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Correlates of Cannabis Initiation in a Longitudinal Sample of Young Women: The Importance of Peer Influences

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Abstract

Objective—Cannabis is the most commonly used illicit drug in developed nations. In adolescent girls especially, rates of cannabis use have increased over the last decade, urging the need to characterize the potential correlates of onset of cannabis use during emerging adulthood.

Method—Using data from 1,065 females (collected 1994–2005) who participated in both the baseline and follow-up wave of interviews of the Missouri Adolescent Female Twin Study, we examined the associations between correlates from the peer, parental and individual domains and new onsets of cannabis use, using logistic regression.

Results—Univariate models revealed that initiation of cannabis use was associated with alcohol and cigarette use at baseline, peer attitude towards alcohol/cigarette/cannabis use, peer substance use and other aspects of impulse-disinhibited behavior. However, multivariate stepwise modeling retained only the significant influences of alcohol use at baseline and peer attitudes towards cannabis as correlates of cannabis initiation.

Conclusion—Having peers with favorable attitudes towards alcohol, cigarette and cannabis use is an important correlate of initiation of cannabis use in women. Prevention and intervention efforts need to take this into account when developing drug resistance training programs for adolescents.

Keywords

Cannabis; Women; Peer Group; Longitudinal

Introduction

Cannabis is the most commonly used illicit drug during adolescence (Schulenberg et al., 2005), a developmental period of increased vulnerability. Thus, studies of risk and protective influences on initiation of cannabis use may wish to focus on longitudinal samples aged 16–26 years of age.

Affiliations with substance-using peers has long been observed as a prominent correlate of illicit drug use in adolescence (Jessor & Jessor, 1977; Oetting & Beauvais, 1986; Dishion & Owen, 2002). Peer cluster theory posits the role of dynamic social interactions between peers in shaping an individual's likelihood of using illicit drugs (Oetting & Beauvais, 1986). Research on peer ecologies by Dishion and Owen revealed a reciprocal relationship between associations

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with deviant peers and cannabis use in boys during later adolescence, even after controlling for early antisocial behavior (Dishion & Owen, 2002). Gifford-Smith and colleagues (2005) suggest that the effect of deviant peer influences may be much stronger in girls than in boys.

The goal of this study was to examine the association between peer, parental and individual factors and initiation of cannabis use in women interviewed during adolescence and young adulthood. A strength of these analyses is our ability to examine the influence of peer and parental factors while controlling for important correlates, including personality and DSM-IV psychopathology (American Psychiatric Association, 1994).

Method

Sample

We used data from the baseline and the first full-length follow-up interview of the older birth cohorts from the Missouri Adolescent Female Twin Study, and from a questionnaire that was mailed between the baseline and follow-up interviews (Heath et al., 2002). Female same-sex twins born between July 1st, 1975 and June 30th, 1985 were identified from Missouri birth records. After determining eligibility, a cohort sequential sampling design was used to collect interview data from 13, 15, 17 or 19 year old twins, during 1994-1999. In 2002-2005, provided the twins or their parents had not indicated an unwillingness to be re-contacted, participants from the baseline interview were invited to participate in the first full-length follow-up interview. Of the 1,290 twins interviewed at baseline, 1,065 twins participated in this follow-up wave of longitudinal data collection. All protocols were approved by the institutional review board at Washington University School of Medicine and additional study details are available elsewhere (Heath et al., 2002).

Measures

Cannabis use was assessed as self-report lifetime use of cannabis. Data on cannabis use was available from the baseline interview, the questionnaire and the full-length follow-up interview. New onsets were coded dichotomously, '1' if the participant reported abstaining from cannabis use in both the baseline interview and their mailed questionnaire, and subsequently reported using cannabis in their follow-up interview, and '0' if the participant report never having used cannabis even once at baseline or follow-up.

The associations between new onsets of cannabis use (N=587), and 17 correlates that could be broadly categorized into peer, parental and individual domain were investigated. These factors, described in detail in Table 1, were assessed during the baseline interview and the mailed self-report questionnaire.

Statistical Analysis

Logistic regression was performed in STATA (Stata Corp, 2003) to examine whether there was a significant univariate relationship between each factor and initiation of cannabis use at follow-up, after controlling for age (under 24 years of age), zygosity (whether the participant was the member of a monozygotic or dizygotic twin pair) and race (Caucasian or African-American). A stepwise regression was then used to retain significant correlates in the multivariate model, with subsequent confirmation using a backward inclusion (covariate entered at $\alpha=0.10$ and retained at $\alpha=0.05$). A robust variance estimator (Huber-White) was used to adjust the standard errors for clustering in twin data.

Results

Sample Characteristics

Of the 1,065 adolescent female twins (54% from monozygotic pairs, 14.6% African-American) who participated in both waves of data collection (mean age at baseline= 18.2, range 16-23 years; at re-interview=24.6, range 20-29 years) 44.9% reported cannabis use at both baseline and follow-up. Of the 587 abstainers at baseline, 15.7% reported new onsets of cannabis use at follow-up. Overall rates of lifetime cannabis use at baseline and follow-up were 44.8% and 53.5% respectively.

Zygoty, age at follow-up and race were not associated with new onsets of cannabis use at follow-up. Alcohol use and cigarette use reported at baseline, peer cigarette and cannabis use, peer attitudes towards alcohol, cigarettes and cannabis, deviance and novelty-seeking were also associated with initiation of cannabis use (Table 2). However, the stepwise regression model retained only two significant factors: peer attitude towards cannabis and alcohol use at baseline (Table 2; χ^2 for stepwise addition was 17.4 (df=4) and 24.5 (df=5) respectively). Women with a prior history of alcohol use were 2.5 times more likely to initiate cannabis use by follow-up while women whose peers had favorable attitudes towards cannabis use were 1.6 times more likely to have initiated cannabis use.

In addition to new onsets of cannabis use, we also examined associations with baseline cannabis use. Results from these models are included in Table 2, and demonstrate that alcohol and cigarette use, peer substance use, perceived health effects and conduct disorder in addition to peer attitudes towards illicit drugs were associated with baseline cannabis use. These associations at baseline underscore the relative importance of peer influences on cannabis use.

Discussion

Several limitations of the present analyses need to be considered: First, despite the twin design, small sample sizes prevented us from incorporating a longitudinal genetic perspective in these models. However, twin observations did not bias our findings as re-analyses selecting one twin at random did not change the results. Second, we did not have independent reports of peer attitudes towards drug use – it is therefore possible that rater bias may have impacted our findings. Third, only 8.6% of our participants reported new onsets contributing to a modest sample size for longitudinal analyses. Fourth, the present data are drawn from a cohort of young Mid-western women and may not necessarily apply to men or to other samples. Notwithstanding these limitations, our findings are similar to those reported previously by Ellickson et al. (2004), showing that peer attitudes towards substance use are potent correlates of initiation of cannabis use. These authors also found that parental attitudes did not have an independent effect on cannabis use and our findings parallel this observation.

While we were limited by self-report on peer factors, research has demonstrated that perceptions of both peer and parental substance use may be more critical in determining substance-use outcomes in adolescents than ratings by peers and parents themselves (see, for example, D'Amico & Fromme, 1997). However, we did not find evidence for a relationship between perceived parental views regarding substance use and cannabis use. This finding, however, does not exclude the possibility that parental behavior may have partially mediated negative peer affiliations, through indirect mechanisms. For instance, the coercive process model (Patterson, 1982) suggests that poor parental supervision, especially of a child with conduct problems, may aid in their affiliations with delinquent peers who conform to and/or encourage delinquent behavior. Such interactive processes warrant careful testing in future analyses.

How can prevention efforts target the specific influence of peer attitudes? A general increase in awareness regarding the problems associated with early substance use could modify adolescents' attitudes towards drug use. Also, reducing adolescent rates of alcohol and tobacco use may reduce an adolescent's exposure to illicit substances such as cannabis. More importantly, educational programs need to equip adolescents with a resiliency towards peer pressure and peer contagion (Dishion & Dodge, 2005). An example of this is the Life Skills Training Program which found that adolescents at high risk for substance initiation (i.e. due to peer substance use behaviors) who received drug resistance and social skills training were significantly less likely to smoke, drink, use inhalants or use multiple substances (Griffin et al., 2003). However, frequency of cannabis use did not decrease significantly in the intervention versus control groups in this study. Therefore, existing programs need to be refined to incorporate specific information regarding the correlates and sequelae of cannabis use.

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Description of covariates included in analysis of adolescent/young adult women from the baseline interviews (I) and questionnaires (Q) of 1,065 participants of the Missouri Adolescent Female Twin Study

Table 1

| Covariate | Description | Response | Source |
|--|--|--|--------|
| Zygoty | Member of an identical or fraternal twin pair | 1=MZ* | I |
| Age | Under 24 years of age at follow-up | 1= under 24* | I |
| African-American | Racial Affiliation | 1=African-American* | I |
| | <i>Perceived Peer Influences Domain</i> | | |
| Perceived Peer Alcohol Use | Close friends use alcohol | 1=Yes* | I/Q |
| Perceived Peer Cigarette Use | Close friends smoke cigarettes | 1=Yes* | I/Q |
| Perceived Peer Cannabis Use | Close friends use cannabis | 1=Yes* | I/Q |
| Perceived Peer Other Illicit Drug Use | Close friends use cocaine, stimulants, sedatives, opiates, hallucinogens, inhalants? | 1=Yes* | Q |
| Perceived Peer Attitude - Alcohol | Sum of 3 items on how the participant thought their close friends felt (or would feel) about experimentation with, weekly and daily alcohol use. | 2=Don't Disapprove, 1=Disapprove, 0=StronglyDisapprove | Q |
| Perceived Peer Attitude - Cigarettes | Sum of 2 items on how the participant thought their close friends felt (or would feel) about experimentation or heavy cigarette smoking. | 2=Don't Disapprove, 1=Disapprove, 0=StronglyDisapprove | Q |
| Perceived Peer Attitude - Cannabis | Sum of 3 items on how the participant thought their close friends felt (or would feel) about experimentation with, occasional and regular use of cannabis. | 2=Don't Disapprove, 1=Disapprove, 0=StronglyDisapprove | Q |
| Perceived Peer Attitude - Cocaine | Sum of 2 items on how the participant thought their close friends felt (or would feel) about experimentation with and occasional use of cocaine | 2=Don't Disapprove, 1=Disapprove, 0=StronglyDisapprove | Q |
| Peer Closeness | Would depend on their friends most (relative to their parents) when making a serious decision about their life | 0=StronglyDisapprove 1=Friends | Q |
| | <i>Perceived Parental Influences Domain</i> | | |
| Perceived Parental Attitude towards cannabis | Single item on how the participant thought their parents would feel/felt about cannabis use | 0=Disapprove 1= Don't Disapprove* | Q |
| Perceived Strictness | Was mother/father more strict than most others at ages 6-13 years | Yes/No* | I |
| Perceived parental pressure regarding schoolwork | Did mother/father put too much pressure on you to do well in school at ages 6-13 years | Yes/No* | I |
| Perceived consistency of rules | Were mother/father pretty consistent about rules at ages 6-13 years | Yes/No* | I |
| Parental Closeness | Closeness to mother/father | 1=very/somewhat* 0=not very/not at all | I |
| | <i>Individual Influences Domain</i> | | |
| Academic Achievement | A's and B's (with some C's) in the past school year | 1=Yes* | I |
| Perceived Health Effects of Cannabis Use | How much of an effect can daily use of cannabis have on the health of people your age | 0= Serious Effect* 1=Mild/No effect | Q |
| Alcohol Use at baseline | Had a full drink of alcohol | 1=Yes* | I |
| Cigarette use at baseline | Smoked a cigarette, even a puff | 1=Yes* | I |
| Conduct Disorder | DSM-IV conduct disorder without clustering (American Psychiatric Association, 1994) | 1=diagnosis* | I |
| Deviance | Summary score of 9 items on how wrong the participant felt it was to do certain things, such as shoplift, lie, skip class, hit someone etc. | 0=Very Wrong to 3=Not Wrong | Q |
| Novelty-Seeking | Summary score from 17 items from the Tridimensional Personality Questionnaire (Cloninger, 1987) | 1=True, 0=False | Q |
| Major Depressive Disorder | DSM-IV major depressive disorder (American Psychiatric Association, 1994) | 1=diagnosis* | I |

Data presented here were collected from 1994-2005 (with collection continuing for subsequent waves).

I=baseline interview, Q=questionnaire

* Binary response categories; all others are continuous measures standardized to mean of 0 and standard deviation of 1.0

Table 2

Logistic regression analyses (odds-ratio (O.R.) with 95% Confidence Intervals (CI)) that examined the association between individual factors and baseline cannabis use as well as new onsets of cannabis use at follow-up in women who participated in the baseline and follow-up interviews of the Missouri Adolescent Female Twin Study.

| | BASELINE CANNABIS USE (N=1065) | | NEW ONSETS AT FOLLOW-UP (N=587) [#] | |
|---|-----------------------------------|---------------------------------|--|--------------------------------|
| | Univariate Model | Stepwise Model | Univariate Model | Stepwise Model |
| | O.R. [95% CI] | O.R. [95% CI] | O.R. [95% CI] | O.R. [95% CI] |
| Zygoty [*] | 0.82 [0.65, 1.06] | 0.88 [0.57, 1.38] | 1.10 [0.70, 1.72] | 1.42 [0.83, 2.45] |
| Age (under 24 years) [*] | 0.72 [0.55, 0.92] | 1.08 [0.69, 1.69] | 1.09 [0.69, 1.70] | 1.50 [0.87, 2.59] |
| African-American ^{*¶} | 1.49 [1.05, 2.50] | 4.02 [1.86, 8.64] | 1.80 [0.99, 3.26] | 1.54 [0.67, 3.58] |
| <i>Perceived Peer Influences Domain</i> | | | | |
| Perceived Peer Alcohol Use [*] | 1.55 [1.19, 2.00] ^b | - | 1.25 [0.79, 1.97] | - |
| Perceived Peer Cigarette Use [*] | 4.15 [3.10, 5.55] ^c | 1.62 [1.02, 2.56] ^a | 1.72 [1.04, 2.84] ^a | - |
| Perceived Peer Cannabis Use [*] | 16.49 [10.45, 25.99] ^c | 2.70 [1.48, 4.92] ^b | 1.99 [1.24, 3.20] ^b | - |
| Perceived Peer Other Illicit Drug Use [*] | 5.48 [4.01, 7.50] ^c | 1.68 [1.07, 2.65] ^a | 1.26 [0.77, 2.06] | - |
| Perceived Peer Attitude (Alcohol) | 2.21 [1.86, 2.62] ^c | - | 1.67 [1.26, 2.21] ^b | - |
| Perceived Peer Attitude (Cigarettes) | 2.53 [2.13, 3.00] ^c | - | 1.48 [1.14, 1.93] ^b | - |
| Perceived Peer Attitude (Cannabis) | 3.71 [3.10, 4.44] ^c | 2.55 [1.97, 3.30] ^c | 1.74 [1.32, 2.30] ^c | 1.62 [1.21-2.17] ^b |
| Perceived Peer Attitude (Cocaine) | 1.10 [0.96, 1.26] | 1.18 [1.02, 1.96] ^a | 1.05 [0.81, 1.35] | - |
| Peer Closeness [*] | 0.90 [0.59, 1.35] | - | 1.25 [0.62, 2.50] | - |
| <i>Perceived Parental Influences Domain</i> | | | | |
| Perceived Parental Attitude towards cannabis [*] | 3.54 [1.89, 6.61] ^c | - | 1.66 [0.44, 6.36] | - |
| Perceived Strictness [*] | 1.25, [0.96, 1.62] | - | 0.77, [0.47, 1.27] | - |
| Perceived parental pressure regarding schoolwork [*] | 1.63 [1.16, 2.29] ^b | - | 1.02 [0.53, 1.97] | - |
| Perceived consistency of rules [*] | 0.43 [0.27, 0.68] ^c | - | 0.75 [0.32, 1.73] | - |
| Parental Closeness [*] | 0.70 [0.35, 1.38] | - | 0.73 [0.21, 2.50] | - |
| <i>Individual Influences Domain</i> | | | | |
| Academic Achievement [*] | 0.31 [0.23-0.43] ^c | 0.48 [0.30, 0.78] ^c | 0.63 [0.37, 1.08] | - |
| Perceived Health Effects of Cannabis Use [*] | 4.31 [3.07, 6.06] ^c | 1.81 [1.11, 2.94] ^c | 1.10 [0.54, 2.20] | - |
| Alcohol use at Baseline [*] | 12.91 [8.19, 20.34] ^c | 2.87 [1.38, 5.95] ^c | 3.37 [1.88, 6.06] ^c | 2.53 [1.35, 4.73] ^b |
| Cigarette use at Baseline [*] | 21.85 [14.17, 33.69] ^c | 7.48 [4.36, 12.86] ^c | 1.99 [1.17, 3.38] ^b | - |
| Conduct Disorder [*] | 8.13 [5.04, 13.11] ^c | 3.56 [1.82, 6.94] ^c | 1.36 [0.47, 3.95] | - |
| Deviance | 1.14 [1.10, 1.19] ^c | - | 1.11 [1.04, 1.19] ^b | - |
| Novelty-Seeking | 8.13 [3.83, 17.22] ^c | - | 5.24 [1.10, 24.81] ^a | - |
| Major Depressive Disorder [*] | 2.53 [1.73, 3.69] ^c | - | 1.41 [0.70, 2.85] | - |

^a p < 0.05

^b p < 0.001

^c p < 0.0001

The outcome (baseline cannabis use and new onsets of cannabis) is dichotomous (yes/no);

[#] About 15.7% of 587 abstainers at baseline reported new onsets of cannabis use at follow-up;

^{*} Reflects a binary measure, such that O.R. reflects increased association in those with covariate; for all other measures, O.R. reflects increase in risk for every unit increase in standard deviation.

[¶] Mean age of Caucasian and African-American girls was 24.6 and 24.5 respectively at follow-up. Data presented here were collected from 1994-2005 (with collection continuing for subsequent waves).