SE)	Cigarette smoking Coeff. (SE)
Intercept	3.52** (0.07)	-0.03 (0.02)	-0.03 (0.02)	-2.75** (0.09)	-3.38** (0.12)	-3.02** (0.13)
Male	-0.64** (0.12)	0.03 (0.04)	0.10** (0.03)	0.09 (0.09)	1.67** (0.09)	0.37** (0.11)
T1 control <sup>a</sup>	0.57** (0.03)	0.37** (0.02)	0.46** (0.02)	0.84** (0.05)	1.68** (0.09)	3.00** (0.12)
Started relationship	0.00 (0.20)	0.06 (0.05)	0.01 (0.06)	0.08 (0.14)	0.08 (0.17)	0.35* (0.18)
More committed	0.52 (0.34)	0.05 (0.09)	-0.04 (0.09)	0.19 (0.21)	0.19 (0.25)	0.17 (0.27)
Ended relationship	0.68** (0.23)	0.18** (0.06)	0.20** (0.06)	0.60** (0.14)	0.51** (0.17)	0.55** (0.19)
Less committed	-0.05 (0.46)	0.04 (0.11)	0.16 (0.10)	-0.22 (0.26)	0.35 (0.35)	0.49 (0.34)
Switched partners	0.30 (0.35)	0.28** (0.11)	0.45** (0.12)	0.32 (0.25)	0.57 (0.30)	0.76* (0.30)
Prior depression				0.01 (0.01)	0.03* (0.02)	0.05** (0.01)
Change in depression				0.00 (0.01)	0.04* (0.02)	0.06** (0.02)
Prior peer use				1.05** (0.06)	1.19** (0.08)	-
Change in peer use				0.71** (0.06)	1.05** (0.06)	-

Notes: Coeff. = coefficient.  $n = 2,563$  intervals for 939 individuals. <sup>a</sup>The dependent variable for the given model measured at the prior to the 6-month interval. \* $p < .05$ ; \*\* $p < .01$ .

transitioning to a more committed relationship status and adoption of this aspect of adulthood unfold over a longer period; thus, our focus on change between ages 18 and 20 may not reflect changes later in young adulthood.

Unexpectedly, we found that, after adjusting for gender, individuals who transitioned from single to dating increased in their cigarette smoking compared with those who stayed single and that this effect was seen in the broader comparison of transitions from being single to any type of relationship compared with experiencing no transition. This phenomenon may be the result of starting relationships with partners who themselves smoke, which, at least in the short term, outweighs the protective effects of entering a relationship. Several studies have identified both socialization and selection effects of partners' substance use (Rhule-Louie and McMahon, 2007). Future research on short- and long-term relationship transitions would be strengthened by including an examination of the role of partner use.

We found support for the hypothesis that dissolution of romantic relationships is related to increases in substance use. Those who transitioned from dating relationships to being single increased their heavy drinking, marijuana use, and cigarette smoking compared with those who remained in stable dating relationships. Although there were only 29 cases of individuals ending cohabiting relationships, these cases significantly increased their heavy drinking and marijuana use compared with those who remained in stable cohabiting relationships. Thus, despite selection of high substance users into the cohabiting status and prior research that has found cohabiting to be linked to increases in substance use (e.g., Bachman et al., 1997), we found that leaving, rather than entering, cohabiting relationships was associated with substance-use increases. The similar results for ending dating and cohabiting relationships were reflected in the broader contrast of dissolution of any type of relationship with relationship stability. Although divorce leading to increases in substance use is well documented (Bachman et al., 1997; Temple et al., 1991), we know of no other prospective longitudinal study that focused on the emerging-adulthood period and documented increases in substance use associated with dissolution of nonmarital romantic relationships.

Because changing partners involves both a breakup and the start of new relationship, we were unsure how this type of transition would be related to changes in substance use. We found that changing dating partners was related to increases in marijuana use compared with staying in a dating relationship with the same partner and that the broader category of changing partners (regardless of whether they were dating or cohabiting partners) was significantly associated with increases in marijuana use and cigarette smoking compared with relationship stability. These findings may be related to a more general pattern for some individuals of instability, experimentation, and risk taking that underlies increasing substance use during this time period, as well as

exploration of multiple relationships (Arnett, 2005). Future research should examine the extent to which these associations are accounted for by differences in temperament, for example, as captured by measures of sensation seeking.

Our exploration of two mechanisms that may account for the associations between relationship transitions and increases in substance use showed evidence of partial mediation. The results support the idea that young people may use more substances to ease the depressive symptoms caused by relationship dissolution, as well as because they spend more time with substance-using peers. The mediation tests, however, were secondary analyses and should be interpreted with caution. The relationships between substance use and both depressive symptoms and peer substance use are no doubt reciprocal (Schuckit, 2006; White et al., 2008), and our models do not tease apart the directionality of these relationships. Also, the measures of exposure to peer substance use were limited because of inconsistent measures across time points, no measure of exposure to peer cigarette smoking, and lack of specificity about marijuana use. Further, unlike Bachman et al. (2002), we lacked information on whether individuals spent evenings out at bars or social gatherings where they would have opportunities to use substances.

Other limitations should be noted. Switching partners within a given interval was not assessed directly; rather, this was determined based on relationship length, which may not always be accurate given the possibility of breaking up with and then getting back together with the same partner. The timing of relationship transitions was also not precisely measured, in that changes could have occurred any time within the 6-month intervals. It may be that increases in substance use occurred before, and perhaps contributed to, the end of a romantic relationship or the transition from one relationship to another. Further, we relied on substance use within the prior month and may have missed short-term changes in substance use that occurred early in a given 6-month interval. Our study did not examine the effects of pregnancies. Becoming pregnant ( $n = 52$ ) occurred in approximately 4% of the female time intervals and 2% of the total intervals used in the study. It is also likely that an additional, small number of women were trying to get pregnant. Nonterminated pregnancies or attempting to conceive may have led to decreases in use among some women, who were most likely in the stable cohabiting and stable married relationship combinations (see Bachman et al., 2002). Finally, although the study provides a needed focus on the period of emerging adulthood after high school when rates of substance use peak (Bachman et al., 1997), the results may be specific to this early period of emerging adulthood. Most of the transitions in relationship status that took place in our data were in and out of dating relationships. Although the results for the breakup of cohabiting and dating relationships were similar and support grouping these transitions together, the findings for models that combined relationship combinations into



broader categories are driven by the results for transitions in and out of dating. As noted above, the early emerging-adulthood time period limited our power to test for the effects of getting married, because only a small number of early marriages were represented in our data.

This study distinguished among romantic relationship types in emerging adulthood and captured the short-term instability in relationship statuses that characterize this developmental period. We found that breakups of romantic relationships were linked to increases in heavy drinking, marijuana use, and cigarette use and that switching from one partner to another during a 6-month interval was related to increases in marijuana and cigarette use. Future research is needed to see whether these increases, as well as increases in depressive symptoms, are temporary or are maintained and lead to long-term problems in adult functioning.

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