Gender Differences in Family Formation Behavior: The Effects of Adolescent Substance Use*

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ABSTRACT. Objective: This study extended previous research on the association of substance use with family formation behavior by assessing the effects of the type and extent of adolescent substance use in a competing risks model. Substance use was expected to increase the likelihood of nonmarital family formation overall and differently by gender. **Method:** Longitudinal data from home interviews with the 14- to 16-year-old respondents to the first wave of the National Longitudinal Survey of Youth 1979 ($N = 4,011$) were used in multinomial logistic regressions estimating the odds that first cohabitation, parenthood, or remaining single occurred before first marriage among five types of substance users compared with nonusers. Full sample analysis preceded separate analyses of women ($n = 1,946$) and men ($n = 2,065$). **Results:** Illegal drug use and concurrent substance use increased the

likelihood that cohabitation, as opposed to marriage, was the first family type. Concurrent use of three types of substances had the largest effect on family formation behavior. The effects of singular marijuana use mattered only for men. The effects of substance use on parenthood as the first family type were significant only for women and increased the likelihood that marriage occurred first. **Conclusions:** The effects of substance use depended on the type(s) of substance(s) used, singular or concurrent use, and gender. Previous research regarding cohabitation was supported and extended. Assumptions that substance use leads to teenage or unwed parenthood based on the relationship of substance use to pregnancy or its predictors should be re-examined. (*J. Stud. Alcohol Drugs*, 71, 938-949, 2010)

TEENAGE OR PREMARITAL COHABITATION, preunion parenthood, or not forming an adult family relate to later poverty, educational failure, unstable labor force participation, criminality, depression, stress, partner violence, and poor physical health (Brown, 2000; Crane, 1991; DeKlyen et al., 2006; Frye et al., 2007; Hagestad and Call, 2007; Knight et al., 1977; Popenoe, 2007). Substance use is an important behavior associated with family formation. For instance, young adults significantly reduce their frequency of substance use when they marry; however, frequency declines only modestly among people who remain single (Bachman et al., 1997; Leonard and Rothbard, 1999; Substance Abuse and Mental Health Services Administration, 2004). A longstanding explanation of the "marriage effect" is that the cultural norms of adult family roles in marriage discourage substance use (Bachman et al., 1997, 2002; Coleman, 1978; Duncan et al., 2006; Homish and Leonard, 2005).

Assumptions that marriage changes all types of substance use behavior may not be justified, however. In this study, *illegal drug use* was defined as the consumption of illegal drugs other than marijuana and *concurrent substance use* was defined as the consumption of more than one type of substance (alcohol, marijuana, or illegal drugs) in a given period during which such use may or may not be simulta-

neous. Illegal drug or concurrent substance users are more likely than other substance users to first use before age 16, to use at least weekly, and to seek help for addiction (Chen and Kandel, 1995; Ives and Ghelani, 2006; Wish et al., 2006). They also may be less willing or able to decrease their use in response to marital role demands and, as a result, may be less likely to marry (Substance Abuse and Mental Health Services Administration, 2007). If self-selection into marriage is patterned such that illegal drug or concurrent substance users are disproportionately not marrying, crediting marriage for substantial decreases in substance use may be overestimating its influence. This study addressed the issue by statistically comparing the first family types of substance users with nonusers.

Social roles and substance use

Goode's (1960) theory of role strain proposes that, when people foresee an inability to adequately perform a role because of incompatibility with some other aspect of their lives, they anticipate role strain. A person responds "first, by selecting a set of roles which are singly less onerous, as mutually supportive as he can manage, and minimally conflicting; and, second, by obtaining as gratifying or value-productive a bargain as he can" (p. 490). Following Goode, Yamaguchi and Kandel (1985b) argued that substance use is incompatible with marital role demands and substance users who want to marry most likely anticipate role strain and act to avoid it. They suggested it would be relatively easy to reduce singular use of the more socially accepted sub-

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stances (i.e., alcohol and marijuana) in response to marital role demands. That strategy to resolve anticipated role strain seemed unlikely, however, for illegal drug or concurrent substance users. They more likely would resist reducing their substance use and, instead, would avoid marriage to resolve anticipated role strain.

Avoiding marriage could manifest as deferred union formation, premarital parenthood, or cohabitation. Nock (2000) pointed out the fundamental benefit of cohabitation versus marriage:

One thing that cohabitation offers is freedom from the rules of marriage because there are no widely accepted and approved assumptions and ideals.... In ... small and large ways, cohabiting couples and their associates must *create* a relationship.... The institution of marriage is a template. This is what cohabiting couples lack. They are exempt from the vast range of marriage norms (and laws in many cases). (p. 247)

Yamaguchi and Kandel (1985b) suggested that illegal drug or concurrent substance users expect cohabitation or premarital parenthood to exempt them from the marital role demands to reduce their substance use; therefore, they are more likely to remain single, cohabit, or parent than marry. However, because women are more likely than men to be physically and financially responsible for children and less likely to have the means to fulfill that responsibility (Brown, 2000), female illegal drug or concurrent substance users may value marriage more highly and be more likely than their male counterparts to modify their substance use than to avoid marriage.

Previous research

The foundational studies relating substance use to family formation were by Kandel and colleagues and published between 1985 and 1992. First, Yamaguchi and Kandel (1985a, 1985b, 1987) found in a regional sample that (a) marijuana and illegal drug users were .40 to .60 less likely than nonusers to be married, (b) marijuana use doubled the odds and concurrent marijuana and illegal drug use increased the odds two and one-half times that cohabitation was the first union, and (c) illegal drug use doubled the odds of premarital pregnancy. Rosenbaum and Kandel (1990) used a national sample and found substance use increased the likelihood of precocious first intercourse three to five times for females and two to three times for males. Examining those females, Mensch and Kandel (1992) found pregnancy four times more likely among illegal drug users compared with those who never used.

Subsequent research found delayed/deferred marriage and a greater likelihood of premarital cohabitation among heavy episodic drinkers than nondrinkers (Duncan et al., 2006; Fu and Goldman, 1996; Power et al., 1999); there are similar effects of illegal drug use (DeKlyen et al., 2006; Fu and

Goldman, 1996; Kaestner, 1997). Substance use also may increase the likelihood of pregnancy risk behaviors (Cooper, 2002; Guo et al., 2002; Santelli et al., 2001). Taken together, the body of research suggests that substance users are more likely than nonusers to remain single, cohabit, or parent as opposed to marry as their first family type; however, no previous study has examined the net effects of different types of substance use on the likelihoods of family formation options as competing risks.

Gender differences

There are well-established gender differences in substance use and in family formation behavior (Cooney and Hogan, 1991; Johnson and Kaplan, 1990; Johnston et al., 2008; Merline et al., 2004; Sassler and Goldscheider, 2004). The relationship of substance use to family formation behavior also differs by gender. Substance-using women generally appear less likely to form any type of union than their male counterparts (Fu and Goldman, 1996; Kaestner, 1997). Less clear are gender differences in the link between substance use and pregnancy or parenthood. Age at first sexual intercourse may be younger among male than female substance users (Leigh and Stall, 1993; Rosenthal et al., 1999) and males with relatively younger ages at first sexual intercourse may be relatively older at first marriage (Miller and Heaton, 1991). Pears et al. (2005), however, found no statistically significant effect of substance use on the timing of first fatherhood in an event history analysis. These findings suggest that substance-using men have a greater risk of biologically fathering a child, but they are less likely to marry or claim parenthood than their female counterparts.

Goals and hypotheses

The main goal of this study was to improve our understanding of substance use effects on family formation behavior by replicating and extending the research initiated by Kandel and colleagues, particularly regarding gender differences. It employed the sample used by Rosenbaum and Kandel (1990) and Mensch and Kandel (1992) and addressed similar hypotheses as Yamaguchi and Kandel (1985a, 1985b). It extended the research with (a) 25 years of marital and fertility data, (b) substance use indicators that contrasted singular to concurrent use, (c) a competing risk analysis assessing family formation with parenthood as an option, (d) separate analyses by gender, and (e) 25 variables to control for alternative explanations of family formation.

Based on Yamaguchi and Kandel's (1985b) application of Goode's (1960) theory of role strain and the results of the subsequent research, I tested the following four hypotheses:

Hypothesis 1. Singular use of alcohol or marijuana was not significantly different from nonuse with respect to family formation behavior.

Hypothesis 2. Illegal drug use increased the likelihoods that (a) cohabitation versus marriage was the first family type, (b) parenthood versus marriage was the first family type, and (c) no family was formed as opposed to marriage as the first family type.

Hypothesis 3. Concurrent substance use increased the likelihoods that (a) cohabitation versus marriage was the first family type, (b) parenthood versus marriage was the first family type, and (c) no family was formed as opposed to marriage as the first family type.

Hypothesis 4. The effects of substance use on family formation behavior differed by gender such that: (Hypothesis 4a) the effects of illegal drug use or concurrent substance use on the likelihood that cohabitation as opposed to marriage was the first family type were larger for men than women, (Hypothesis 4b) the effects of illegal drug use or concurrent substance use on the likelihood that parenthood occurred before first marriage were larger for women than men, and (Hypothesis 4c) the effects of illegal drug use or concurrent substance use on the likelihood that no family was formed versus marriage as the first family type were larger for women than men.

Method

Participants

The data were drawn from the National Longitudinal Survey of Youth 1979 (NLSY79), a nationally representative sample of young men and women in the United States born between January 1, 1957 and December 31, 1964. The NLSY79 provides data on family formation through midlife, substance use behavior, and factors relevant to family formation and substance use. Data were collected yearly from 1979 to 1994 and biennially from 1996 to 2004. This study examined the respondents who were 14-16 years old in 1979 who had not formed an adult family prior to or in 1979 ($N = 4,011$; 2,065 male). A sampling weight was applied to account for the differential probability of selection into

the original samples (Carr et al., 1996; Center for Human Resource Research, 2004), producing group estimates demographically representative of the 1979 base year population (U.S. Bureau of Labor Statistics, 2006).

Outcome variable

"First family type" was derived from fertility and relationship history data from ages 14 to 16 (in 1979) through ages 39 to 41 (in 2004). Parent-child co-residence information was derived from household rosters. Each subject was assigned to one of four statuses.

Marriage was first. These subjects reported the year and month of legal marriage before reporting ever cohabiting or parenting.

Cohabitation was first. These subjects reported the year and month of a romantic co-residence before reporting ever marrying or parenting. Responses to questions about "living as a partner with someone of the opposite sex" were used, thus limiting cohabitation status to heterosexual couples; gay/lesbian couples likely were treated by NLSY79 interviewers as roommates or friends.

Parenthood was first. These subjects reported first-year co-residence with a biological or adopted son or daughter before ever marrying or cohabiting. Parenthood was indicated by (a) bearing, fathering, or adopting a first child (in response to questions such as "What is the date of birth of your oldest child?") and (b) co-residing with the oldest child for its first year, defining parenthood as the social role of "parent" and not merely reproduction.

No family was formed. These subjects reported they had never married, never cohabited, and had no children from 1979 through 2004.

Year and month of first marriage, cohabitation, and parenthood were identified for every subject and then chronologically ordered. Events that had not occurred were ordered after events that had occurred. When events occurred in the same year, the order was determined by the order of the first months. When events occurred in the same year and

TABLE 1. Proportions (prop.) and numbers of cases (in parentheses) in the categories of first family type in the full sample and for males and females^a

Variable	Marriage was first Prop. (n)	Cohabitation was first Prop. (n)	Parenthood was first Prop. (n)	No family was formed Prop. (n)	Total n
Full sample ^b	.51 (2,031)	.25 (1,012)	.14 (554)	.10 (414)	4,011
Gender***					
Male	.49 (1,012)	.24 (503)	.13 (232)	.13 (278)	2,065
Female	.52 (1,019)	.26 (509)	.14 (282)	.07 (136)	1,946
Chi-square	$\chi^2(3) = 45.455$				

^aSome groups of proportions do not exactly add to 1.0 due to computational rounding; ^babout .20 of the sample had not married, about .58 of the sample had not cohabited, and about .27 of the sample had not parented by 2004; all parents had co-resided with their first biological child for at least the first year after his or her birth.

*** $p < .001$; two-tailed tests of significance; data are weighted.

the same month, first cohabitation was ordered before first marriage and first parenthood was ordered before both first marriage and first cohabitation. No data were missing. In the analysis, "marriage was first" was the reference category in a dummy variable set of indicators. Table 1 describes the distribution of the subjects by first family type.

Substance use indicators

Substance use was indicated by a dummy variable set capturing both the type and the extent (concurrent use of two or three types) of substance use in 1979 (ages 14-16). It was based on responses to questions asked in 1980 about past-year use of (a) alcohol, (b) marijuana, or (c) other illegal drugs. There were seven categories: (1) singular alcohol use; (2) singular marijuana use; (3) concurrent alcohol and marijuana use; (4) illegal drugs singly used or used with alcohol or marijuana; (5) concurrent alcohol, marijuana, and illegal drug use; (6) no use; and (7) missing data. Category 4 included (a) singular use of illegal drugs ($n = 20$), (b) concurrent illegal drug and marijuana use ($n = 65$), and (c) concurrent illegal drug and alcohol use ($n = 48$). Preliminary analysis found too few cases in these groups for meaningful separate analysis, chi-square tests found no statistically significant first family type differences ($p > .05$), and they were combined into Category 4. Auxiliary data on substance use gathered after 1980 were used to resolve inconsistencies and recode missing data. Cases in which the existing datum was "no use" on one type and missing data on two types were coded "missing" ($n = 227$); that group was significantly different from the types of substance use across the types of first families ($p < .05$). For analysis, the seven categories were transformed into a dummy variable set (Cohen and Cohen, 1983); "no use" was the reference category. Table 2 describes the distribution in the sample of the types of substances used in 1979.

Three demographic characteristics: 1979

Age was identified by responses to "Exactly how old are you as of today?"; 1 = age 14 (.27), 2 = age 15 (.38), and 0

= age 16 (.35). Gender was 1 = male and 0 = female based on interviewer observation. Race/ethnicity was self-identified as (a) non-Hispanic white; (b) African American/black; (c) Hispanic/Latino; (d) American Indian/Native American; or (e) do not know, mixed race, American, or "other."

One physical characteristic: 1979

Body mass index was calculated with weight and height information using the American Heart Association (2009) formula and categorized as "healthy," "less healthy," or "least healthy" using the Centers for Disease Control and Prevention (2000) "2 to 20 years: Boys Body Mass Index-for-age percentiles" and "2 to 20 years: Girls Body Mass Index-for-age percentiles" (www.cdc.gov/growthcharts/clinical_charts.htm).

Five family background factors: 1978-1979

Family poverty status in 1978 was based on total family income and government subsidies reported in 1979 about the prior year using 1978 Poverty Income Guidelines (Center for Human Resource Research, 2004). Mother and father Social Status Index Scores were calculated with a modified Four-Factor Index of Social Status (Hollingshead, 1975) that combined years of education with occupational rank of each parent. The number of co-residential siblings was the sum of individuals identified by the subject as such in the household roster. Residence at age 14 combined data on South region and rural residence: (a) rural south, (b) rural nonsouth, (c) nonrural south, and (d) nonrural nonsouth.

Ten attitude and socialization variables: 1979

Fertility history data were combined with responses to "When do you expect to have your first [next] child—in how many years?" to identify expected age at first birth. Responses to "At what age would you like to marry?" identified expected age at first marriage. Expected years of educational attainment were derived from responses to "As things now

TABLE 2. Proportions (prop.) and numbers of cases (in parentheses) by the types of substance use in the full sample and for males and females^a

Variable	Alcohol Prop. (n)	Marijuana Prop. (n)	Concurrent alcohol and marijuana Prop. (n)	Illegal drugs singly or concurrently with alcohol or marijuana Prop. (n)	Concurrent use of all three types Prop. (n)	No use Prop. (n)
Full sample	.20 (800)	.08 (315)	.26 (1,025)	.03 (133)	.16 (635)	.22 (876)
Gender***						
Male	.20 (420)	.09 (183)	.27 (565)	.04 (81)	.16 (323)	.19 (393)
Female	.19 (380)	.07 (132)	.24 (460)	.03 (52)	.16 (312)	.25 (484)
Chi-square	$\chi^2(6) = 37.528$					

^aMissing data (.06 of the sample; $n = 227$) not shown.

*** $p < .001$; two-tailed tests of significance; data are weighted.

stand, what is the highest grade or year [of regular school] you think you will actually complete?" Religious conservatism in childhood was based on responses to "In what religion were you raised?" ranked using Perrin's (1989) tiers of religious conservatism. Mother's age at subject's birth and father's age at subject's birth were calculated using the household roster, subjects' ages, and data on parents' ages and dates of birth. Self-esteem was a composite score using the 10-item Rosenberg Self-Esteem Scale (Cronbach's $\alpha = .85$). There were two dichotomous indicators of locus of control, or "the extent to which individuals believe they have control over their own lives through self-motivation or self-determination [internal control] as opposed to the extent that the environment (i.e., chance, fate, luck) controls their lives [external control]" (Center for Human Resource Research, 2004, p. 107): (a) overall orientation and (b) ability to make plans work out. Approval of wives in the labor force was the sum of responses to five items on gender roles (Cronbach's $\alpha = .76$).

Six behaviors: 1979

Age at first sexual intercourse was determined from responses to 1983, 1984, and 1985 questions and age at first birth. Frequency of church attendance was determined by responses to "In the past year, how often have you attended religious services?" Number of violent acts was a four-item composite score of reported frequency of violent behaviors (Cronbach's $\alpha = .73$). Number of juvenile delinquent acts was a four-item composite score of delinquent acts (Cronbach's $\alpha = .88$). Number of criminal acts was a six-item composite score of crimes committed (Cronbach's $\alpha = .71$). Responses to (a) four questions about convictions, (b) 16 questions about convictions of specific offenses, and (c) two questions about time spent in institutional facilities identified whether each subject was ever convicted of a crime.

The control variables were analyzed as dummy variables or dummy variable sets to ease interpretation of the logistic regression coefficients and are described in Table 3.

Analytic strategy

Multinomial logistic regression was chosen to address the hypotheses because the main goal of the study was to predict group membership of substance users and nonusers in one of four family types. The first step tested the hypotheses using the full sample ($N = 4,011$) in a two-model approach. In Model 1, the effects of substance use were assessed; in Model 2, the control variables were included to evaluate the net effects of substance use on family formation. Model 2 also tested multiplicative interaction terms between gender and each substance use indicator. The second step was to perform separate analyses (Model 2 only) of the men and women. When the probability that an observed relationship

of substance use to family formation behavior occurred by chance was .05 or less, the result was considered statistically significant, indicated in tables and text with p values smaller than .05.

Results

Full sample

Table 4 shows summary statistics and parameter estimates of the full sample analysis. The effects of substance use in Model 1 (model $\chi^2 = 253.028$, $p < .001$) were diminished by the inclusion of the control variables in Model 2 (block $\chi^2 = 46.598$, $p < .001$). The contribution of substance use remained large and statistically significant; however, it mostly appears to be the effect of concurrent use of all three types.

Net of the effects of the control variables, substance use increased the likelihood that cohabitation rather than marriage was first (Table 4, Model 2). Neither singular alcohol nor singular marijuana use was statistically significant; however, their concurrent use with illegal drugs increased the likelihood that cohabitation was first about 0.70 ($p < .05$) to 0.80 ($p < .001$), respectively. Substance use was not statistically significant to the likelihood that parenthood or marriage was first. Marijuana used singly or concurrently with alcohol, however, decreased the likelihood that no family was formed as opposed to marriage first about 0.42 ($p < .05$) to 0.66 ($p < .01$), respectively, whereas illegal drugs used singly or concurrently with alcohol or marijuana almost doubled the likelihood that no family was formed as opposed to marriage first ($p < .05$).

Gender differences

In the full sample analysis Model 2, men were twice as likely as women that no family was formed as opposed to marriage first, $b = 0.707$, $p < .001$, $\text{Exp}(b) = 2.027$, and about half as likely as women to become a parent as opposed to marriage as the first family type, $b = -0.706$, $p < .001$, $\text{Exp}(b) = .494$. The interaction of gender with singular marijuana use was the only statistically significant interaction between gender and substance use (likelihood ratio $\chi^2 = 8.149$, $p < .05$), suggesting the effects of substance use were similar for men and women with the exception of singular marijuana use.

Summary statistics of the separate analyses of men and women are shown in Table 5, Panel 1. Women's somewhat larger model chi-square ($\chi^2 = 1,103.105$, $p < .001$ for women vs. $\chi^2 = 928.068$, $p < .001$ for men) and pseudo- R^2 (.480 for women vs. .396 for men) suggest a relatively better fit to the model; however, men's relatively larger block likelihood ratio ($\chi^2 = 38.717$, $p < .001$ for men vs. $\chi^2 = 29.830$, $p < .05$ for women) suggests the effects of substance use were more relevant for the men. Singular marijuana use and

TABLE 3. Control variables: Ranges (in parentheses); means or proportions in the sample (National Longitudinal Survey of Youth 1979; $N = 4,011$)

Variables	M/proportion	Variables	M/proportion
Demographic characteristics		Mother's age at subject's birth (14-46 years)	26.40
Age (14, 15, or 16) ^a	15.08	14-19 years	.10
Gender (male = 1)	.52	20-24 years ^a	.34
Race/ethnicity		25-29 years	.26
Non-Hispanic White ^a	.58	30-46 years	.27
African American	.13	Unknown	.03
Hispanic	.07	Father's age at subject's birth (14-65 years)	29.79
American Indian	.10	14-19 years	.03
Don't know, mixed, race, "American," other	.11	20-24 years ^a	.21
Physical characteristic		25-29 years	.27
Body mass index (13.48-37.56 kg/m ²)	21.78	30-65 years	.40
Healthy ^a	.77	Unknown	.09
Less healthy	.16	Self-esteem (1-31)	20.75
Least healthy	.07	Low (1-18) ^a	.23
Family background factors		Medium (19-23)	.50
Family poverty (in poverty = 1)	.16	High (24-31)	.26
Mother's Social Status Index score (1-64)	29.66	Locus of control—overall (internal = 1)	.65
Low	.31	Locus of control—plans work (internal = 1)	.43
Middle	.30	Approval of wives in the labor force (1-16)	7.12
High ^a	.32	Least in favor of staying home	.26
Mother not in household	.07	Less favorable toward staying home	.31
Father's Social Status Index score (1-64)	39.85	Favorable toward staying home	.21
Low	.26	Most in favor of staying home ^a	.18
Middle	.22	Missing data	.04
High ^a	.24	Behaviors	
Father not in household	.28	Age at first intercourse (4-40 years)	17.84 ^c
Co-residential siblings ^a (0, 1, 2, or ≥3)	1.18	4-12 years	.03
Residence at age 14		13-15 years	.18
Rural South	.15	16 years ^a	.20
Rural non-South	.20	17-18 years	.33
Nonrural South	.17	19-21 years	.13
Nonrural non-South ^a	.48	22-40 years	.11
Attitudes and adolescent socialization		Never	.03
Expected age at first birth (14-46 years)	23.32 ^b	Frequency of church attendance (1-6)	
Don't want, don't know, skipped	.10	None	.16
14-19 years	.07	Infrequently through 2-3 times a month ^a	.41
20-24 years ^a	.52	Once a week	.30
25-29 years	.26	More than once a week	.13
30-46 years	.05	No. of violent acts (0-24)	2.41
Expected age at first marriage (<20 to ≥30 years)		0-1 ^a	.51
<20 years	.07	2-5	.30
20-24 years ^a	.54	6-10	.13
25-29 years	.31	11-24	.03
≥30 years	.06	Missing data	.04
Never	.03	No. of juvenile delinquent acts (0-24)	2.40
Expected years of education (1-18)	13.90	0 ^a	.54
Less than high school	.05	1-4	.19
High school diploma ^a	.42	5-10	.24
Some college	.13	11-24	.02
Four-year degree	.30	Missing data	.05
Some graduate or professional training	.10	No. of criminal acts (0-36)	2.20
Religious conservatism in childhood (1-4)		0 ^a	.33
Liberal	.15	1	.13
Moderate (Roman Catholic, Lutheran, other)	.52	2	.23
Conservative	.25	3-36	.25
None ^a	.05	Missing data	.05
		Ever convicted of a crime (yes = 1)	.06

^aReference group in the analysis; ^bmean age is among those who expected to ever have a child; ^cmean age is among those for whom data were available and had ever had intercourse ($n = 3,743$).

concurrent use of all three types made statistically significant contributions to the men's model ($p < .01$ and $p < .05$, respectively); concurrent use of all three types was the only statistically significant substance use indicator for the women ($p < .05$).

Cohabitation versus marriage first

In the full sample analysis, both indicators of illegal drug use significantly increased the likelihood that cohabitation, as opposed to marriage, was first. In the separate analyses,

however, only the concurrent use of all three types was statistically significant and similarly for men and women (Table 5, Panel 2). Male users of all three types were about twice as likely as male nonusers ($p < .01$) and female users of all three types were about 0.60 more likely than female nonusers ($p < .05$) that cohabitation rather than marriage was first.

Parenthood versus marriage first

The full sample results indicated no statistically significant differences between substance users' and nonusers'

likelihoods that parenthood or marriage was first. This result held true for the men (Table 5, Panel 3). However, women who used alcohol singly or concurrently with marijuana were about half as likely as female nonusers to enter parenthood rather than marriage first (Table 5, Panel 3).

No family was formed versus marriage first

Singular marijuana use or concurrent marijuana and alcohol use decreased the likelihood that no family was formed versus marriage first in the full sample analysis. For the men, singular

TABLE 4. Full sample analysis: Multinomial logistic regression summary statistics with degrees of freedom in parentheses; unstandardized coefficients (b), standard errors (SE), and odds ratios ($\text{Exp}(b)$) for first cohabitation, first parenthood, and not forming a family versus first marriage ($N = 4,011$)

	Summary statistics				
Variable	Model 1 ^a		Model 2 ^b		
Goodness of fit					
Model χ^2	253.028*** (18)		1720.399*** (237)		
Intercept	376.722*** (3)		30.293*** (3)		
Nagelkerke's R^2	.067		.383		
Likelihood ratio test statistics	$\chi^2(3)$		$\chi^2(3)$		
Block likelihood ratio test			46.598***		
Singular alcohol use	28.058***		7.195		
Singular marijuana use	30.532***		9.281*		
Concurrent alcohol and marijuana use	33.794***		9.134*		
Illegal drug use ^c	18.369***		8.700*		
Concurrent use of all three types	92.477***		16.185***		
First cohabitation occurred first versus first marriage occurred first					
	Model 1 ^a		Model 2 ^b		
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>SE</i>	Exp(<i>b</i>)
Singular alcohol use	0.414***	1.513	0.206	0.139	1.229
Singular marijuana use	0.325*	1.384	0.052	0.193	1.054
Alcohol and marijuana	0.492***	1.635	0.122	0.140	1.129
Illegal drug use ^c	0.938***	2.554	0.517*	0.259	1.676
All three types	1.133***	3.106	0.589***	0.170	1.801
Intercept	-1.158***		-0.769	0.468	
First parenthood occurred first versus first marriage occurred first					
	Model 1 ^a		Model 2 ^b		
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>SE</i>	Exp(<i>b</i>)
Singular alcohol use	-0.484**	0.616	-0.353	0.202	0.702
Singular marijuana use	0.602***	1.826	-0.036	0.227	0.965
Alcohol and marijuana	-0.088	0.916	-0.326	0.189	0.722
Illegal drug use ^c	0.389	1.476	-0.196	0.345	0.822
All three types	0.397**	1.487	0.063	0.231	1.065
Intercept	-1.340***		-2.687***	0.658	
No family was formed by 2004 versus first marriage occurred first					
	Model 1 ^a		Model 2 ^b		
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>SE</i>	Exp(<i>b</i>)
Singular alcohol use	-0.191	0.826	-0.105	0.183	0.900
Singular marijuana use	-0.877**	0.416	-0.863**	0.317	0.422
Alcohol and marijuana	-0.461**	0.631	-0.418*	0.198	0.659
Illegal drug use ^c	0.741**	2.099	0.651*	0.316	1.918
All three types	-0.238	0.788	-0.289	0.265	0.749
Intercept	-1.493***		-3.171***	0.778	

^aIncluded only the indicators of the type(s) of substance(s) used at ages 14-16; ^badded to Model 1 were the control variables; ^cillegal drugs used singly or concurrently with alcohol or marijuana.

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed tests of significance.

TABLE 5. Gender differences: Multinomial logistic regression summary statistics with degrees of freedom in parentheses; unstandardized coefficients (*b*), odds ratios ($\text{Exp}(b)$) with standard errors in parentheses^a for first cohabitation, first parenthood, and not forming a family versus first marriage; National Longitudinal Survey of Youth 1979

	Summary statistics model ^b			
Variable	Males (<i>n</i> = 2,065)		Females (<i>n</i> = 1,946)	
Goodness of fit				
Model χ^2	928.068*** (234)		1,103.105*** (234)	
Intercept	20.957*** (3)		12.539** (3)	
Nagelkerke's R^2	.396		.480	
Likelihood ratio test statistics	$\chi^2(3)$		$\chi^2(3)$	
Block likelihood ratio test	38.717***		29.830*	
Singular alcohol use	4.195		4.984	
Singular marijuana use	13.787**		3.178	
Concurrent alcohol and marijuana use	7.412		6.043	
Illegal drug use ^c	4.381		6.818	
Concurrent use of all three types	8.794*		9.195*	
First cohabitation occurred first versus first marriage parameter estimates				
	Males		Females	
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	Exp(<i>b</i>)
Singular alcohol use	0.314	1.369	0.054	1.056
Singular marijuana use	0.471	1.602	-0.500	0.607
Alcohol and marijuana	0.409	1.505	-0.180	0.835
Illegal drug use ^c	0.675	1.964	0.398	1.489
All three types	0.688**	1.991 (0.261)	0.473*	1.604 (0.240)
Intercept	-1.271		-0.374	
First parenthood occurred first versus first marriage parameter estimates				
	Males		Females	
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	Exp(<i>b</i>)
Singular alcohol use	-0.218	0.804	-0.607*	0.545 (0.295)
Singular marijuana use	0.287	1.333	-0.185	0.831
Alcohol and marijuana	-0.007	0.993	-0.605*	0.546 (0.278)
Illegal drug use ^c	0.246	1.279	-0.512	0.599
All three types	0.447	1.564	-0.149	0.862
Intercept	-3.741***	0.999	-2.895**	0.997
No family was formed by 2004 versus first marriage parameter estimates				
	Males		Females	
Type of use	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	Exp(<i>b</i>)
Singular alcohol use	-0.164	0.849	0.009	1.009
Singular marijuana use	-0.983*	0.374 (0.400)	-0.463	0.630
Alcohol and marijuana	-0.344	0.709	-0.500	0.607
Illegal drug use ^c	0.608	1.837	1.329*	3.778 (0.618)
All three types	-0.106	0.899	-0.985	0.373
Intercept	-3.078**	1.056	-3.056*	1.377

^aStandard errors of odds ratios not statistically significant at .05 level or better are not shown; ^bthe control variables are identical to those used in Model 2 of the full sample analysis; ^cillegal drugs used singly or concurrently with alcohol or marijuana.

* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed tests of significance.

marijuana use decreased the likelihood of not forming a family as opposed to marriage first about 0.37 ($p < .05$); however, there was no significant effect of this type of substance use for women (Table 5, Panel 4). The full sample analysis also found that illegal drugs used alone or concurrently with alcohol or marijuana had the opposite effect, approximately doubling the likelihood that no family was formed as opposed to marriage first. Table 5, Panel 4, shows this effect was limited to the women, increasing their likelihood about three and three-quarters times that of the non-using women. The tolerance

and variance inflation factor analysis of the standard error associated with the coefficient (.618) determined that its size was related to the small sample size of women ($n = 52$) who had not formed a family by ages 39-41.

Discussion

The main goal of this study was to extend prior research on the family formation behavior of male and female substance users. Adult family formation behavior is important to address

because when and in what order people marry and have children and whether they cohabit before or instead of marriage have immediate and lasting impacts on the direction and quality of their lives and the lives of their children (Brown, 2000; Fussell and Furstenberg, 2005). The effects of five types of adolescent substance use on family formation behavior were assessed in a competing risks analysis. Substance use made a statistically significant contribution to predicting first family type, even accounting for the effects of many other explanatory factors. The results suggested that the effects of substance use on family formation behavior depended on the type(s) of substance(s) used, the type of family formed, and subject's gender.

Singular substance use had no statistically significant effect on the likelihood that cohabitation or marriage occurred first (supporting Hypothesis 1), and concurrent use of all three types doubled the likelihood for men and increased the likelihood by about .60 for women (supporting Hypotheses 2, 3, and 4a). Considering that men and women were equally likely to concurrently use all three types (.16), the results support the theoretical position that female concurrent substance users are less likely than their male counterparts to use cohabitation as a strategy to avoid role strain between substance use and marital roles. Perhaps female substance users are more interested than their male counterparts in the financial security that marriage offers (Brown, 2000), which may decrease cohabitation's attractiveness as a strategy to resolve role strain.

This was the first known attempt to assess the effects of substance use directly on pre-union parenthood and by gender. The indicator "parenthood was first," as it referred to men, specified those who claimed fatherhood of a first child and co-resided with that child for its first year before ever forming a union. The female and male subjects were remarkably similar in their likelihoods that parenthood was first (females = .14, $n = 282$; males = .13, $n = 272$), $\chi^2(1) = 1.465$, $p = .226$. Although substance use was not statistically significant regarding whether the first family type was parenthood or marriage for men (supporting Hypothesis 1 and refuting Hypotheses 2 and 3), alcohol used singly or concurrently with marijuana decreased women's likelihood that parenthood was first to about half that of nonuse (refuting Hypotheses 1, 2, 3, and 4b).

It seemed counterintuitive that substance use *decreased* the likelihood that parenthood instead of marriage was first, because substance users tend to take more pregnancy-related risks. Perhaps a greater likelihood of clinical and spontaneous abortion among substance users mediates the relationship (see Abel, 1997; Costa et al., 1987; Reardon et al., 2004). Mensch and Kandel (1992) found unmarried female substance users five to six times more likely to terminate a pregnancy. Substance use also may increase the likelihood of teenage marriage through its positive effects on the likelihood of pre-union pregnancy (Martino et al., 2004). Moreover, there is evidence that consistent use of some illegal drugs impedes conception

(Crandall et al., 2003; Substance Abuse and Mental Health Services Administration, 2005). In sum, these results suggest a more complex relationship of substance use to pre-union parenthood for females than was addressed in this analysis.

Contrary to all hypotheses for the men, singular marijuana users were more likely than nonusers to marry first than not form a family by midlife ($p < .05$). Separate binomial logistic regression analyses of Model 2 found male singular marijuana users four times more likely than nonusers to parent first ($p < .01$), five times more likely to cohabit first ($p < .001$), and more than twice as likely to marry first than not form a family ($p < .05$). Alcohol or other illegal drug use was not statistically significant except for alcohol concurrently used with marijuana (male users were twice as likely as nonusers to marry as opposed to not form a family).

One explanation for these results is that men's reasons for using marijuana may be similar to their reasons for using alcohol. Some research has found alcohol used as a social lubricant to lower stress, enhance self-image, and lessen social anxiety (Moeller and Crockett, 2009; Siquiera et al., 2001; Skogen et al., 2009; Windle and Wiesner, 2004). To the extent they aim for and obtain that result, alcohol use may increase the number of romantic partners (Grossman et al., 2004; Santelli et al., 2001) and the likelihood of marriage. Indeed, social and sexual facilitation is a major component of Schafer and Brown's (1991) construct of marijuana-use expectancies, and some research has found young people (particularly males) who *expect* marijuana use to lessen their social and sexual anxiety are more likely to use it for that purpose (Buckner and Schmidt, 2008; Kingree and Thompson 2007). Thus, socially anxious young men who want a serious romantic relationship may turn to marijuana use to facilitate obtaining one. To the extent that marijuana use *does* facilitate partnerships, the finding that adolescent male marijuana users subsequently are more likely to marry than remain single suggests that goal was achieved.

Conversely, girls' use of illegal drugs, singly or concurrently with alcohol or marijuana, increased the likelihood that no family was formed as opposed to marriage first more than three and one-half times (supporting Hypotheses 1, 2, 3, and 4c). In the mid-1980s, when the subjects were most likely to form their families, there was greater stigma attached to women's than men's illegal drug use. Moreover, mothers were expected to shoulder the bulk of childrearing responsibilities. In that cultural context, female illegal drug users may have anticipated more marital role strain than their male counterparts, prompting them (more than their male counterparts) to defer marriage.

Conclusions

This study achieved its main purpose of extending knowledge of the family formation behavior of adolescent substance users. The analytical plan was careful to tempo-

rally order the substance use and control variables before family formation by setting them in 1979. First family type was constructed from 25 years of relationship and fertility histories. Although this approach had the advantage of providing a larger and older sample of subjects with completed first family formation compared with previous studies, changes in substance use behavior and other factors between 1979 and family formation were not considered. Thus, the extent to which the results specify the effects of adolescent substance use *per se* or the effects of substance use and/or other time-varying factors present or absent in the interim is unknown. Event history analysis would address the question of causality.

The analysis included measures of 25 factors for the purpose of controlling their effects on family formation behavior. As a group, they made a substantial contribution net of the effects of substance use (Nagelkerke's $R^2 = .365$). Many of them made individual contributions to predicting first family type. Childhood religious affiliation, age at first intercourse, church attendance, parents' socioeconomic status, and future aspirations had the largest influence. It is important to note that there were statistically significant gender, racial/ethnic, and rural/regional differences in the extent to which these factors influenced family formation behavior.

Although beyond the scope of this article, age at first use and frequency of use are important aspects of substance use behavior related to family formation (Cooper, 2002; Lowry et al., 1994; Martino et al., 2004; Power et al., 1999). In separate analyses, younger ages at first alcohol, marijuana, and other illegal drug use significantly increased the likelihood of nonmarital family formation, particularly cohabitation, net of the effects of frequency of use in 1979. On the other hand, net of the effects of age at first use, more frequent alcohol use *decreased* the likelihood of nonmarital family formation and the frequency of marijuana use was not significantly related to first family type. These separate analyses also found substantive and statistically significant differences by gender. Frequency of and age at first substance use as they relate to family formation behavior are examined in a separate article.

The norms of family roles have changed since the 1980s when these subjects were most likely to form their first families. Cohabitation is now a normative step in the family formation process; gay and lesbian families, invisible in the 1980s, are proportionally increasing and gaining social acceptance and legal sanction. The very meaning of marriage has changed (Cherlin, 2004, 2005). Adolescent substance use behavior also has changed; today's adolescents are less likely to use illegal drugs and more likely to misuse prescription drugs than in the past (Johnston et al., 2008). Research on younger cohorts may reveal different ways that substance use relates to family formation in the 21st century.

Follow-up research also might examine the relationship of alcohol use to family formation in more detail. The vast majority of these subjects used alcohol (about .90), and its

popularity has not waned over time. Every substance use indicator that included alcohol was statistically predictive of first family type and the family formation behavior of alcohol users significantly differed among the types of alcohol use ($p < .01$).

Although pre-union pregnancies are socially disruptive and physically risky for prospective mothers and their unborn children, as well as costly for families and society, many of these risks end if the pregnancy ends before childbirth. The consequences of pre-union parenthood, however, affect mothers and children, extended families, and communities in complex ways for relatively longer periods. Research aimed at understanding the role that abortion and contextual factors play in the relationship of substance use to pre-union parenthood may be vital to moving beyond assumptions that an increased risk of pre-union pregnancy necessarily means an increased risk of pre-union parenthood.

The subjects of this study generally formed their first families during a period in which there was considerable familial and societal pressure to conform to normative ordering and timing of family formation events alongside an open cultural ambivalence toward gender roles and the institution of the family (Thornton and Young-DeMarco, 2001). Adolescent and young adult substance use was at its three-decade peak (Johnston et al., 2008) in the 1980s. In the mainstream culture of the 1980s, conservatives argued that substance use threatened the very fabric of the family whereas advocates of the counter-culture argued that individuals' rights to self-realization and personal gratification were as or more important than the conventional family (Kingwood College Library, 2006). Regardless of one's position on the uses and misuses of substances and the growing social acceptability of alternative family types, in the 1980s, when these subjects were most likely to marry, cohabit, or parent for the first time, substance use behavior was in conflict with the dominant cultural expectations of marital roles, and combining the two would be expected to yield considerable role strain. Some substance users apparently responded by choosing alternative nontraditional paths to adult family life.

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