AN EXAMINATION OF PARENTAL AND PEER INFLUENCE ON SUBSTANCE USE AND CRIMINAL OFFENDING DURING THE TRANSITION FROM ADOLESCENCE TO ADULTHOOD

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Although peer behavior and parent–child conflict have been associated with adolescent and young adults' behavior, prior studies have not adequately controlled for selection effects and other confounders, or examined whether associations change across the transition to adulthood or by race. Using annual data from men followed from age 17 to 26, within-individual change models examined whether substance use or offending increased in the year after boys began affiliating with friends who engaged in substance use/offending and/or experienced increased parent–son conflict. Moderation analyses tested whether associations varied by age or race. Alcohol use, marijuana use, and offending (Black participants only) increased in the year after boys began affiliating with more peers who engaged in similar behaviors. Associations were strongest during adolescence for substance use. Parent–son conflict was not associated with the outcomes. Findings underscore the importance of developmental and racialized differences in understanding the role of social influences on young men's substance use and offending.

Keywords: peer influence; parental influence; social influences; offending; substance use; socialization; adolescence; transition to adulthood

Social influence models emphasize the importance of parent–child conflict and peer behavior as key factors driving the development of adolescent substance use and criminal offending. However, longitudinal studies supporting this assertion have not adequately ruled out the possibility that observed associations are due to selection effects or other confounding variables. Moreover, few studies have examined the relative influence of parents versus peers in substance use and offending from late adolescence through the mid-20s. This is an important epoch to study because heavy substance use and offending tend to peak and then decline from adolescence to young adulthood, while youth are gaining greater control over their social relationships. The purpose of this article is to stringently test whether changes in parent–child relationship quality and peer networks influence subsequent changes in substance use and offending from adolescence to young adulthood using a longitudinal sample of Black and White males. Importantly, we also examined whether the strength of associations varied by age or between Blacks and Whites.

BACKGROUND

Two of the most commonly studied sources of social influence in adolescence are parents and peers. Indeed, many studies have found that parental monitoring and supervision are important factors in preventing substance use and offending during adolescence (Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006; Guo, Hill, Hawkins, Catalano, & Abbott, 2002; Pardini, Loeber, & Stouthamer-Loeber, 2005; Van Ryzin, Fosco, & Dishion, 2012). For example, parental monitoring is believed to exert a largely indirect influence on these behaviors by peer selection or by reducing the amount of unstructured time youth spend with antisocial friends (Abar & Turrisi, 2008; Pardini et al., 2005; Van Ryzin et al., 2012). However, the control parents have over their adolescents' whereabouts dissipates during late adolescence, as youth gain autonomy and begin establishing adult roles. What remains unclear is whether other aspects of an evolving parent–son relationship continue to influence substance use and offending during the transition to early adulthood. Some limited longitudinal evidence suggests that adolescents who establish an emotionally supportive and nonpunitive relationship with their parents during the late teens and early 20s are less likely to exhibit substance use and criminal offending in later adulthood (Johnson, Giordano, Manning, & Longmore, 2011). Importantly, evidence suggests that this association may not be fully explained by parental influences on peer group selection (Johnson et al., 2011). However, associations

between parent–child relationship quality and offspring behavior could also just reflect time-invariant shared risk factors that underlie both parent–child relationship quality and offspring behavior.

In addition to parents, affiliating with peers who engage in antisocial and illegal behavior is one of the most robust correlates of substance use and offending during adolescence and young adulthood (Dodge, Dishion, & Lansford, 2006; Vitaro, Brendgen, & Lacourse, 2015). However, it is unclear if peers' behavior actually increases risk for adolescent and young-adult problem behaviors (a socialization effect), or if adolescent and young-adult problem behavior/antisocial predispositions simply increase risk for delinquent peer group affiliation (a selection effect). Interestingly, some studies suggest that up to 86% of the association between peer delinquency and adolescents' own delinquency might be explained by homophily (tendency for individuals to affiliate with those who share similar interests and attitudes), consistent with a selection effect (Kandel, 1978; Vitaro et al., 2015). However, one study of overt peer pressure found that only 37% of the covariance between peer pressure and self-report of delinquency across adolescence was due to homophily, which the authors interpreted as genetic underpinnings (giving some support to selection processes), while the remaining 63% was due to nonshared environmental influences (potentially supporting socialization; Connolly, Schwartz, Nedelec, Beaver, & Barnes, 2015). Socialization effects of peer delinquency have also been reported in intervention studies (i.e., "deviancy training"; (Dishion, McCord, & Poulin, 1999; Dodge et al., 2006; Lipsey, Petrie, Weisburd, & Gottfredson, 2006; Poulin, Dishion, & Burraston, 2001; Werch & Owen, 2002), laboratory or experimental studies (confederate modeling or direct encouragement of behaviors; Borsari & Carey, 2001; Gardner & Steinberg, 2005), and longitudinal studies (Monahan, Steinberg, & Cauffman, 2009; Samek, Goodman, Erath, McGue, & Iacono, 2016).

A major criticism of longitudinal research examining the influence of peers and parents on substance use and offending is the failure to account for selection effects, shared preexisting risk factors, and other potential confounding factors. One under-utilized way to control for these factors is to use within-individual change modeling. By focusing on change within individuals, time-stable effects of all constant, preexisting factors (e.g., early rearing environment, antisocial predisposition)—whether measured or not—are inherently controlled (Allison, 2009). To our knowledge, only one longitudinal study has used fixed effects regressions within the context of within-individual change models to examine whether changes in peer delinquency were associated with changes in adolescents' substance use and illegal behavior (Fergusson, Swain-Campbell, & Horwood, 2002). However, the investigators only examined concurrent associations and therefore did not establish temporal ordering. The finding that changes in peer delinquency correlated with changes in adolescents' problem behavior over the same timeframe could be due to selection effects, socialization effects, co-offending, or a combination of these processes. Furthermore, the study only followed participants until ~age 21, so it is unclear how these processes unfold during the transition to adulthood. In addition, we are not aware of a similar study that has examined associations between changes in parent–child relationship quality and offspring behavior in within-individual change models.

PRESENT STUDY

This study examined whether parent–child relationships and peers prospectively predicted substance use (alcohol, marijuana) and criminal offending (violence, theft) in a sample of young men who were interviewed annually for 10 years. In an effort to maximize the test of socialization and minimize the influence of selection effects and other shared risk factors, the present student utilized within-individual change models and exclusively examined the prospective associations. We examined our research questions using a sample of males, given that base rates of serious violence and theft are generally too low in community samples of young women to examine within-person variability. Because the goal of the study was to examine peer socialization processes, we examined whether friends had general or behavior-specific (e.g., whether exposure to peers who engage in a greater diversity of delinquency is more likely to lead to increased marijuana use than exposure to a greater proportion of friends who specifically use marijuana) effects on youths' behavior, as behavior-specific associations offer stronger evidence of direct socialization pathways (Thomas, 2015; Warr, 2002). Given that most studies have used general measures of peer delinquency, an examination of the behavior-specific correlations between peers and participants is an important contribution. Finally, we examined whether associations varied by age and race, given evidence suggesting that associations might be strongest in adolescence (Cleveland, Feinberg, Bontempo, & Greenberg, 2008; Cleveland, Feinberg, & Jones, 2012; Ferguson & Meehan, 2011; Fergusson et al., 2002; Gardner & Steinberg, 2005; Monahan et al., 2009; Samek et al., 2016) and may differ by race (Brannock, Schandler, & Oncley, 1990; Catalano et al., 1992; Matsueda & Heimer, 1987; Mrug & McCay, 2013).

METHOD

DESIGN AND SAMPLE

The sample consisted of boys enrolled in the oldest cohort of the Pittsburgh Youth Study. In 1987-1988, boys were randomly selected from seventh-grade students attending public schools to participate in a multi-informant screening (youth-, parent-, and teacher-reported data). Boys who scored in the upper third on conduct problems at screening were invited to participate in a longitudinal follow-up study ($n = 257$), and a roughly equal number of boys ($n = 249$) were randomly selected from the remaining end (total $N = 506$; 54.6% Black, 41.7% White, 3.8% Other). Following screening ($M_{age} = 13.38$ years, $SD = 0.79$), boys were assessed every 6 months for 30 months, followed by 10 annual interviews. The analysis in the present study utilized the 10 annual assessments from mean age 17 (range = 15-19) to mean age 26 (range = 24-29) to capture friend and parenting relationships during adolescence and the transition to young adulthood and to ensure that the recall period was the same for all measurement occasions used. Sample retention ranged from 83.2% to 93.3% for the assessments used in the present study. Because one of the goals in the present study was to examine racial differences in the strength of social influences, and more than 96% of the sample identified as Black or White, men who reported another race ($n = 19$) were not included. Parental consent and youth assent were obtained for all participants. Study procedures were approved by the University's Institutional Review Board. Further study details are available elsewhere (Loeber, Farrington, Stouthamer-Loeber, & White, 2008).

MEASURES

Demographics

At the initial screening, primary caretakers reported the boys' race. Race was dichotomized to indicate whether the boy was Black or White (1 = Black; 0 = White). As mentioned previously, boys who were another race were not included in the present analysis (n = 19). Primary caretakers also provided the boys' date of birth, which was used to calculate the participant's age at each interview.

Participant's Substance Use (Ages 17-26)

Frequency of marijuana use and alcohol use were assessed at each interview with the Substance Use Questionnaire (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). Specifically, at each annual assessment, participants reported the number of days in the past year (0-365) that they used each substance.

Participant's Offending (Ages 17-26)

Participant offending was assessed with 14 items from the Self-Reported Delinquency scale at each interview (Elliott, Huizinga, & Ageton, 1985). Each item asked participants to state whether they had engaged in different criminal behaviors in the past year ("In the past year, have you X?"). Items assessed relatively serious violence (gang fighting, forcible robbery, attacked with a weapon or with the idea of seriously hurting another person, raped, coerced sex) and theft (broken into a building to stealing something, stolen a motor vehicle, broke and entered stolen motor vehicle, went joyriding, stolen a purse/wallet, stolen from a car, stolen anything worth more than US$5, dealt stolen goods). Because of negative skew at all ages, and relatively low base rates at the older ages, a binary variable indexing offending (or not) was created at each age (1 = engaged in violence/theft; 0 = did not engage in violence/theft).

Parent–Son Conflict (Ages 17-26)

Parent–son conflict with the primary caretaker (approximately 91% female) was assessed at all interviews using five items from the Relationship With Primary Caretaker questionnaire (Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikstrom, 2002). Participants reported how often they experienced conflict with their primary caretaker (e.g., "how often have you thought that your caretaker really bugged you") using a 3-point Likert-type scale ranging from 0 (*never*) to 2 (*often*). Reliability was acceptable at all timepoints (average α = .783, ranged from .723-.845).[1]

Friends' Substance Use and Offending (Ages 17-26)

Friends' substance use (marijuana, alcohol) and offending were assessed with 10 items from the Peer Delinquency Scale (Loeber et al., 1998). Items asked youth to state the proportion of friends that had engaged in various behaviors in the past year using a 5-point Likert-type scale ranging from 0 (*none*) to 4 (*all*). Alcohol and marijuana use were assessed using individual items that represented the proportion of friends that had used alcohol or

marijuana in the past year. Friend offending was the sum of eight items that assessed the proportion of friends that had engaged in violence (e.g., attacked a person, committed a forcible robbery) or theft (e.g., stolen something, gone joyriding; average α = .904, ranged from .815-.938).

STATISTICAL ANALYSIS

All analyses were conducted in Stata version 13.1. Fixed effect (within-individual change models) regressions were used to examine the extent to which substance use and offending systematically changed as a function of past-year parent–son conflict and friend behavior during adolescence and the transition to adulthood. These within-individual change models used participants as their own controls, thereby inherently controlling for time-stable effects of all unchanging characteristics of the individual—whether measured or not (Allison, 2009). Because the analysis exclusively focused on change in substance use and offending, only predictors that changed within individuals could be included as possible explanatory variables. Factors that do not change within individuals might explain average differences between individuals, but they do not explain why an individual fluctuates from year-to-year. Fixed effects binary logistic regressions were used to estimate change in offending using Stata 13.1's xtlogit program.

Fixed effects negative binomial regressions were used to model within-individual change in the yearly counts of days of marijuana and alcohol use, given that these data were count variables and positively skewed. Negative binomial regressions are ideal for these data given that they were designed to be used with count data (Long, 1997) and they can accommodate over-dispersed data (i.e., situations where the standard deviation is greater than mean). Compared with other methods (e.g., bootstrap or jackknife estimation with Poisson regressions), negative binomial regressions produce more efficient coefficients and more accurate standard errors (Allison, 2009). Because Stata 13.1 does not have a program to accurately estimate true fixed effects negative binomial regressions (Allison & Waterman, 2002), standard negative binomial regressions with dummy-coded IDs (except one) and outer product of gradient standard errors were used (Allison, 2009).

In a preliminary analysis that examined associations between the three friend behaviors (friend marijuana use, friend alcohol use, friend offending) and the three outcome variables (participant marijuana use, participant alcohol use, participant offending), results demonstrated significant specificity in the nature of the associations (Supplemental Table 1). Based on these analyses, final models only included the concordant friend behavior (e.g., friend marijuana use predicting participant marijuana use).

In the first step of the primary analysis, we examined the extent to which parent–son conflict and concordant friend behavior at one time-point (Time T) were associated with participant behavior at the next time-point (Time T + 1), controlling for age and age^2 to account for both linear and nonlinear change (Model 1). Next, we repeated the previous main effects models and added statistical interactions between each predictor (friend behavior, parent–son conflict) and age, age^2, and race (Model 2). Although it is not possible to obtain main effects for time-invariant (e.g., race) factors in fixed effects models, it is possible to interact time-invariant factors with time-varying factors (e.g., peer substance use). When significant interactions with age^2 were observed, we probed the interaction by recentering age to clarify the nature of the interaction. We also examined three-way interactions

between each predictor, race, and age/age^2, but none were significant and are therefore not discussed.[2] To complement our primary analysis, we examined the opposite direction as one proxy for selection effects or reverse causation in two fixed effects models: participant behavior predicting parent–son conflict in the next year (Table 3) and participant behavior predicting concordant friend behavior in the next year (Table 4). For both of these analyses, we used fixed effects linear regressions, given the fairly normal distribution of these outcome variables. Because all fixed effects regressions focus on change within individuals, participants who demonstrated no change on any particular outcome variable were automatically dropped from that analysis. For example, an individual who never offended would have nothing substantively to contribute to a parameter representing the change in the odds of offending and thus this individual would be automatically dropped from that analysis. As such, the analytic sample sizes vary for each outcome variable.

MISSING DATA

Approximately 61% of the sample provided data at all interviews and 74% provided data for at least nine of the 10 measurement occasions. We regressed missingness (any missing data vs. none) on race as well as the three outcomes at all 10 time-points. The only difference between men who did ($n = 191$) and did not ($n = 296$) complete all 10 assessments was that men who were missing data were more likely to be Black (odds ratio [OR] = 2.12, $p < .001$). All available data were used to generate model parameters with maximum likelihood estimation.

RESULTS

DESCRIPTIVE STATISTICS

Participant marijuana use peaked around age 22, when participants were using an average of 1.2 times per week ($M = 64.0$ times in the past year; $SD = 120.1$). Participant alcohol use peaked around age 23, when participants were using an average of 1.8 times per week ($M = 91.1$ times in the past year; $SD = 109.5$). The prevalence of offending was highest around age 18, when approximately 30.3% of participants reported engaging in at least one theft or violent offense. Parent–son conflict was highest at Time 1 (around age 17) and decreased across adolescence and the transition to adulthood. Peer marijuana use and peer alcohol use were highest around ages 20 and 22, respectively, while peer offending peaked a little earlier (around age 19). See Table 1 for additional descriptive statistics.

MARIJUANA USE

Changes in parent–son conflict were not significantly associated with changes in next-year marijuana use (Table 2; Model 1), and none of the interactions between parent–son conflict and age or race were significant (Table 2; Model 2). However, friend marijuana use was significantly associated with participants' next-year marijuana use (OR = 1.39; 95% confidence interval [CI] [1.20, 1.60]). Specifically, when participants reported higher friend marijuana use, their own marijuana use was significantly higher in the following year relative to other years (Table 2; Model 1). Furthermore, significant interactions with age (linear OR = 0.79; 95% CI [0.64, 0.97]; quadratic OR = 1.02; 95% CI [1.00, 1.04]) demonstrated that the magnitude of this effect was largest in adolescence and decreased

TABLE 1: Descriptive Statistics for Analysis Variables

Analysis variable	Time 1 M/% (SD/n)	Time 2 M/% (SD/n)	Time 3 M/% (SD/n)	Time 4 M/% (SD/n)	Time 5 M/% (SD/n)	Time 6 M/% (SD/n)	Time 7 M/% (SD/n)	Time 8 M/% (SD/n)	Time 9 M/% (SD/n)	Time 10 M/% (SD/n)
Age	16.9 (0.8)	17.9 (0.8)	18.9 (0.8)	19.9 (0.8)	21.0 (0.8)	21.9 (0.8)	22.9 (0.8)	23.9 (0.8)	24.9 (0.8)	26.0 (0.8)
Marijuana use	9.7 (46.7)	22.6 (75.2)	41.7 (98.5)	54.9 (109.6)	62.4 (115.4)	64.0 (120.1)	58.8 (116.1)	48.0 (105.9)	41.0 (98.0)	43.5 (104.3)
Alcohol use	23.4 (61.5)	35.0 (73.3)	51.4 (91.4)	64.7 (101.8)	72.8 (105.5)	76.2 (99.4)	91.1 (109.5)	79.5 (100.4)	77.7 (98.1)	82.7 (105.0)
Offending	28.3% (117)	30.3% (122)	23.8% (108)	24.3% (106)	21.3% (89)	13.6% (58)	10.5% (44)	7.4% (31)	8.6% (35)	3.0% (12)
Parent–son conflict	3.6 (2.3)	3.5 (2.4)	3.1 (2.2)	2.6 (2.3)	2.5 (2.1)	2.3 (2.1)	2.2 (2.1)	2.1 (2.1)	2.0 (2.1)	1.9 (2.0)
Peer marijuana	0.9 (1.2)	1.4 (1.3)	1.6 (1.4)	1.8 (1.5)	1.6 (1.5)	1.5 (1.5)	1.4 (1.4)	1.4 (1.4)	1.3 (1.4)	1.4 (1.4)
Peer alcohol	1.7 (1.3)	2.0 (1.4)	2.2 (1.4)	2.3 (1.5)	2.3 (1.5)	2.6 (1.5)	2.2 (1.5)	2.3 (1.5)	2.1 (1.5)	2.4 (1.3)
Peer offending	3.9 (4.7)	4.3 (5.3)	4.8 (6.4)	4.2 (5.7)	3.1 (5.1)	2.6 (4.5)	2.1 (3.9)	2.2 (4.4)	1.8 (3.7)	1.1 (2.8)

Note. Means and standard deviations reported for all variables except offending. Percent and *n* reported for offending.

TABLE 2:   Within-Individual Associations Between Changes in Friend Behavior and Parent–Son Conflict and Changes in Next-Year Substance Use and Offending in Young Men

Model	Marijuana use		Alcohol use		Offending	
	IRR	95% CI	IRR	95% CI	OR	95% CI
Model 1 (main effects only)						
Parent–son conflict	1.02	[0.91, 1.13]	0.98	[0.94, 1.03]	1.07	[0.99, 1.15]
Concordant friend behavior	1.39***	[1.20, 1.60]	1.25***	[1.17, 1.33]	1.03*	[1.00, 1.05]
Age (linear age)	1.47**	[1.14, 1.89]	1.58***	[1.42, 1.75]	0.81*	[0.68, 0.95]
Age^2 (quadratic age)	0.96**	[0.94, 0.99]	0.97***	[0.96, 0.98]	0.99	[0.97, 1.01]
Model 2 (main effects and interaction model)						
Parent–son conflict by race	0.91	[0.74, 1.13]	0.99	[0.90, 1.08]	0.92	[0.80, 1.06]
Parent–son conflict by age	1.06	[0.94, 1.19]	1.02	[0.97, 1.07]	0.99	[0.92, 1.07]
Parent–son conflict by age^2	1.00	[0.98, 1.01]	1.00	[0.99, 1.00]	1.00	[0.99, 1.01]
Concordant friend behavior by race	0.90	[0.66, 1.23]	0.94	[0.83, 1.07]	1.06*	[1.00, 1.12]
Black	—	—	—	—	1.10*	[1.01, 1.19]
White	—	—	—	—	1.04	[0.96, 1.12]
Concordant friend behavior by age	0.79*	[0.64, 0.97]	0.85***	[0.78, 0.91]	0.98	[0.95, 1.02]
Concordant friend behavior by age^2	1.02*	[1.00, 1.04]	1.01***	[1.01, 1.02]	1.00	[1.00, 1.01]
Concordant friend behavior at age 16	2.62***	[1.53, 4.48]	1.88***	[1.55, 2.28]	—	—
Concordant friend behavior at age 18	1.75***	[1.30, 2.37]	1.42***	[1.26, 1.61]	—	—
Concordant friend behavior at age 20	1.38*	[1.05, 1.81]	1.21**	[1.08, 1.36]	—	—
Concordant friend behavior at age 22	1.28	[0.97, 1.69]	1.16*	[1.03, 1.30]	—	—
Concordant friend behavior at age 24	1.39*	[1.02, 1.91]	1.25***	[1.10, 1.41]	—	—

Note. Analysis sample size: Marijuana (*n* = 319; observations = 2316); Alcohol (*n* = 451; observations = 3292); Offending (*n* = 241; observations = 1850). Analysis sample size varies because only individuals who experience change on the outcome variable are included in the analysis (model default). Fixed effects negative binomial regression used in models predicting alcohol and marijuana frequency. Fixed effects binary logistic regressions used in models predicting offending. Interactions probed in final model by rotating and/or recentering age/race. Only significant interactions were probed and therefore simple effects were not reported by race or age for nonsignificant interactions (i.e., cells with dashes). IRR = incidence rate ratio; CI = confidence interval; OR = odds ratio.
*p < .05. **p < .01. ***p < .001.

until about age 22 (ORs from 2.62 to 1.28), and then demonstrated a slight increase around age 24 (OR = 1.39; Table 2, Model 2). The interaction between friend marijuana use and race was not significant.

ALCOHOL USE

Changes in parent–son conflict were not associated with changes in next-year alcohol use (Table 2; Model 1), and this effect did not vary by age or race (Table 2; Model 2). However, when friend alcohol use increased, participants' own alcohol use in the following year was significantly higher than other years (OR = 1.25; 95% CI [1.17, 1.33]; Table 2; Model 1). Furthermore, significant interactions with age (linear OR = 0.85; 95% CI [0.78,

TABLE 3: Potential Reverse Causation: Within-Individual Associations Between Changes in Participant Behavior and Next-Year Changes in Parent–Son Conflict in Young Men (T$_{\text{participant behavior}}$ T + 1$_{\text{parent–son conflict}}$)

Model	t	p
Model 1 (main effects only)		
Participant marijuana use	0.89	.372
Participant alcohol use	0.82	.411
Participant offending	0.67	.502
Age	−10.67***	<.001
Age^2	6.44***	<.001
Model 2 (interaction model)		
Participant marijuana by race	0.65	.518
Participant marijuana by age	−0.13	.899
Participant marijuana by age^2	−0.06	.951
Participant alcohol by race	0.54	.589
Participant alcohol by age	1.30	.193
Participant alcohol by age^2	−0.92	.358
Participant offending by race	−1.57	.116
Participant offending by age	−2.54*	.011
Participant offending by age^2	2.44*	.015
Age 16	2.91**	.004
Age 18	1.85	.065
Age 20	0.24	.811
Age 22	0.26	.792
Age 24	1.36	.175

Note. Fixed effects linear regressions. Significant interaction between participant offending and age^2 probed by rotating and recentering age for illustrative purposes. Only significant interactions were probed.
*p < .05. **p < .01. ***p < .001.

0.91]; quadratic OR = 1.01; 95% CI [1.01, 1.02]) demonstrated that the magnitude of this effect was largest in adolescence and decreased until about age 22 (ORs from 1.88 to 1.16), and then demonstrated a slight increase around age 24 (OR = 1.25), following a similar pattern as the one observed for marijuana use (Table 2; Model 2). The interaction between friend alcohol use and race was not significant (Table 2; Model 2).

OFFENDING[3]

Young men's likelihood of offending did not fluctuate based on changes in past-year parent–son conflict (Table 2; Model 1). None of the interactions between age or race with parent–son conflict were significant (Table 2, Model 2). However, young men's odds of offending were significantly elevated in years following an increase in friend offending (OR = 1.03; 95% CI [1.00, 1.05]; Table 2; Model 1). The interaction between friend offending and race was significant (OR = 1.06; 95% CI [1.00, 1.12]), indicating that the effect of prior friend offending was significantly associated with participants' own offending only for Black young men (Black OR = 1.10; 95% CI [1.01, 1.19]; White OR = 1.04; 95% CI [0.96, 1.12]; Table 2, Model 2). The interactions between friend offending and age were not significant.

POTENTIAL REVERSE CAUSATION

As shown in Table 3, the main effect of participant behavior—in any of the three domains—was not predictive of parent–son conflict in the following year (Model 1).

TABLE 4: **Potential Reverse Causation: Within-Individual Associations Between Participant Behavior and Next-Year Changes in Friend Behavior in Young Men (T$_{participant\ behavior}$ T + 1$_{peer\ behavior}$)**

	Friend marijuana use		Friend alcohol use		Friend offending	
Model	t	p	t	p	t	p
Model 1 (main effects only)						
Concordant participant behavior	6.49***	<.001	4.61***	<.001	5.31***	<.001
Age	3.08**	.002	5.16***	<.001	−3.99***	<.001
Age^2	−3.82***	<.001	−4.70***	<.001	−0.25	.805
Model 2 (interaction model)						
Concordant participant behavior by race	−0.60	.548	−0.98	.326	1.82	.069
Concordant participant behavior by age	−1.89	.058	−4.73***	<.001	−1.41	.159
Concordant participant behavior by age^2	1.37	.170	4.14***	<.001	0.10	.923
Age 16	—	—	6.26***	<.001	—	—
Age 18	—	—	5.92***	<.001	—	—
Age 20	—	—	3.11**	.002	—	—
Age 22	—	—	1.57	.116	—	—
Age 24	—	—	2.32*	.020	—	—

Note. Fixed effects linear regressions. Significant interaction between participant behavior and age^2 (alcohol use only) probed by rotating and recentering age for illustrative purposes. Only significant interactions were probed and therefore simple effects were not reported by race or age for nonsignificant interactions (i.e., cells with dashes).
*p < .05. **p < .01. ***p < .001.

However, the interaction between participant offending and age was significant (linear age $t = −2.54$; $p = .011$); quadratic age $t = 2.44$; $p = .015$). Post hoc probing of this effect indicated that increases in participant offending were only associated with increases in next-year parent–son conflict around age 16 ($t = 2.91$; $p = .004$; Table 3, Model 2).

Participant marijuana use, alcohol use, and offending were significantly associated with participants' proclivity to affiliate with friends who engaged in these same behaviors in the following year (*t*s from 4.61 to 6.49; *p* values < .001; Table 4, Model 1). The interaction between participant alcohol use and age was significant (linear age $t = −4.73$; $p < .001$; quadratic age $t = 4.14$; $p < .001$), suggesting that the strength of the association between participants' behavior and next-year friend alcohol use was strongest in adolescence age 16 ($t = 6.26$; $p < .001$), decreased until around age 22 ($t = 1.57$; $p = .116$), and then demonstrated a slight increase around age 24 ($t = 2.32$; $p = .020$; Table 4, Model 2).

DISCUSSION

The present study examined the socialization effects of parents and friends on young men's substance use and criminal offending during adolescence and the transition to adulthood. Specifically, this study examined the prospective within-individual associations between changes in parent–son conflict and friend behavior and next-year changes in young men's substance use and offending. Rigorous analyses controlled for the simultaneous effects of friend substance use/friend offending and parent–son conflict, developmental

trends in behavior, and time-stable effects of all time-invariant and preexisting confounding factors. Results suggested that friends indeed exert a socialization effect on substance use and offending during adolescence and young adulthood, although there was no evidence of socialization by parents. Importantly, these associations were not due to selection effects as these factors were minimized by focusing on change within individuals and by focusing on the prospective associations between parents/peers and young men's behavior in the next year.

Consistent with peer-influence models, findings indicated that young men engaged in greater marijuana use, alcohol use, and offending (Black men only) in the year after they were exposed to a greater proportion of friends who engaged in the same type of behavior. Interestingly, there was substantial specificity in the nature of the associations between friends' behavior and young men's own behavior. The strongest predictor of substance use and offending during adolescence and young adulthood was the extent to which a young man's friends engaged in the same behavior—and not simply whether his friends engaged in substance use and offending more broadly. Given that socialization implies that friends model, reinforce, and normalize specific behaviors, the correspondence between friends' behavior and participants' own behavior seems to provide support for a socialization pathway (Thomas, 2015; Warr, 2002).

Similar to other longitudinal studies, we found that the strength of peer influence on alcohol and marijuana use was strongest during the teenage years and subsequently dissipated through the mid-20s (Cleveland et al., 2008; Cleveland et al., 2012; Ferguson & Meehan, 2011; Fergusson et al., 2002). This developmental shift is consistent with the idea that behavioral autonomy and resistance to peer influence increase throughout adolescence and young adulthood (Brown & Larson, 2009; Steinberg & Monahan, 2007; Sumter, Bokhorst, Steinberg, & Westenberg, 2009). In contrast, findings indicated that the strength of peers' influence on offending, which was only apparent for Black men, did not change across the transition to adulthood. This suggests that the social context in which peer affiliation occurs might be particularly important for understanding factors that disrupt desistance for Black men. Interestingly, the present study also demonstrated evidence of friend selection effects (i.e., participant behavior predicting friend behavior in the next year) for marijuana use, alcohol use, and offending, consistent with other research (Scalco, Trucco, Coffman, & Colder, 2015; Vitaro et al., 2015). This is also consistent with other studies suggesting that selection processes, homophily, or genetic influences on behavior continue to be powerful explanatory factors into young adulthood (e.g., Bergen, Gardner, & Kendler, 2007). Taken together, findings suggest that adolescents and young adults both join social groups with like-minded peers and are influenced by their choice of friends.

Unlike the effects of friend behavior, there was no evidence that parent–son conflict influenced changes in substance use and offending during the study period. Future research should explore whether other characteristics of parents (e.g., parental substance use and offending) are associated with subsequent changes in young men's substance use and offending. Interestingly, our data showed some evidence in support of the reverse pathway: participant offending predicting increases in parent–son conflict during the following year—but only in adolescence. Perhaps this is because parents of adolescents are more privy to—or feel more responsible for—their children's behavior than parents of young adults.

LIMITATIONS

The current study focused on a slightly high-risk community sample of adolescent and young-adult men. Therefore, the findings may not generalize to female, clinical, and justice system populations. Furthermore, the measures of friends' substance use and offending were based on the study participants' perception of their friends' behavior, which might not accurately reflect the true prevalence of certain behaviors. However, it is likely that adolescent and young adults' perception of social norms regarding substance use and illegal behavior are more influential than the actual prevalence of these behaviors. In addition, our measure of parental influence consisted of items that assessed the young man's perception of the parent–child relationship quality. We may have found a significant effect of parenting if we used a measure of parental substance use or offending—items that would have been more concordant with the outcome variables—or used parent-reported parent–child conflict. Future research should examine the extent to which measures of parental substance use and offending, and parent-reported relationship quality, are associated with adolescent and young adults' substance use and offending.

In addition, although we found race-specific effects of peers in the present study, Black participants were more likely to have missing data than White participants. However, we have no reason to suspect that racial differences in attrition influenced the findings in the direction of the observed results, given the relatively small effect of racial differences in attrition and that having missing data was not associated with any of the outcome variables. Future studies should develop and implement procedures to prevent racial disparities in sample retention. Moreover, we focused on moderate and serious offending, and results may not extend to minor offending. Future studies should examine the effects of peers and parents with additional measures of offending. Finally, the present study only examined the influence of peers and parents. Other sources of social influence (e.g., romantic partners, siblings) might affect the outcomes studied here (Osgood, 2010; Siennick et al., 2014). Future research should also include additional time-varying covariates.

CONCLUSION

Friends appear to have a behavior-specific influence on young men's future substance use and offending. Indeed, the best predictor of adolescent and young adults' substance use and offending was the extent to which his friends engaged in the same behavior. However, there are important racialized and developmental differences in the strength of this influence. For example, although both White and Black young men's marijuana use and alcohol use were influenced by their friends' substance use in the previous year, only Black young men engaged in more offending in the year after a higher proportion of their friends engaged in offending. Furthermore, the impact of peer substance use was stronger in adolescence than young adulthood for both marijuana use and alcohol use. Importantly, none of these associations could be explained by time-invariant confounding factors that might contribute to selection effects as these factors were inherently accounted for in the analysis.

This study highlights the strong socializing influence of friends during adolescence and the transition to adulthood. The findings demonstrate that the behavioral similarities among peers are not just due to selection forces driving like-minded peers together. Indeed, the findings showed that when a greater proportion of young men's peers engaged in substance use or offending (Black only), young men increased their own marijuana use, alcohol use,

and offending in the following year, respectively. Intervention and prevention programs for substance use and offending should not underestimate the critical role of friends—even in young adulthood. The relative strength of the associations during adolescence highlights the need for prevention programs to start in early adolescence—when peer influence is strongest and before substance use peaks around age 22 to 23. Prevention and intervention programs should also aim to change youths' perception of social norms regarding substance use and illegal behavior by strengthening relationships and connections with positive peers. Insofar as peer influence works both ways, friendships with positive peers could help reduce overall levels of substance use and offending. Nonetheless, it is important for practitioners and clinicians to consider the peers with whom at-risk adolescents and young adults affiliate, as peers play an important role in the abstention and desistance processes. Finally, future work should consider both developmental and racial differences in understanding the role of social influences on young men's substance use and offending.

NOTES

1. One item was the same at all measurement occasions ("How often have you felt that your caretaker was easy to get along with?") and one item varied by one word ("How often have you thought that your caretaker really bugged you"; "bothered" was substituted for "bugged" in the later eight assessments). Three items were moderately altered after the first two interviews to be more developmentally appropriate. For example, "How often have you felt that your caretaker was too strict or hard on you" (first two interviews) was changed to "How often have you felt that your caretaker was too demanding" during the last eight interviews. Nonsignificant interactions between parent–son conflict and a binary indicator of when the wording changed (Times 1 and 2 vs. Times 3-10) suggested that the measurement difference did not affect the nature of the association between parent–son conflict and any of the outcomes.

2. Primary analyses examined the effects of friends and parents simultaneously, but supplemental analyses testing effects of friends and parents separately are shown in Supplemental Table 2.

3. Because the base rate of offending was relatively low at the last of the 10 measurement occasions, we repeated the primary analysis using only the first nine measurement occasions. Results were almost identical, so we retained the models with all available data.

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