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Changes in Drug Use During Young Adulthood: The Effects of Parent Alcoholism and Transition Into Marriage

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The present study examined the changes in drug use during the transition from emerging adulthood into young adulthood among a community sample of children of alcoholics (COAs) and demographically matched non-COAs. Consistent with national data, the non-COAs significantly decreased their drug use during this time, but the COAs did not significantly decrease their use. On the basis of role compatibility theory, the authors next examined whether marital status mediated or moderated this difference between COAs and non-COAs in linear drug use growth trajectories. In support of mediation, the authors found that COAs were significantly less likely than non-COAs to be currently married and that, for male participants, marriage was significantly associated with greater decreases in drug use during the mid to late 20s.

Keywords: parent alcoholism, young adult drug use, transition into marriage, role compatibility

Illicit drug use has been shown to have systemic relations with age. In particular, peak use occurs during emerging adulthood (ages 18–25; Arnett, 2000) and declines after the mid 20s, with cessation of drug use typically occurring before age 30 (Bachman et al., 2002; Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997; Chen & Kandel, 1995). However, there are substantial individual differences in the course of drug use during young adulthood, with some individuals stopping use by age 30 (i.e., developmentally limited drug use), others declining but not stopping, and still others actually increasing their drug use during young adulthood. Thus, it is crucial to identify factors that explain this heterogeneity in drug use changes during emerging and young adulthood.

Parental alcoholism has been identified as an important risk factor for escalated use of both alcohol and drugs during young adulthood (see Harter, 2000, for a review). In particular, parental alcoholism has been associated both with an early onset of drinking (Chassin, Pitts, & Prost, 2002; Dawson, 2000) and with trajectories of persistent alcohol use disorders (Jackson, Sher, & Wood, 2000). However, compared with alcohol use, much less is known about the developmental course of drug use among children of alcoholics (COAs) relative to non-COAs. Chassin, Flora, and King (2004) found that a latent class of heavy drug and alcohol users were a distinct risk group from those with heavy alcohol use alone. Although both groups were overrepresented with COAs, the heavy drug use class also showed unique elevations in behavioral undercontrol. Because the heavy drug-using group had a distinct risk profile and because drug use is relatively unstudied among COAs, the present article focuses on trajectories of illegal drug use among COAs compared with non-COAs.

The onset of adult roles (e.g., marriage, parenthood, full-time employment) has been frequently examined as an important predictor of declines in substance use, and role compatibility theory may provide an explanation for potential differences in young adult drug use trajectories among COAs relative to non-COAs. Role compatibility theory posits that two basic processes underlie the relation between substance use and social roles (Yamaguchi & Kandel, 1985a, 1985b). The first, *role selection*, is the process by which preexisting substance use is related to later conventional role occupancy. For example, drug use may cause impairments that prevent later role transitions, or adolescent drug users may have certain characteristics, such as high rebelliousness, low educational aspirations or achievement, or low socioeconomic status, that hinder adult role acquisitions. The second process, *role socialization*, suggests that social conditions and obligations associated with role occupancy affect substance use. Role socialization is likely to decrease substance use when such use is nonnormative, decreases role performance or satisfaction, or is ineffective at reducing role strain. In general, role socialization predicts decreases in substance use when use is incompatible with the role (i.e., *role incompatibility*). Conversely, role socialization may also predict increases in substance use when use is normative within the context of the role, enhances role performance, or reduces role-associated stress.

The transition into marriage represents one type of adult role acquisition that has been strongly associated with subsequent decreases in substance use in normative populations. In particular, several longitudinal studies have established the link between marriage and subsequent decreases in alcohol use (e.g., Bachman et al., 1997; Curran, Muthén, & Harford, 1998; Temple et al., 1991). Fewer studies have examined the relation between adult role acquisitions and illicit drug use, although there is evidence that marriage also predicts declines in drug use (Bachman et al.,

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1997; Kandel, Simcha-Fagan, & Davies, 1986; Yamaguchi, 1990; Yamaguchi & Kandel, 1985b, 1993). Although Bachman et al. reported that parenthood and entrance into the workforce are also related to declines in drug use, these effects were not as strong as the relation between marriage and decreasing drug use, which suggests that marriage may be one adult role with which substance use is especially incompatible. Accordingly, in the present study we focus on the relation between marriage and drug use trajectories.

Differences in marital roles may help to explain the effect of parent alcoholism on drug use trajectories in that COAs may be less likely to enter and maintain normative adult roles, such as marriage, that predict declines in substance use. For instance, Larson and Thayne (1998) found that COAs aged 18–25 were more negative in their opinions and feelings about marriage, perceived themselves as being less ready for marriage, and wanted a significantly longer waiting period before marriage relative to non-COAs. Reflective of these attitudes, analysis of a large, nationally representative sample by Watt (2002) found that adult COAs were significantly less likely to be currently married than were non-COAs (also see Black, Bucky, & Wilder-Padilla, 1986). A seemingly conflicting finding from Dawson, Grant, and Harford (1992) with a different nationally representative sample was that COAs were more likely to marry than non-COAs. However, the Watt study compared adult COAs with non-COAs on whether they were currently married, whereas Dawson et al. compared adult COAs with non-COAs on whether they had ever been married. This is a crucial distinction given the consistent finding that COAs are more likely than non-COAs to divorce (e.g., Harter, 2000; Watt, 2002). Further, socialization effects that are associated with substance use decreases derive from *current* occupancy of the role, with its norms and obligations. Accordingly, in the present study, we compare currently married participants with all others. Therefore, role selection and socialization mechanisms may decrease the likelihood that COAs successfully transition into marriage and remain married, thus decreasing the likelihood of normative substance use declines among COAs. These processes suggest that marital status may mediate the relation between parent alcoholism and young adult trajectories of drug use.

Furthermore, even if COAs do successfully marry, the role socialization mechanisms that predict declines in substance use in normative populations may have weaker effects among COAs. That is, parental alcoholism may moderate the association between role attainment and drug use trajectories. For example, studies suggest that adult COAs may be more likely than non-COAs to have a substance-abusing spouse (Schuckit, Tipp, & Kelner, 1994; Watt, 2002) as well as a poorer spousal relationship and greater numbers of marriages and divorces (see Harter, 2000). These findings combine to suggest that, for COAs, marriage is less likely to provide a social environment that discourages substance use than for non-COAs. Hence, parental alcoholism may moderate the relation between marriage and decreasing drug use such that COAs may be less likely than non-COAs to decrease drug use following marriage.

In the present study, we use latent growth modeling (e.g., Meredith & Tisak, 1990; Willett & Sayer, 1994) to examine the longitudinal course of drug use from emerging adulthood (i.e., ages 17–20) into young adulthood (i.e., ages 25–30) across a sample of COAs and demographically matched controls. Thus, we examine drug use trajectories beginning at the typical ages for peak levels of drug use to the ages at which drug use is expected to decline in normative samples. We hypothesize that, compared with controls, COAs will have a less steep decline in drug use (i.e., a less negative latent slope factor mean), leading to a higher average level of drug use in young adulthood (i.e., a greater latent intercept, or status, factor mean at ages 25–30). Next, we assess whether marriage is related to drug use trajectories. Consistent with previous literature, we hypothesize that being married will be associated with greater decreases in drug use and that marriage will prospectively predict lower levels of drug use during young adulthood (i.e., ages 25–30). Finally, we also assess whether marriage mediates or moderates the relation between parent alcoholism and young adult drug use trajectories. With respect to mediation, we test whether COAs have smaller declines in drug use during the 20s and a subsequently higher average level of young adulthood drug use because they are less likely to marry. In terms of moderation, we test whether the effect of marriage on drug use trajectories is weaker for COAs.

Finally, this study also offers several methodological advantages in addition to the use of longitudinal data. These include use of a community-based sample (rather than school-based samples or college samples, which might underrepresent high-risk individuals) and direct diagnosis of parent alcoholism and other psychopathology (rather than relying on offspring report). Thus, we are able to test reliably the unique effects of parent alcoholism over other parent psychopathology.

Method

Participants

Participants were from an ongoing study of parental alcoholism (Chassin, Curran, Hussong, & Colder, 1996; Chassin, Pillow, Curran, Molina, & Barrera, 1993; Chassin, Rogosch, & Barrera, 1991). At Measurement Wave 1, there were 454 adolescents (M age = 13.22 years, range = 10.5–15.5), of whom 246 had at least one biological alcoholic parent who was also a custodial parent (COAs) and 208 were demographically matched adolescents with no biological or custodial alcoholic parents (controls). There were three annual assessments (Wave 1–Wave 3) of the adolescents and their parents and two long-term follow-ups (Waves 4 and 5). The present study uses data from Waves 3–5.

At Wave 3, 445 (98%) of the original participants were interviewed, with ages ranging from 13.5 to 18.5 years. Sample retention was excellent at Wave 4, which included 407 original participants (90% of the original sample, 83.6% of COAs, 93.3% of controls), with ages ranging from 18 to 23. At Wave 5, sample retention was again excellent, including 412 original participants (91% of the original sample, 88% of COAs, 94% of controls), with ages ranging from 22 to 30. At both long-term follow-ups, sample retention was unbiased by gender and ethnicity, but somewhat more COAs than controls were lost, χ^2s(1, N = 454) = 5.45 at Wave 4 and 4.12 at Wave 5, both ps $< .05$.

At Wave 4, for the first time, full-biological siblings were included if their age was in the range of 18–26 years (all age-eligible siblings were also invited to participate at Wave 5). At Wave 4, 327 siblings (78% of eligibles, *Mdn* age = 22) were interviewed. At Wave 5, 350 (83% of eligibles, *Mdn* age = 27) were interviewed (a total of 366 siblings were interviewed at least once). The combined sample of original targets and their siblings was 734 at Wave 4, 762 at Wave 5, and 817 with at least one measurement at either Wave 4 or Wave 5.

Details of sample recruitment are reported elsewhere (Chassin, Barrera, Bech, & Kossak-Fuller, 1992). COA families were recruited via court records, health maintenance organization questionnaires, and community telephone screening. One family was referred by a local hospital. COAs

had to meet the following criteria: age 10.5–15.5, Arizona residency, Hispanic or non-Hispanic Caucasian parents, English speaking, and no cognitive limitations that would preclude interview. Direct interview data had to confirm that a biological and custodial parent met *Diagnostic and Statistical Manual of Mental Disorders*, third edition (3rd ed.; *DSM–III*; American Psychiatric Association, 1980) criteria for lifetime alcohol abuse or dependence (according to the Diagnostic Interview Schedule [DIS]; Robins, Helzer, Croughan, & Ratcliff, 1981) or Family-History Research Diagnostic Criteria (FH-RDC, Version 3; Endicott, Andreason, & Spitzer, 1975), according to reports by the other parent (if the alcoholic parent was not interviewed).

Demographically matched controls were recruited via telephone interviews. When a COA family was recruited, reverse directories were used to locate families in the same neighborhood. Controls were screened to match the COA in ethnicity, family structure, age (within 1 year), and socioeconomic status (according to the property value code from the reverse directory). Interview data confirmed that neither biological nor custodial parents met *DSM–III* criteria (or FH-RDC criteria) for lifetime alcohol abuse or dependence.

Sample representativeness is discussed in detail elsewhere (Chassin et al., 1992). The sample was unbiased with respect to alcoholism indicators available in archival records (e.g., blood alcohol levels recorded at the time of the arrest). Moreover, the alcoholic sample had rates of other psychopathology similar to those that were reported for a community-dwelling alcoholic sample (Helzer & Pryzbeck, 1988). However, those who refused participation were more likely to be Hispanic, which suggests some caution in generalization.

Procedure

Data were collected with computer-assisted interviews either at families' home or on campus. To minimize contamination, family members were interviewed individually, on the same occasion, by different interviewers when possible. When a family moved out of state, an interviewer from a nearby university administered a shortened version, and the diagnostic interview was done by telephone, or the entire interview was done by telephone if no nearby interviewer was available. Interviewers were unaware of the family's group membership. To encourage honest responding, we reinforced confidentiality with a Department of Health and Human Services Certificate of Confidentiality. To maximize privacy, we gave participants an option to enter their responses on the keyboard rather than verbally.

Measures

Parent alcoholism and psychopathology. At Wave 1, lifetime *DSM–III* diagnoses of parent alcoholism (abuse or dependence), affective disorder (major depression or dysthymia), and antisocial personality disorder were assessed with the DIS (Version III; Robins et al., 1981).[1] For noninterviewed parents, lifetime alcoholism diagnoses were established with FH-RDC criteria (Endicott et al., 1975) on the basis of spousal report. For the present analyses, diagnoses were dichotomous variables, either present (at least one biological parent met lifetime criteria) or absent (neither biological parent met lifetime criteria). Although parental drug disorder diagnoses were not available, we also created a dichotomous variable representing whether parents had more than two lifetime negative drug use consequences.

Drug consumption. At each wave, participants self-reported their use in the past year of eight different types of drugs (i.e., marijuana, amphetamines, cocaine, hallucinogens, opiates, inhalants, barbiturates, tranquilizers) on a scale ranging from 0 (*never*) to 7 (*every day*). For the present analyses, the sum of these items, log-transformed, served as the drug consumption measure. Interpretations of specific values on this transformed scale are given below.

Marital status. At Waves 4 and 5, participants reported whether they were married and, if so, at what age they first became married as well as whether they had ever been divorced or separated. So that marriage could be viewed as a prospective predictor of individual drug use status in young adulthood, we used a dummy variable representing whether a participant became married before his or her last nonmissing measurement without ever becoming divorced or separated.

The Present Sample

As described above, the present study used data from Waves 3–5. However, given our interest in describing drug use during the transition from emerging adulthood into young adulthood, we used Wave 3 data only for participants who were at least 17 years old at that measurement wave. Because there was considerable age heterogeneity at each measurement wave, we modeled drug use growth as a function of age rather than as a measurement occasion. However, even with missing data methods, the sparseness of the data at some ages necessitated that we collapse age into three categories: 17–20 (Age 1), 21–24 (Age 2), and 25–30 (Age 3). Note that it is crucial to distinguish between measurement occasion (i.e., Waves 1–5), which pertains to the experimental design of the longitudinal study, and age category (i.e., Ages 1–3), which pertains to the actual time variable that is modeled in the present analyses. For participants to be included in the present analyses, we required that they be measured in at least two of the three age categories (218 were removed for this reason). Finally, participants with missing data on the marriage dummy variable were not included in the analyses (49 were removed for this reason). The final sample consisted of 561 participants from 390 different families (mean number of participants per family was 1.44).[2] Of the 561 participants, 363 (65%) contributed data at Age 1, 479 (85%) contributed data at Age 2, and 415 (74%) contributed data at Age 3. Thus, we used advanced methods for model estimation in the presence of missing data (see below).

Among the final sample of 561 young adults, 289 (52%) were male, and 283 (50%) were COAs. Relative to the full sample of 816 individuals participating at either Wave 4 or Wave 5, the present sample was unbiased with respect to gender, $\chi^2(1, N = 816) = 1.00$, $p = .32$; ethnicity, $\chi^2(1, N = 816) = 0.21$, $p = .64$; parent alcoholism, $\chi^2(1, N = 816) = 0.23$, $p = .63$; parental antisocial personality, $\chi^2(1, N = 816) = 2.24$, $p = .13$; and parental affective disorder, $\chi^2(1, N = 816) = 2.30$, $p = .13$.

Data Analytic Strategy

We used latent growth curve modeling in a structural equation framework (e.g., Meredith & Tisak, 1990; Willett & Sayer, 1994) to describe the change in drug use across the three age categories named above (i.e., ages 17–20, 21–24, and 25–30). We tested linear growth models because our models were fit to only three age categories. The models consist of two basic random-effects growth factors: an overall status factor and a linear

[1] The major difference between *DSM–III* alcohol disorder criteria and *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) criteria pertains to the distinction between abuse and dependence (see Grant, 1993, 1996). In particular, although the prevalence rates of *DSM–III* and *DSM–IV* alcohol abuse and dependence combined are highly similar, *DSM–IV* criteria elicit higher rates of abuse relative to dependence than do *DSM–III* criteria. In the present study, because parent alcoholism was defined as present when a parent received a *DSM–III* diagnosis of either abuse or dependence, we would expect little difference in the classification of parental alcoholism across *DSM–III* and *DSM–IV* criteria.

[2] Although siblings were measured only at Waves 4 and 5, it is important to note that, because of age heterogeneity at each measurement wave, sibling data were observed at each of the three age categories defined above. Among participants with Age 1 data, 73% were original targets and 27% were siblings; at Age 2, 64% of participants were targets and 36% were siblings; and at Age 3, 67% were targets and 33% were siblings.

Table 1
Zero-Order Correlations Among Predictor and Criterion Variables

Variable and statistic	1	2	3	4	5	6	7	8	9
1. Gender	—	.03	.03	.03	.02	−.16*	.16*	.22*	.16*
2. Ethnicity		—	−.10*	.05	.01	−.04	−.03	−.02	.07
3. Parent alcoholism			—	.23*	.23*	−.10*	.25*	.20*	.54*
4. Parent affective disorder				—	.21*	−.01	.17*	.14*	.10*
5. Parent antisocial personality					—	−.04	.37*	.04	.18*
6. Marriage						—	−.16*	−.25*	−.23*
7. Drug 1							—	.43*	.41*
8. Drug 2								—	.67*
9. Drug 3									—
M	0.52	0.71	0.50	0.14	0.08	0.25	0.56	0.50	0.47
SD	0.50	0.46	0.50	0.35	0.27	0.44	0.32	0.55	0.29

Note. $N = 561$. For Drug 1, Drug 2, and Drug 3, descriptive statistics were estimated from the full-information maximum-likelihood missing data method. Gender is coded 0 = female, 1 = male; ethnicity is coded 0 = non-White, 1 = White; marriage is coded 0 = not currently married, 1 = married; parent alcoholism, affective disorder, and antisocial personality disorder are each coded 0 = absent, 1 = present.
* $p < .05$.

growth factor. In the present study, because we wanted to predict the level of young adult drug use prospectively from role transitions occurring during emerging adulthood, we parameterized the overall status factor to represent drug use at the last age category (i.e., ages 25–30). The linear factor represented the amount of linear change in drug use that occurred over the three age categories. Because they represent random effects, these growth factors are described by both their mean (i.e., mean level of drug use at ages 25–30 and mean change in drug use over the three age categories) and their variance (i.e., individual differences in average level and average change). We estimated all models both including individuals who abstained from drug use at all three age categories and with these constant abstainers removed from the data. Of the 561 participants in the present sample, 309 abstained from use at all three age categories (or at two age categories if one was missing), leaving 252 participants for the models estimated without abstainers.

Because many participants were siblings within the same family, it was necessary to use an analytic method to account for this source interdependency in the data. We used two-level growth modeling, a type of multilevel structural equation model procedure described by B. O. Muthén (1994, 1997) and implemented with the software package Mplus (Version 2.13; L. K. Muthén & Muthén, 1998, 2001).[3] Additionally, we used full-information maximum-likelihood (FIML) estimation under missingness at random to account for missing data patterns among the drug use variables (Arbuckle, 1996; Little & Rubin, 2002).[4] Finally, because of nonnormality in the drug use measures, we applied the Satorra–Bentler (e.g., Satorra & Bentler, 1994) corrections to chi-square tests of model fit and parameter standard errors.[5]

Results

Descriptive statistics and correlations among the drug use variables and all predictors and covariates are in Table 1; Table 2 gives percentages of drug users and abstainers by age category, gender, and COA status; and Table 3 presents drug use means and standard deviations by age category, parental alcoholism, gender, and the marriage variable. As can be seen in Table 3, the highest levels of drug use were observed among single COA men. Their level of use remained relatively stable across the three age categories, ranging from 0.85 at age 17–20 to 0.81 at age 25–30. These values roughly correspond to monthly use within the past year. In comparison, the drug use of single non-COA men decreased from 0.62 at age 17–20, corresponding to having used drugs three to five times in the past year, to 0.50 at age 25–30, corresponding to drug use once or twice within the past year. Non-COA married women had the lowest mean levels of use, which were very close to zero use at all three age categories. It is important to note, however, that these mean values account for the fact that there was a large proportion of abstainers in each group (see Table 2). Among nonabstaining single COA men, the mean level of drug use was approximately weekly, and among nonabstaining single non-COA men, the mean level of drug use decreased from one to three times per month to slightly less than monthly. Additionally, of particular importance in Table 2 are the standard deviations of the drug use variables, which are rather large relative to the mean values, indicating that there was substantial heterogeneity in drug use across individuals, even within the same combinations of gender, COA status, marital status, and age.

Next, we tested a series of latent growth models to assess each of the primary hypotheses described above. First, we fitted an unconditional growth model to the data to examine the overall growth trajectory and to test for individual and between-families variability in change over time. We then extended this model to include the main effects of gender and parental alcoholism as well as the potential covariates of parental drug consequences and antisocial personality and affective disorders. Next, we added the marriage variable to the model to examine the main effects of marriage on drug use trajectories in addition to testing whether

[3] Our sample can be conceptualized as three-level data in that repeated observations are nested within individuals who are siblings nested within families. However, in two-level growth modeling of the type implemented here, the growth model for the repeated measures is treated as a single-level multivariate model (the within-individual growth model), whereas the second level accounts for variance observed among families.

[4] Note that FIML model estimation in the presence of missing data is not a data imputation method. Rather, model estimation proceeds by estimating a likelihood function for each pattern of data completeness (i.e., separate functions for participants with complete data vs. participants with data missing at the first time point vs. participants with data missing at the second time point, and so forth). Next, these separate functions are combined into a single model solution. Thus, participants with incomplete data are still included in the analysis.

[5] When we compared nested models, we conducted difference tests for rescaled chi-square statistics using the method developed by Satorra (2000; see also L. K. Muthén & Muthén, 1998, p. 360).

Table 2
Proportions of Individuals Abstaining From Drug Use, Using Marijuana Only, and Using Other Drugs by Age, COA Status, and Gender

	COA			Control		
Age and gender	% abstainers	% using marijuana only	% using other drugs	% abstainers	% using marijuana only	% using other drugs
Age 1 (17–20 years)						
Men	56.52	17.39	26.09	64.37	13.79	21.84
Women	60.00	21.25	18.75	76.92	10.26	12.82
Total	58.14	19.19	22.67	70.30	12.12	17.58
Age 2 (21–24 years)						
Men	53.60	18.40	28.00	72.23	15.45	12.32
Women	68.37	20.62	11.01	79.28	9.91	10.81
Total	60.09	19.28	20.63	76.02	12.67	11.31
Age 3 (25–30 years)						
Men	61.17	18.45	20.38	77.55	10.20	12.25
Women	67.65	13.73	18.62	91.67	2.78	5.55
Total	64.39	16.10	19.51	84.95	6.31	8.74

Note. $N = 561$. COA = child of alcoholic.

marriage mediated or moderated the main effects of parental alcoholism on drug use trajectories. We also tested for gender differences with respect to the prediction of trajectories from parent alcoholism and marriage.

Model 1: Unconditional Model

The parameterization of the basic individual-level unconditional model is shown in Figure 1. This model fit the data well, $\chi^2(4, N = 561) = 3.43$, $p = .49$, root-mean-square error of approximation (RMSEA) = 0.00, indicating that a linear function adequately described the change in drug use across the three age categories. The mean of the overall drug use status factor was significantly greater than zero ($p < .01$), suggesting that average drug use among participants was still nonzero during the age period 25–30. However, the variance terms for the status factor were significant at both the individual level and the between-families level (both

Table 3
Drug Use Means and Standard Deviations by Age, COA Status, Gender, and Marital Status

	COA			Control			Total		
Gender and status	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Age 1 (17–20 years)									
Single men	79	0.85	1.03	68	0.62	0.91	147	0.75	0.98
Married men	13	0.37	0.75	19	0.49	1.00	32	0.44	0.90
All men	92	0.79	1.01	87	0.60	0.92	179	0.69	0.97
Single women	51	0.64	0.85	53	0.51	0.88	104	0.58	0.86
Married women	29	0.32	0.56	25	0.06	0.28	54	0.20	0.47
All women	80	0.53	0.77	78	0.37	0.77	158	0.45	0.77
Age 2 (21–24 years)									
Single men	108	0.84	1.01	89	0.52	0.85	197	0.70	0.95
Married men	17	0.42	0.69	21	0.03	0.15	38	0.21	0.51
All men	125	0.78	0.98	110	0.43	0.79	235	0.62	0.91
Single women	78	0.47	0.62	73	0.43	0.77	151	0.45	0.77
Married women	20	0.19	0.50	38	0.05	0.19	58	0.10	0.33
All women	98	0.41	0.73	111	0.30	0.66	209	0.35	0.69
Age 3 (25–30 years)									
Single men	83	0.81	1.01	70	0.50	0.86	153	0.66	0.96
Married men	20	0.17	0.44	28	0.04	0.21	48	0.09	0.33
All men	103	0.68	0.96	98	0.36	0.77	201	0.53	0.88
Single women	69	0.62	0.93	60	0.10	0.33	129	0.38	0.76
Married women	33	0.29	0.61	48	0.10	0.41	81	0.18	0.51
All women	102	0.51	0.85	108	0.10	0.37	210	0.30	0.68

Note. $N = 561$. *Single* versus *married* pertains to whether participants became married at any age prior to their last nonmissing measurement occasion without becoming divorced. COA = child of alcoholic.

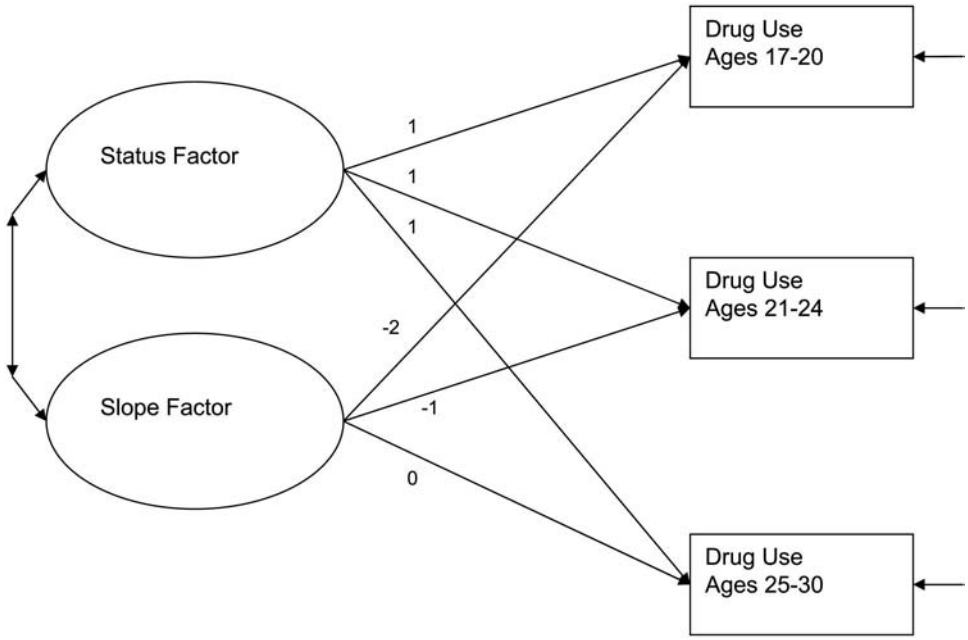


Figure 1. Unconditional growth model.

*p*s < .05), which means that there was substantial heterogeneity in drug use at ages 25–30 across individuals and that heterogeneity across families remained beyond individual variance. The mean of the slope factor was marginally significantly lower than zero (p = .07), suggesting that, on average, participants decreased their drug use during the transition into young adulthood, but this average decrease was only marginally reliably different from no change. However, there was significant variance in the slope factor at the individual level ($p < .05$), implying that there was substantial heterogeneity across participants in their change in drug use behavior during the transition to young adulthood, such that some decreased their use, whereas others maintained consistent use or even increased use.[6] In particular, 130 participants (23.17% of the sample) decreased their use, whereas 109 (19.43%) increased use and 322 (57.40%) maintained constant use (among the constant users, 309, or 55.08%, were abstainers). Finally, there was a significant positive correlation between the status factor and the slope factor, which means that higher levels of drug use at age 25–30 were associated with greater drug use slopes (i.e., larger increases in use and smaller decreases in use). Given that we found significant heterogeneity in the drug use status and slope factors, our subsequent models attempt to explain this variability through the effects of parent alcoholism and marriage.

An unconditional model estimated with abstainers removed from the data also fit well, $\chi^2(6, N = 252) = 1.02$, $p = .98$, RMSEA = 0.00. Again, the mean of the overall status factor was significantly greater than zero, with significant individual variability around the mean (both *p*s < .01). Additionally, the mean slope factor was significantly less than zero ($p < .05$), suggesting that nonabstainers decreased their drug use on average. There was significant individual variance in the slope factor ($p < .05$), implying that, among the nonabstainers, participants varied substantially in the change in drug use over the three measurements.

Model 2: Trajectories Conditioned on Parent Alcoholism

Our next model extended the unconditional model to include the main effects of parent alcoholism as well as gender, ethnicity, parent antisocial personality, parent affective disorder, and parent drug use consequences. In particular, the status and slope factors defined above were regressed on this set of variables. The relations of ethnicity, parent antisocial personality, parent affective disorder, and parental drug use consequences with the status and slope factors were each nonsignificant (all *p*s > .10), as were effects due to the interaction between parent alcoholism and gender; thus, these terms were trimmed from the model. The final version of this model provided excellent fit to the data, $\chi^2(7, N = 561) = 4.11$, $p = .77$, RMSEA = 0.00. Both gender and parent alcoholism significantly predicted drug use status at age 25–30 (both *p*s < .01), such that men and COAs consumed more drugs.

Although the path between parental alcoholism and the drug use slope factor was marginally significant ($p = .07$), removal of this term led to significantly worse model fit, $\chi^2(1, N = 561) = 3.89$, $p < .05$, implying that COAs had different mean drug use slopes than did non-COAs. Because the relation between a predictor and the slope factor of a latent growth model can be viewed as an interaction between the predictor and time, we estimated separate simple trajectories for the COA and control groups (see Curran, Bauer, & Willoughby, 2004). Among control participants, the mean slope was significantly less than zero ($p < .01$), which means that there was a mean decline in drug use among controls

[6] The between-families slope variance was constrained to zero in this and subsequent models. Freeing this parameter did not significantly improve model fit, $\chi^2(1, N = 561) = 2.15$, $p = .14$. Thus, there was no significant variability in drug use slope between families beyond individual variability.

over the three age periods. Conversely, the mean slope factor for COAs did not significantly differ from zero ($p = .98$), which implies that COAs maintained a consistent level of drug use, on average. Figure 2 displays the model-implied trajectories of drug use by COA status and gender, and Table 2 displays observed means of drug use by COA status and gender.

Finally, significant individual variance remained in both the status factor ($p < .01$) and the slope factor ($p < .05$), suggesting that parent alcoholism and gender did not completely account for the heterogeneity among individual drug use trajectories. Among men, 48.79% of participants were abstainers, 26.30% decreased use, 22.15% increased use, and 2.77% maintained constant use. Among women, 61.76% of participants were abstainers, 19.85% decreased use, 16.54% increased use, and 1.84% maintained constant use. With respect to parent alcoholism, 43.46% of COAs were abstainers, 27.56% decreased use, 25.80% increased use, and 3.18% maintained constant use. In contrast, 66.91% of non-COAs were abstainers, 18.71% decreased use, 12.95% increased use, and 1.44% maintained constant use.

When we estimated the identical model with abstainers removed from the data, model fit was again excellent, $\chi^2(7, N = 252) = 0.77$, $p = .99$, RMSEA = 0.00. Gender again significantly predicted drug use status at age 25–30 ($p < .01$), such that men consumed more drugs. However, parental alcoholism became a marginal predictor of drug use status at age 25–30 ($p = .07$). Parental alcoholism remained a significant predictor of drug use slope ($p < .05$). Probing of simple trajectories showed that the mean slope factor of nonabstaining COAs did not significantly differ from zero ($p = .72$), which implies that COAs maintained a consistent level of drug use, whereas non-COAs had a significant ($p < .01$) decline in drug use on average.

Model 3: Trajectories Conditioned on Marriage

Next, we extended Model 2 to test whether marriage was associated with both the change in drug use over the three age periods and drug use status at the third measurement (i.e., age 25–30), beyond the effects of gender and parent alcoholism. The interaction between marriage and parent alcoholism did not significantly predict either the status factor ($p = .16$) or the slope factor ($p = .27$); hence, parent alcoholism did not moderate the relation between marriage and drug use trajectories. We thus omitted these interaction terms from the model. After we included terms for the interaction between marriage and gender, the model fit the data well, $\chi^2(8, N = 561) = 4.70$, $p = .79$, RMSEA = 0.00. Figure 3 displays the model-implied trajectories by marital status and gender, and a path diagram of this model is given in Figure 4.

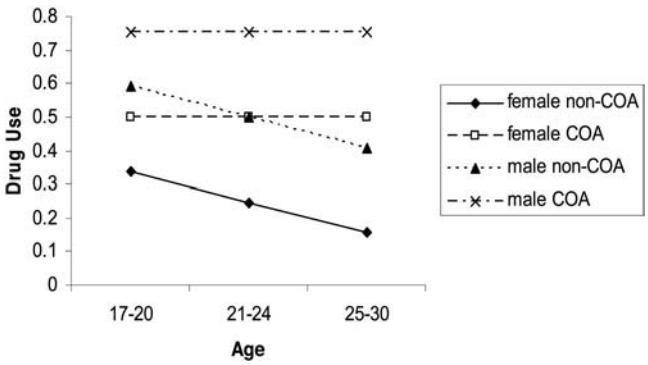


Figure 2. Model-implied mean trajectories of drug use by child of alcoholic (COA), status, and gender.

The relation between marriage and the status factor significantly interacted with gender ($p < .01$). In particular, among men and women, the drug use of married participants at ages 25–30 was significantly lower than that of other participants (both ps $< .05$). The interaction effect was such that the difference in drug use at ages 25–30 between married participants and other participants was much greater among men than among women.

The relation between marriage and the slope factor also interacted significantly with gender ($p < .05$). Thus, we examined the relation between drug use slope and marriage separately for men and women. Among women, marriage was not significantly related to a difference in the mean slope factor ($p = .36$). In all, 77.27% of married women were abstainers, 12.50% decreased their drug use, 9.09% increased use, and 1.14% maintained constant use. Among unmarried women, 54.35% were abstainers, 23.37% decreased use, 20.11% increased use, and 2.17% maintained constant use. Among men, the mean slope factor was significantly lower among married participants than among other participants ($p < .05$). In all, 72.22% of married men were abstainers, 22.22% decreased their drug use, 3.70% increased use, and 1.85% maintained constant use. Among unmarried men, 43.40% were abstainers, 27.23% decreased use, 26.38% increased use, and 2.98% maintained constant use.

Again applying the method of Curran, Bauer, and Willoughby (2004), we estimated separate simple trajectories for married men versus other men. Among married men, the mean slope factor was significantly lower than zero ($p < .01$), implying that these participants decreased their drug use, on average. Among other men, the mean slope factor did not significantly differ from zero ($p = .22$), implying that, on average, these participants maintained constant levels of drug use over the three age periods. With these marriage effects included in the model, the relation between parent alcoholism and the status factor remained significant ($p < .01$), whereas the relation between parent alcoholism and the slope factor was not significant ($p = .10$).

We estimated the same growth model without abstainers included in the data. However, because only 35 of the 252 nonabstaining participants were married, results from this model should be interpreted with caution. This model had excellent fit to the data, $\chi^2(9, N = 252) = 1.41$, $p = .99$, RMSEA = 0.00. The relations between marriage and both the status and the slope factors were again significant (both ps $< .05$). In particular, among men, marriage was associated with a significant decrease in drug use ($p < .01$), whereas other men had a smaller mean decrease in drug use that was only marginally significantly different from no change ($p = .07$). Among women, marriage was not associated with the rate of change in use ($p = .51$). Furthermore, married men had significantly lower levels of use at ages 25–30 than did other men ($p < .01$), whereas marriage did not predict a difference in drug use at ages 25–30 among women ($p = .48$). Beyond these effects, parental alcoholism marginally predicted higher levels of drug use at ages 25–30 ($p = .07$) and was significantly associated with greater drug use slopes (i.e., smaller declines and greater increases; $p < .05$).

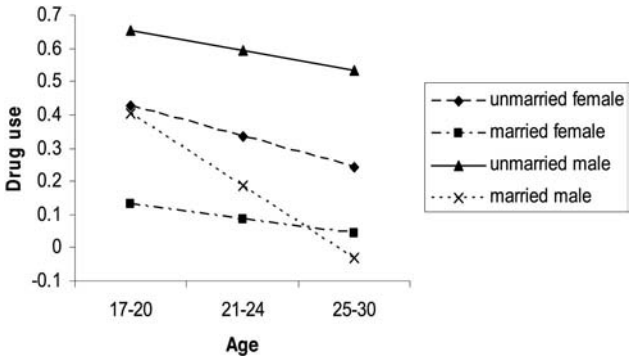


Figure 3. Model-implied mean trajectories of drug use by gender and marital status.

Mediation Analysis

Finally, to test whether marriage mediated the relation between parent alcoholism and drug use trajectories (including abstainers), we first estimated a logistic regression model to test whether parent alcoholism predicted marital status, controlling for gender. Because some of our participants were siblings, we adjusted the standard error of the logistic regression coefficient according to the estimated design effect.[7] This analysis showed that COAs were significantly less likely to be married than were non-COAs ($p < .05$). Next, we tested for mediation using the product of coefficients method described by MacKinnon, Lockwood, and Hoffman (1998; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) by multiplying the z statistic representing the relation between parent alcoholism and marriage by the z statistic representing the relations between marriage and drug use trajectory (separate tests for the status and slope factors obtained with the full sample including abstainers).[8] Because the relation between marriage and drug trajectories interacted with gender, we assessed moderated mediation by conducting tests of mediation separately for men and women.

Among men, marriage significantly mediated the relations between parent alcoholism and both the drug use status factor and the drug use slope factor (both ps $< .05$). With respect to the slope factor, parental alcoholism predicted a significantly lower probability of marriage, which, in turn, was associated with a smaller decrease in drug use over the three measurements. With respect to the status factor, parental alcoholism predicted a significantly lower probability of marriage, which, in turn, predicted a greater average level of drug use at ages 25–30. Among women, marriage significantly mediated the relation between parent alcoholism and the drug use status factor ($p < .05$) in the same direction found for men, but marriage did not mediate the relation between parent alcoholism and the drug use slope factor for women ($p > .10$).

Discussion

In the present study, we sought to test whether COAs show different rates of change in drug use during the transition from emerging adulthood to young adulthood relative to a control group of non-COAs. Consistent with national data (e.g., Bachman et al., 1997), control participants had an average decrease in their drug use during this period. However, even among control participants, there was still a substantial number of individuals who actually increased their drug use during their 20s. This finding underscores the fact that although large national studies (e.g., Bachman et al., 1997) have established that the normative trend is to decrease or "mature out of" drug use during the transition to young adulthood, there remains substantial heterogeneity in patterns of change in substance use. This heterogeneity is such that individuals vary both in the direction of their change in drug use (increases vs. decreases) and in the extent of their change in drug use.

In contrast to control participants, COAs, on average, maintained consistent levels of drug use, such that by ages 25–30, the level of drug use among COAs was much higher than that of non-COAs. These parental alcoholism effects occurred beyond effects from other parent psychopathology. Thus, COAs do not typically follow the normative trend by which individuals are expected to mature out of drug use before age 30. Like the control participants, COAs also varied with respect to whether their use decreased or increased (if they were not abstainers). However, among COAs there were both fewer abstainers and more individuals increasing use than among non-COAs.

This finding supports the notion that parental alcoholism represents a risk factor for maladaptive behaviors in adulthood that reach beyond alcoholism itself. Of course, an effect of parental alcoholism on drug outcomes might also have been produced in our data if the alcoholic parents also showed high rates of comorbid drug disorders. In the present sample, 25% of the COA families (and fewer than 4% of the non-COA families) had a parent who reported more than two lifetime drug consequences or dependence symptoms at baseline. In additional analyses, these parental drug problems could not account for the parent alcoholism effects and did not significantly predict drug use trajectories. Thus, we conclude that parental alcoholism itself is a substantial risk factor for adult drug use, beyond the effects of parental drug problems.

Next, based on role compatibility theory (Yamaguchi & Kandel, 1985a, 1985b), we posited that occupying an adult role, namely, marriage, would be related to drug use trajectories during the transition from emerging adulthood into young adulthood. Consistent with this hypothesis, we found that marriage prospectively predicted participants' amount of drug use during ages 25–30, such that married participants consumed a significantly smaller amount of drugs during these ages. Furthermore, we found that marriage was related to the rate of change in drug use over the three measurements; however, this effect was only significant among male participants. In particular, approximately 94% of married men either remained abstinent from drugs or decreased their drug use, whereas a substantial proportion of unmarried men (approximately 26%) actually increased their drug use.

[7] The design effect is a function of the average number of siblings per family (1.438) and the intraclass correlation (0.15). The observed sample size (561) divided by the design effect gives an estimate of the effective sample size, which can then be used to adjust the coefficient standard error obtained under the assumption of independent observations (see, e.g., Skinner, Holt, & Smith, 1989, chap. 2).

[8] A common method for testing the significance of a product of coefficients in mediational analysis involves estimating the standard error of the product term using Sobel's (1982) formula. However, as MacKinnon et al. (2002) discussed, this approach has low power relative to their product of z statistics method, which uses a standard error term that more accurately reflects the distribution of the product of two normal distributions.

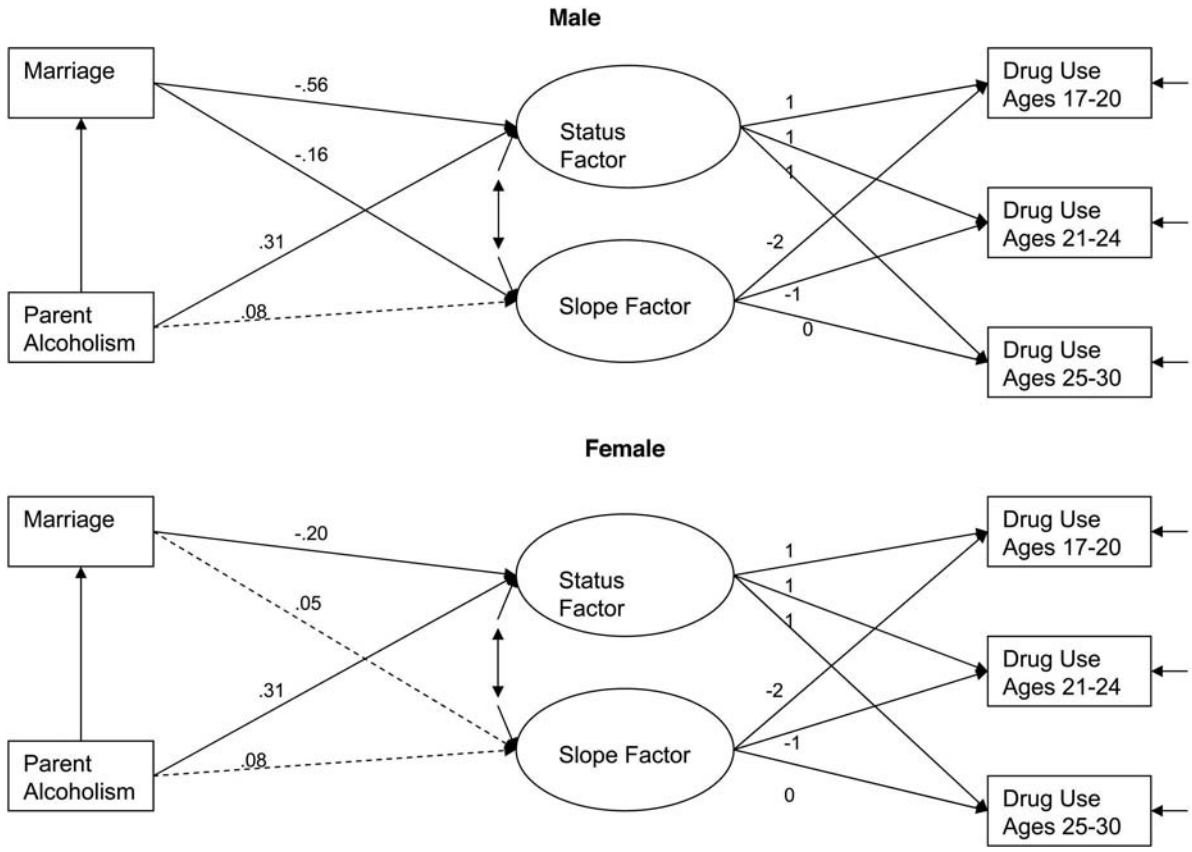


Figure 4. Final growth model of drug use conditioned on child of alcoholic, status, and marriage by gender. Dashed lines represent nonsignificant paths.

When one interprets our observed relations between marriage and drug use trajectories, it is important to recognize that the relation between marriage and the status factor (i.e., mean level of drug use during ages 25–30) reflects *prospective* prediction of young adult drug use from earlier marriage. However, because marriage did not necessarily occur on or before the first measurement occasion (i.e., ages 17–20) for all participants, the relation between marriage and the slope factor should be interpreted conservatively as a correlation between marriage and the change in drug use. Additional research with additional measurement occasions and age points is needed to evaluate the effects of marriage with methods for time-varying covariates (e.g., Curran et al., 1998), where entry into marriage is a deflection, or "turning point," in substance use trajectories.

In accordance with the interpretations described above, the relations among marriage and drug use trajectory factors are likely to represent a combination of both role selection and role socialization effects. The finding that a large proportion of married participants abstained from drug use throughout the three age periods can be interpreted as a role selection effect, such that abstinence facilitates entry into marriage and those who maintain substantial levels of drug use during their 20s are less likely to marry. With respect to role socialization, married individuals (particularly men) decreased their drug use at a higher rate than unmarried individuals, and a much higher proportion of unmarried individuals than married individuals actually increased their drug use (26% vs. 4% among men in the present sample). Marriage can also be viewed as a protective factor in that married participants were more likely to remain abstinent throughout their 20s, because an initiation of use would be incompatible with the marital role.

The finding that gender interacts with the relation between marriage and the rate of change in drug use is at least partially attributable to the fact that women had a much lower base rate of drug use than did men, which, in turn, led to smaller variability in drug use slopes among women than among men. Thus, the statistical power to detect a marriage effect was weaker among women. Some studies have found that the marriage effect on substance use is consistent across gender (e.g., Bachman et al., 2002, 1997), whereas other studies have reported the opposite interaction, namely, that marriage effects are bigger for women than for men (e.g., Yamaguchi & Kandel, 1985a). Given these findings, the lack of variability in drug use slopes among women is the most likely explanation for the gender interaction in the present analyses.

With respect to the joint effects of marriage and parental alcoholism on trajectories of drug use into young adulthood, we found that marriage mediated but did not moderate the relations between parental alcoholism and both the rate of change in drug use during the transition into young adulthood (i.e., the slope factor) and the level of drug use at ages 25–30 (i.e., the status factor). In particular, our findings show that COAs were less likely to be currently married, which is in accordance with the findings of Watt (2002). Partially because they were less likely to be married, COAs, in

turn, had smaller decreases in drug use (or even increased use) and had a subsequently higher level of drug use at ages 25–30. The fact that COAs were less likely to be married may be due to role selection effects (including preexisting involvement with substance use), and, as a result, COAs were less likely to benefit from the role socialization processes by which marriage is associated with reductions in drug use. Future research is needed to probe further why COAs appear to be less likely to enter this important adult role. For instance, it may be that COAs have less commitment to traditional social institutions or have impairments in establishing romantic relationships that may be due to factors such as heritable personality traits (e.g., lowered agreeableness; see Chassin et al., 2004), poor social support, or poor modeling of romantic relations from their parents. Such characteristics might explain the comparatively negative attitudes toward marriage among COAs observed by Larson and Thayne (1998).

Our findings do not show that marriage moderated the relation between parental alcoholism and drug use trajectories; that is, the relation between marriage and drug use trajectories did not vary as a function of parental alcoholism. Thus, our data do not suggest that role socialization mechanisms due to marriage that are related to reductions in drug use are weaker among COAs, despite previous findings that COAs are more likely to have a substance-abusing spouse and a less positive marital relationship (Harter, 2000; Schuckit et al., 1994; Watt, 2002).

It is important to note, however, that parental alcoholism remained a significant predictor of drug use trajectories beyond marriage effects; thus, marriage only partially mediated the relation between parental alcoholism and drug use trajectories. Broad personality risk for behavioral undercontrol may also underlie the association between parental alcoholism and trajectories of drug use in young adulthood. This interpretation is supported by our recent finding that adolescent impulsivity mediated the relation between parental alcoholism and trajectories of co-occurring heavy drug and alcohol use in young adulthood (Chassin et al., 2004). Other studies have also suggested that a broad and heritable diathesis toward behavioral undercontrol is associated both with comorbidity of alcohol and drug dependence (Kendler, Prescott, Myers, & Neale, 2003; Krueger et al., 2002; Vanyukov et al., 2003) and with parental alcoholism (Iacono, Carlson, Taylor, Elkins, & McGue, 1999; Sher, Walitzer, Wood, & Brent, 1991). Finally, it may be that behavioral undercontrol simultaneously affects both the transition into adult roles and substance use trajectories among COAs.

It is also important to note some of the limitations of the present study. First, because our growth models were a function of only three time points, collapsed across several ages, we were not able to examine nonlinear changes in drug use. Second, the present analyses focused on marital roles, whereas the occupancy and timing of other adult roles, such as parenthood and employment (and their interaction), may produce different findings. For instance, marriage combined with parenthood might more strongly predict young adult substance use than marriage without parenthood. Finally, our outcome variable combined several types of illicit drugs and did not consider alcohol use. The strength of the relation between marriage and drug use might vary for particular drugs or for the combination of alcohol and drug use.

In short, the present study examined the changes in drug use during the transition from emerging adulthood into young adulthood among a community sample of COAs and demographically matched non-COAs. Consistent with national data, the non-COAs significantly decreased their drug use during this time, but the COAs did not significantly decrease their use. On the basis of role compatibility theory, we next examined whether marital status mediated or moderated this difference between COAs and non-COAs in linear drug use growth trajectories. In support of mediation, we found that COAs were significantly less likely than non-COAs to be married and that, for male participants, marriage was significantly associated with greater decreases in drug use during the mid- to late 20s.

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