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Peers, Parent-Child Conflict, and Familial History in the Prediction of Substance Use in College

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### Abstract

Using a cross-sectional study design, we examined whether peer relationships, parent-child conflict and family history of substance problems predicted substance use (frequency and quantify of alcohol, nicotine and marijuana use, age at first and alcohol and marijuana use, and maximum number of drinks consumed in a 24 hour period) in a sample of college students (N=194). Our findings suggested the following: 1) deviant peers and deviant substance using peers were significantly related to increases in all substance use measures, and a decrease in age at first alcohol, use but not age at first marijuana use. 2) there were no gender differences found in substance use or the relationships between the predictors and outcomes, 3) there were no effects of a family history of substance use problems on the SU outcomes, and 4) there were no effects of parent-child conflict on the SU outcomes. Results from this study suggest that effective intervention and prevention programs should be aimed at disrupting deviant or deviant substance- using peer group in college students at risk of problem substance use.

### Peers, Parent-Child Conflict, and Familial History in the Prediction of Substance Use in College

Research demonstrates that alcohol and marijuana use is common among adolescent and young adults (aged 12-23). It is estimated that 83% of college age women and 86% of college age men drink alcohol (Martin & Hoffman, 1993). According to the 2012 National Survey of Drug Use and Health (NSDUH) for Ages 12 and Older, 31.5% of 18-25 year olds have used marijuana in the past year. These high rates of substance use have implications for many aspects of young adults' lives. Many studies have examined socialization (i.e., family and peer) influences on substance use in adolescence (Ramirez et al., 2012, Chassin et al., 1996, Paek, 2009). Results of studies are mixed, suggesting at different ages, parents and peers exert differential influences on substance use behaviors. Recently, researchers have suggested that parents are influential in early adolescence, but peers become increasingly influential in late adolescence and young adulthood (Walden et al., 2004, Van Ryzin et al., 2012 ). Parenting relationship variables including parent-child conflict and other influences have been demonstrated to be influential in early adolescence (Walden et al., 2004, Chassin et al., 1996, Burt et al., 2003). Adolescents and young adults are particularly vulnerable to peer influences on substance use. Association with deviant peer groups is associated with increased likelihood for problematic behavior such as substance use (Van Ryzin et al., 2012). In addition poor parental support and parental control practices have been identified as risk factors for substance use (Hawkins et al, 1992). Family history of substance use has also been found to play a role in predicting adolescent substance use (Chassin et al., 1996).

#### **Peer Influences**

Much research has been done on the topic of peer influence and its role in adolescent drug and alcohol use. When examining substance use in young adulthood it is important to examine both family and peer influences simultaneously because there could be an overlap between family and peer risk factors (Dishion et al., 2000). Peers are thought to become increasingly influential relative to parents

during adolescence (Berndt, 1979; Kandel, 1996). Research suggests that in early adolescence, adolescents are particularly vulnerable to peer influence related to substance use (Kelly et al., 2012). E.H. Sutherland (1970) argued that an individual's behavior and actions are based on interactions with individuals who model favorably or unfavorably a particular behavior (Glynn, 1981). A study by Ennet et al. (2006) found that adolescents were more likely to use substances if they were less embedded in a particular peer network, if they had greater status within that network and if they had closer social proximity to peer substance users (Ennet et al., 2006). Increased risk of alcohol use has also been found to be associated with young adults' adaptations to new social settings and environments (Talbot et al., 2008).

Increased risk of alcohol use has been found to be related to young adults' adaptations to new social settings and environments (Talbot et al., 2008). First year college students must adapt to their new life on campus by establishing new interpersonal relationships, adjusting to shared living quarters and adjusting to new standards of academic performance (Talbot et al., 2008).

Deviant peers also play a role in influencing substance use. According to the theory of differential association, a crucial factor in adolescent delinquent behavior is the availability of deviant role models in an adolescent's peer group (Glynn, 1981). While young children may initially rely on their family for sources of attitudes and values, adolescents may go through a process known as "desattellizing" in which they look beyond their family for values (Glynn, 1981). According to Kandel's theory of drug use, perceptions of peer alcohol use, peer attitudes about hard liquor and the degree of involvement in peer activities such as attending parties were the most important peer related factors to predict adolescent initiation into hard liquor (Glynn, 1981). Peer modeling effects seem to play a large role for adolescent marijuana use (Glynn, 1981). Some research suggests tobacco use is a risk factor for later association with deviant peers as well as later substance use; meanwhile other research suggests early alcohol and marijuana use may be contributing to later tobacco use (Van Ryzin

et al., 2012). A longitudinal study by Van Ryzin et al.(2012) tested direct effects of parental monitoring, family relationship quality, and deviant peers in an effort to examine variations in associations within familial and peer contexts of substance use across adolescent and early adulthood. The study also examined how the relative strength of direct family and peer effects change over the course of adolescence. Results of the study (Van Ryzin et al., 2012) suggest that deviant peer association was the best predictor of higher likelihood of use and neither family relationship quality nor parental monitoring were significant predictors at this age. Although parent-child relationships did not have a direct effect on substance use in early adulthood, they did predict a reduction on deviant peer associations on high school, thus indirectly predicting a lower risk of substance use in young adulthood.

### **Family History of Substance Problems and Parent-Child Conflict**

Other research suggests that parental alcoholism raises the risk for alcohol and drug use during adolescence (Hawkins, Catalano, & Miller, 1992). Parental drinking behavior has been found to strongly influence adolescent initiation into alcohol use (Glynn, 1981). Parental monitoring and the quality of parent-child relationships may influence adolescence behavior (Van Ryzin et al. 2012) as well. A study by Pinchevsky et al. (2012) supports the claim that parent and peer influences together play a role in marijuana exposure opportunity and initiation in college students. While they claim that the study supports the idea that family and peer influences combine to influence marijuana exposure opportunity and initiation risk in college, after exposure occurred, the decision to use or not was related to proximal peer influences more than to earlier parental influences (Pinchevsky et al., 2012, p.51).

According to the literature, parental alcoholism and other familial influences such as parental drinking patterns, quality of parent-child relationships, and parental attitudes and values may play a role in adolescent substance use. The quality of relationships between parent and youth has been linked to decreased risk for various problem behaviors during adolescence including substance use (Ackard,

Neumark-Sztainer, Story, & Perry, 2006; Herman, Dornbusch, Herron, & Herting, 1997). While there is evidence that parent alcoholism is a risk factor for adult alcoholism, there is less known about the mechanisms underlying the risk for adolescent substance use.

It has been speculated that social environmental mechanisms, such as impaired parental monitoring and control, and weak bonds between parents and adolescents may play a role (Chassin et al., 1996, p.70). Biologically based theories have examined potentially heritable personally traits and potentially heritable individual differences in alcohol effects related to substance use (Chassin et al., 1996, p.70). A lack of parental support and effective parental control has also been recognized as risk factors for adolescent substance use (Hawkins et al., 1992, as cited in Chassin et al., 1996). These theories have been thought to interact and determine risk for substance use. Weaker parent-child relationships may not play as significant of a role in predicting substance use in young adults because parent-child interactions may be less frequent than in early adolescence.

In a longitudinal study by Chassin et al., (1996) parental alcoholism was tested for its effects on adolescents' substance use growth. Results of the study suggest that adolescents with alcoholic fathers are more likely use substances, and to increase their substance use at a faster rate than non-COA peers (Chassin et al., 1996). Paternal alcoholism was associated with a reduction in parental monitoring of adolescent behavior, which then predicted associations with other drug-using peers (p.78). Paternal alcoholism was associated with environmental stress. This environmental stress was then associated with higher levels of negative affect, which was related to affiliation with drug using peers which predicted increases in substance use over time. The study suggest that these findings support Kaplan's (1980) self-derogation theory which claims that adolescents who experience low self-esteem (or lower levels of perceived control and higher levels of negative affect) are more likely to affiliate with deviant peer groups (Kaplan, 1980, as cited in Chassin et al., 1996). While this study yields much support for the influence of biological risks on adolescent substance use, it also provides evidence to suggest that

biological and environmental influences work together interactively and synergistically to increase risk for adolescent substance use.

### **Gaps in the Literature**

While there has been much research on the subject of adolescent drug use and its influences, especially peer and family influences, fewer studies have examined substance use into young adulthood. While many studies have examined the relationships between socio-environmental influences and personality factors in prediction of substance use, few have looked directly at peer deviance and parent-child conflict in the same study. This is important due to the fact that theories considering the social influences of parent-child relationships and peers much examine whether both play a role in prediction of substance use behaviors, or one is more influential than the other. In addition, previous studies have been limited by the lack of psychometrically sound measures of deviant peer relationships and parent-child relationships. Here, we used a well-established self-report measure of parent-child relationships and peer deviance (with a high reliability coefficient) that has performed well in previous studies (Walden et al., 2004, Burt et al., 2003). In addition, our study was undertaken in a small private liberal arts college in a major metropolitan area, and the sample was approximately 20 percent non-White. Many previous studies of college students have been conducted on almost exclusively Caucasian individuals and on non-urban settings. Substance use behaviors are often influenced by the context of the study (urban versus rural; Dick et al. 2001) and far fewer college samples have been conducted in a major metropolitan city. Few studies examine these relationships in a group of young adults, who may not have had time to develop more significant addiction histories. Another weakness of the literature thus far is that we are still not yet able to make causal claims regarding peer and familial influences on substance use.

### **The Current Study**

In the present study, we examined whether family history of substance use problems, parent-



child relationships, and peer deviance would be associated with increased substance use in a sample of college students. We predicted that family history of substance use and peer deviance measures but not parent-child conflict measures would be associated with increased substance use. We predict that college age students with a greater familial risk of substance abuse will be more likely to drink alcohol or use marijuana or tobacco, regardless of peer deviance and peer substance use.

## Method

### Participants

We recruited 194 undergraduate-student volunteers from ten different introductory and upper level Psychology, and Criminal Justice courses. Participants ranged in age from 18 to 50 ( $M= 19.98$ ,  $SD= 2.66$ ). For a complete demographics, see Table 1. The sample was 77% percent female ( $n= 149$ ) and 23% males ( $n=45$ ). Of the 194 students in the current sample, 80% were White/Caucasian, 7% were Hispanic or Latino, 5% were Black or African American, and 6% were Asian or Pacific Islander. The sample consisted of 36% freshman, 23% sophomores, 27% juniors, and 14 % seniors. Seventy-seven percent of participants had a GPA between 3.1 and 4.0. Twenty-one percent had a GPA of 3.0 or below. In order to compensate our participants, they had the option to receive a small amount of extra credit to be counted toward the course of their choosing within the participating courses.

### Measures

**Family history of drug and alcohol problems.** Participants were asked if they have a biological parent that has an alcohol problem that may be diagnosable. Available responses included yes, no, or don't know. The same question (and format) was asked about parents' history of drug problems.

**Perceived peer substance use and peer deviance.** Participants were asked to report on peer

group deviance using 18 items from the Friends Inventory, a measure of peer characteristics developed by Minnesota Twin Family Study staff (Walden et al., 2004). Participants were instructed to provide ratings for their entire peer group. Items were scored using a 4-choice response format (1 = *none of my friends are like that*, 2 = *just a few of my friends are like that*, 3 = *most of my friends are like that*, and 4 = *all of my friends are like that*). Deviant peer association and peer substance use were measured by averaging across 18 items. Item ratings were then summed to yield scores for two derived scales: Peer Substance Use (4 items: e.g., *my friends drink alcohol or beer*) and Peer Delinquency (5 items: e.g., *my friends break the rules*). Peer substance use yielded an alpha statistic of .80, Peer deviance produced an alpha statistic of .88 suggesting both scales have relatively high internal consistencies.

**Parent-child Conflict.** Self reports concerning participants' level of perceived conflict with their parent(s) were taken using 12 items from the Parental Environment Questionnaire (PEQ) Parent-Child Conflict Scale. Participants were asked to rate items assessing aspects of their relationships with their mother and then again for their father. The items were rated on a 4-point scale (1 = *definitely false*, 2 = *somewhat false*, 3 = *somewhat true*, 4 = *definitely true*). The alpha statistic for the PEQ was .96, suggesting that the measure has a high level of internal consistency.

**Substance use.** We examined several substance use variables capturing normal level use, to problematic substance use (tobacco, alcohol, and marijuana).

*Number of substances used.* Participants were asked to indicate if they had tried cigarettes, alcohol, marijuana, chewing tobacco, opioids, hallucinogens, and crack/cocaine, however, only cigarettes, alcohol and marijuana were used in data analysis. Items were scored using a 3-choice response format (*Yes, No, Don't Know*).

*Frequency/quantity of alcohol, marijuana and nicotine use.* In addition, participants were asked to indicate how often and how much they typically use each substance. Frequency measures were rated on a 6-point scale (0 = *Not applicable* 1 = *Once a month or less* 2 = *More than once a month, but less*

*than once a week 3=At least once a week 4= 2-3 times a week 5=Everyday.*) Quantity of alcohol use was measured by asking participants how much alcohol, do they consume on an average occasion? The following scale was used: 0=0-1 *standard drinks*, 1= 2-3 *standard drinks*, 2=3-4 *standard drinks*, 3=5-6 *standard drinks*, 4= 7+ *standard drinks*. Participants were informed that 1 standard drink is equal to one 12-ounce beer, one 12-ounce wine cooler, one 4-ounce glass of wine, one 1.5 ounce shot of liquor, or one cocktail containing one shot of liquor. Quantity of cigarette use was measured by asking participants to report the number of cigarettes smoked in a typical day? Participants were instructed to answer according to the following scale: 1=0-1, 2=2-4, 3=5-7, 4=8-10, 5=*over half a pack but less than a whole pack*, 6=*a pack or more*.

*Age of first alcohol and marijuana use.* Participants were asked to report the age they were when they first used alcohol, marijuana and cigarettes. If a student had never tried one of the substances they were instructed to specify this.

*Maximum number of drinks consumed in 24 hours.* Participants reported the maximum number of standard drinks they have consumed in a 24 hour period.

## Results

### Descriptive Statistics

Prior to model-fitting, we computed descriptive statistics on all dependent variables and independent variables. These data are presented in Table 2.

**Substance use.** Table 2 includes means and standard deviations for the dependent variables (frequency/quantity of alcohol use, frequency/quantity of smoking, frequency of marijuana use, age of first alcoholic drink, age of first marijuana use, and maximum number of drinks consumed in a 24 hour period). The average age of first alcohol use was around 16 years old ( $M= 16.42$ ,  $SD= 2.19$ ), average age of first pot use was roughly 16 years ( $M= 16.63$ ,  $SD= 1.89$ ), average maximum number of drinks consumed in 24 hours was around 6 ( $M= 5.70$ ,  $SD= 5.15$ ). The average alcohol frequency/quantity

score was just under 3 ( $M=2.71$ ,  $SD= 3.53$ ). A variable that measured the frequency times quantity of smoking in the past 12 months yielded an average score of .49 cigarettes: ( $M= .49$ ,  $SD=2.298$ ). The average frequency times quantity of marijuana use was .5 ( $M=.50$ ,  $SD= 1.13$ ).

**Peers, parents, and family history.** Family history variables included any biological parent with a diagnosable alcohol problem (bioparalc), biological mother with a diagnosable drug problem (biomotherdrug), and biological father with a diagnosable drug problem (biofatherdrug). A combined variable was created and 24% of the sample had either parent with a drug or alcohol problem ( $n=43$ ). Next, descriptive statistics were run for both PEQ and Both Peer Deviance measures. See Table 1 for descriptives of PEQ and deviant peer measures. The average score of the PEQ scale was around 21 ( $M=20.58$ ,  $SD=8.63$ ). The Deviant peer scale averaged 29 points ( $M=29.46$ ,  $SD=7.19$ ), while the Deviant peer substance measure produced an average score of 12 ( $M=12.37$ ,  $SD=3.67$ ).

### **Family History, Parent-Child Relations, Peer Deviance, Gender, and the**

#### **Prediction of Substance Use**

We examined the degree to which family history, parent-child relations, peer deviance and gender predicted several substance use outcomes. Dependent measures included (1) Frequency/quantity of alcohol use, (2) Frequency/quantity of nicotine use, (3) Frequency of marijuana use, (4) Age of first alcohol use, (5) Age of first marijuana use and (6) Maximum number of drinks consumed in a 24 hour period. A series of several multiple regression analyses was performed at the same time to test the predictor variables Parent Drug time Parent Alcohol Problem (pardrugalc), Deviant Peer Measure (devpeer), Gender, and Average PEQ (avgpeq).

The regression analyses are presented in Table 4. For each substance use outcome, we fit a model using the following variables in the prediction of the six substance use variables: self-reported familial history of parent drug or alcohol problem, parent drug times parent alcohol problem (pardrugalc), deviant peer scale (devpeer), gender, and average Parent Environment scale (indicating

parent child conflicts) (avgpeq). For each of the six analyses, all variables were entered simultaneously in one step in the prediction of each dependent variable.

#### *Frequency/Quantity of Alcohol Use*

In the prediction of frequency times quantity of alcohol use, a regression analysis revealed that the predictor variables together explained 16% of the overall variance in frequency/quantity of alcohol use, ( $F=8.38$ ,  $P < .0001$ ), with deviant peers serving as the only significant predictor ( $\beta=.40$ ,  $P < .001$ ). Specifically, an increase in deviant peers was associated with an increase in frequency/quantity of alcohol use.

#### *Maximum number of Drinks Consumed in 24 Hours*

Analysis of maximum number of drinks consumed in 24 hours revealed that the predictor variables together accounted for 20.3% of the overall variance ( $F=10.93$ ,  $P < .0001$ ) with deviant peers being the only significant predictor ( $\beta=.47$ ,  $P < .001$ ). In predicting maximum number of drinks consumed in 24 hours, it was seen that an increase in deviant peers was associated with an increase in number of drinks consumed in 24 hours.

#### *Frequency/Quantity of Nicotine Use*

The same model was fit in the prediction of nicotine use. The predictor variables together explained 3.6% of the overall variance in frequency/quantity of nicotine use ( $F=2.44$ ,  $P < .0001$ ), with deviant peers again being the only significant predictor ( $\beta=.22$ ,  $P < .01$ ). In predicting frequency/quantity of nicotine use, it was seen that an increase in deviant peers was associated with an increase in frequency/quantity of nicotine use.

#### *Frequency/Quantity of Marijuana Use*

In predicting frequency of marijuana use, predictor variables together explained 5.1% of the overall variance in frequency of marijuana use ( $F=3.10$ ,  $P < .0001$ ) with deviant peers again being the only significant predictor ( $\beta=.27$ ,  $P < .001$ ). In predicting frequency of marijuana use, it was seen that

an increase in deviant peers was associated with an increase in frequency of marijuana use.

#### *Age at First Alcohol and Marijuana Use*

Analysis of age of first alcohol use showed that the predictor variables together explained 11.8% of the overall variance ( $F=5.48$ ,  $P < .0001$ ) with gender and deviant peers being the only significant predictors ( $\beta=.21$ ,  $\beta=-.04$ ,  $P < .01$ ,  $P < .001$ ). In predicting age of first alcohol use, an increase in deviant peers, was associated with a decrease in age of first alcohol use, such that women had a lower age of first drink. In predicting age of first marijuana use, none of the predictor variables were significant predictors.

#### **Family History, Parent-Child Relations, Deviant Peer Substance Use, Gender, and the Prediction of Substance Use**

In a similar series of models, we examined the degree to which family history, parent-child relations, deviant peer substance use and gender predicted the same six substance use outcomes. These analyses yielded similar results.

#### *Frequency/Quantity of Alcohol, Nicotine and Marijuana Use.*

The overall model predicting frequency/quantity of alcohol use revealed that the predictor variables together accounted for 27.4% of the overall variance ( $F=16.56$ ,  $P < .0001$ ) with average PEQ and deviant peer substance being the only significant predictors ( $\beta= -.15$ ,  $\beta=.52$ ,  $P < .05$ ,  $P < .001$ ). In predicting frequency/quantity of alcohol use, it was seen that an increase in deviant peers and was associated with an increase in frequency/quantity of alcohol use. In addition, the negative correlation between average PEQ score and frequency/quantity of alcohol use suggested that higher levels of parent-child conflict are associated with lower levels of alcohol use.

The analysis of frequency/quantity of nicotine use revealed that the predictor variables together accounted for 10% of the overall variance ( $F=5.61$ ,  $P < .0001$ ) with deviant peer substance being the only significant predictor ( $\beta=.33$ ,  $P < .001$ ). In predicting frequency/quantity of nicotine use, it was seen

that an increase in deviant peers was associated with an increase in frequency/quantity of nicotine use.

The analysis of frequency of marijuana use revealed that the predictor variables together explained 16.9% of the overall variance ( $F=9.41$ ,  $P < .0001$ ) with deviant peer substance being the only significant predictor ( $\beta=.43$ ,  $P < .001$ ). In predicting frequency of marijuana use, it was seen that an increase in deviant peers was associated with an increase in frequency of marijuana use.

#### *Maximum Drinks Consumed in 24 Hours*

Finally, analysis of maximum number of drinks consume in 24 hours revealed that together, the predictor variables explained 30.8% of the overall variance ( $F=19.35$ ,  $P < .0001$ ) with deviant peer substance being the only significant predictor ( $\beta=.56$ ,  $P < .001$ ). In predicting maximum number of drinks consumed in 24 hours, it was seen that an increase in deviant peers was associated with an increase in maximum number of drinks consumed in 24 hours.

#### *Age at First Alcohol and Marijuana Use*

Analysis of age of first alcohol use revealed that the predictor variables accounted for 13.1% of the overall variance ( $F=6.35$ ,  $P < .0001$ ) with gender and deviant peer substance as the only significant predictors ( $\beta=.18$ ,  $\beta=-.34$ ,  $P < .05$ ,  $P < .001$ ). In predicting age of first alcohol use, it was seen that an increase in deviant peers was associated with a lower age of first drink. In addition, we found that there was a gender main effect for age at first alcohol use, such that women had a lower age of first drink ( $P < .01$ ). We tested the gender times deviant peer interaction and no interaction was found. In analysis of age of first marijuana use, it was revealed that none of the predictor variables were significant.

## **Discussion**

The major goal of the present study was to examine whether family history of substance use problems, parent-child relationships, and peer deviance would be associated with increased substance use in a sample of college students. The findings provide further evidence of the influence of deviant

peer groups on increased substance use in young adults.

*Family History, Peer Deviance/Peer Deviance Substance, Gender, and the Prediction of Substance Use*

We tested the following hypotheses: 1) Family history of substance use and peer deviance measures, but not parent-child relationship measures would be associated with increased substance use, and 2) College-age students with a greater familial risk of substance abuse will be more likely to drink alcohol or use marijuana or tobacco, regardless of peer deviance and peer substance use. Results of the study partially support the hypothesis that family history of substance use and peer deviance measures, but not parent-child conflict measures would be associated with increased substance use. Deviant peers was associated with substance use across all measures except for age of first marijuana use, such that an increase in deviant peers was associated with an increase in frequency and quantity of alcohol, marijuana and nicotine use, an increase in maximum number of drinks consumed in a 24 hour period, and a decrease in age of first alcohol use. Similarly, deviant peer substance use was associated with substance use across all measures except for age of first marijuana use. These results suggests that an increase in deviant substance using peers would be associated with increased frequency and quantity of alcohol, marijuana and nicotine use, an increase in maximum number of drinks consumed in a 24 hour period, and a decrease in age of first alcohol use. An increase in deviant substance using peers predicted substance use across all substance use outcomes except age of first marijuana use.

No effects were of parent-child conflict on substance use outcomes were found in the current sample. The effects of deviant peers and deviant peer substance use in young adults are consistent with evidence suggesting that at this age peers may exert a more significant effect on substance use than parents (Walden et al., 2004). The effects found for peers are similar to other studies examining substance use in adolescents and young adults. In Van Ryzin et al., (2012) results suggested that in early adulthood, deviant peer association was the strongest predictor of higher likelihood of use in young adults and neither parental monitoring nor parent-youth relationship quality were significant



predictors. Our findings support those of previous research indicating that deviant peers and deviant substance using peers would be more significant predictors than parent-child conflict in young adulthood due to the transition into college life being a time of increasing independence and separation from one's parents and a greater affiliation with peer groups. The current study yielded no major gender differences in this effect. We did have one gender main effect for age of first alcohol use such that females had a lower age of first alcohol use. No substance specific effects were found in the current sample.

Our second hypothesis that an increase in familial history of substance use problems is not a significant predictor of increased substance use problems was not supported. These findings are inconsistent with previous research in that familial risk of substance problems significantly predicted increased likelihood of initial substance use and increased frequency and quantity of use (Chassin et al., 1996, Hawkins Catalano, & Miller, 1992). Numerous studies of adult samples have suggested that nicotine (Kendler, Neale, et al., 1999), alcohol (Heath et al., 1997), and drug-related (Kendler et al., 2000) phenotypes are heritable. Results of previous studies have revealed that paternal alcoholism significantly predicted steeper rates of substance use growth, thus suggesting that adolescents with fathers who have a history of alcohol using problems are not only more likely to use substances, but that their substance use occurs at more rapid rates than non-COA peers (Chassin et al., 1996). Parent drug use has been found to be associated with a decrease in parental monitoring, which was in turn associated with membership in drug-using peer groups that was a proximal pathway into adolescent drug sampling (Chassin et al., 1993). The inconsistencies between our findings and those of other studies may reflect differences in sample size. Chassin and colleagues (1996) had a substantially larger sample ( $n=316$ ) than the current study. The small sample size of the current study could have prevented us from producing the effects of familial risk of substance use. Furthermore, relatively small number of males ( $n=45$ ) in the current sample is a limitation and a possible explanation for why familial risk of

substance use did not significantly predict increased substance use in the sample. The rates of substance use problems were generally higher in our sample compared to Chassin et al., (1996). Over half of COAs used alcohol in the Chassin (1996). Similarly, 60% of our current sample used alcohol. The rate of marijuana use was higher in our study (25%) compared to 18% Chassin et al., (1996). This could be due in part because our current sample consisted of college students who have had more exposure opportunity than younger adolescents.

In the current study we did not include measures of psychopathology and personality traits which may have yielded further information in predicting substance use. A study by Krueger and colleagues (2002) examine the origins of comorbidity among substance dependence, antisocial behavior, and a disinhibited personality style. Results of the study suggest evidence supporting a hierarchical model of the externalizing spectrum of disorder in late adolescence (Krueger et al., 2002). Deviant people tend to associate with other deviant peer groups which may be an effect of certain personality traits. King and colleagues (2009) found that a history of parental alcohol dependence was associated with increased levels of disinhibition when adolescents were biologically related to their rearing parents. Measuring personality within the context of the current sample may have provided us with a better understanding of why parental history of substance problems did not significantly predict substance use outcomes in college students who may or may not possess certain personality traits such as high levels of disinhibition.

Parent-child conflict only significantly predicted frequency and quantity of alcohol use in the model including the deviant peer substance use measure. This lack of significance supports research suggesting that later in adolescence and young adulthood, parents become less influential in predicting substance use (Van Ryzin et al., 2012). The contribution of parent-child conflict could be explained by its association with peer deviance. Parental influence on adolescent substance use has been found to be largely mediated through deviant peers (Walden et al., 2004). The current study relied on self-reports of

parent-child conflict rather than gathering parental reports of parent-child conflict which could have provided varying views of conflict between child and parent and provided a better understanding of why parent-child conflict did not significantly predict substance use outcomes in the current sample.

Several limitations of the current study deserve note. First, because the data was gathered from a single private, Midwestern, Liberal Arts University, the findings have limited generalizability to students on other campuses such as large public universities and populations with more racial/ethnic diversity. Although the present sample represented a somewhat diverse population (18% were ethnic groups other than Caucasian, the sample overall was considerably smaller in size than previous studies (Chassin et al., 1996, Walden et al., 2004, Pinchevsky et al., 2012). Further studies could also look at various college settings such as private, public, and commuter campuses in an effort to increase generalizability. By examining substance use using larger samples from more diverse, public or commuter schools, differences in the level of substance use outcomes may potentially be identified.

In addition, because our study relied upon self-report of familial risk of substance use, self substance use and parent-child relationships, our results are subject to recall bias. Although the online survey was coded to ensure complete anonymity and confidentiality, some students may have been reluctant to reveal the actual extent of their substance use. Particularly students, who were under the legal drinking age, may have been less inclined to reveal the full extent of their substance use. Next, because substance initiation was dichotomized into use or non-use, individuals who may have only tried alcohol, nicotine, or marijuana once or twice were coded in the same way frequent users. Lastly, because parent-child relations were based on the child's reports, results might reveal perceived parent-child relations rather than actual parental behavior. Also, because the Friends Inventory, and frequency and quantity of substance use measures rely on participants' self-reports, a level of self-report bias may be present.

It would be beneficial for future studies to recruit a more gender balanced sample as the current

study was highly skewed in favor of female participation. This imbalance of male and female participants greatly reduced our ability to find gender differences in substance use outcomes and may have influenced the lack of significance of family history and parent-child risk factors of substance use in the population. The imbalance of gender also decreased the overall generalizability of the study as substance use of males was not reported on a large scale.

Despite its limitations the present study provides a key contribution to the literature on young adult substance use. The study provides further evidence of the link between deviant peers and deviant substance using peers and substance use in young adults. Our results highlight the importance of peer-group based interventions in college. Further research would add to our understanding of risk factors for substance use in college and university settings as well as for young adults in general. The findings of the current study have implications for future research that are needed to understand the developmental processes involved in substance use during young adult years. Our research suggests that deviant peer associations are powerful platforms from which to influence a significant increase in substance use in college. Further research should focus on intervention and prevention efforts aimed at reducing alcohol and drug use among at-risk college students. Peer groups are an important focus of intervention techniques when seeking to reduce young adult substance use. Effective interventions of young adult substance use should be aimed at disrupting deviant or deviant substance-using peer groups. This can be a difficult task as deviant peer groups are difficult to change once they have been established (Van Ryzin et al., 2012).

**Table 1** Descriptive Statistics of PEQ and Deviant Peer Measures

	PEQ (Range)	Dev. Peer (Range)	Dev. Peer Substance (Range)
M	20.58 (12-48)	29.47 (16-61)	12.37 (6-23)
SD	8.63	7.19	3.67

**Table 2** Descriptive data of dependent variables

Dependent variables (Range)	Mean	Standard deviation	<i>n</i>
Frequency/quantity of alcohol use (0-16)	2.71	3.53	194
Frequency/quantity of nicotine use (0-16)	.49	2.30	193
Frequency of marijuana use (0-5)	.50	1.13	194
Age of first alcoholic use (8-21)	16.42	2.19	162*
Age of first marijuana use (12-21)	16.63	1.89	80*
Maximum number of drinks consumed in 24 hours (0-25)	5.70	5.15	194

\**n*=those who tried the substance

**Table 3** Correlations between dependent and independent variables

Variables	1	2	3	4	5	6	7	8	9
<b>Dependent variables</b>	-								
1. Frequency/quantity alcohol use	-	.20**	.53**	-.22**	-.08	.54**	-.13	.41**	.52**
2. Frequency/quantity nicotine use	-	-	.09	-.39**	-.40**	.23**	-.04	.20**	.32**
3. Frequency marijuana use	-	-	-	-.18*	-.04	.32**	.10	.27**	.43**
4. Age of first alcohol use	-	-	-	-	.62**	-.23**	-.19*	-.30**	-.33**
5. Age of first marijuana use	-	-	-	-	-	-.08	-.11	-.19	-.17
6. Maximum number of drinks in 24 hours	-	-	-	-	-	-	.05	.48**	.57**
<b>Independent variables</b>									
7. Average PEQ Score	-	-	-	-	-	-	-	-.01	.04
8. Deviant peer	-	-	-	-	-	-	-	-	.88**
9. Deviant peer substance use	-	-	-	-	-	-	-	-	-

Gender was dummy-coded, with females =0 and males = 1.

**Table 4** Individual variable contributions predicting substance use with deviant peer measure \*

	$\Delta R^2$	<i>t</i> (each predictor)	$\beta$	<i>P</i>
<u>DV: Freqqualc</u>	.16	-	-	-
Gender		.28	.021	ns
AvgPEQ		-1.60	-.12	ns
Devpeer		5.31	.40	<.001
Pardrugalc		-.43	-.03	ns
<u>DV: Freqquasmoke</u>	.04	-	-	ns
Gender		-1.66	-.13	ns
AvgPEQ		-.42	-.03	ns
Devpeer		2.74	.22	<.01
Pardrugalc		-.72	-.06	ns
<u>DV:Freqpotuse</u>	.05	-	-	-
Gender		-.36	-.03	ns
AvgPEQ		.97	.08	ns
Devpeer		3.34	.27	<.001
Pardrugalc		-.65	-.05	ns
<u>DV: Agefirstpotuse</u>	-.01	-	-	-
Gender		1.01	.13	ns
AvgPEQ		-.58	-.07	ns
Devpeer		-1.59	-.21	ns
Pardrugalc		-.62	-.08	ns
<u>DV:Agefirstdrink</u>	.12	-	-	ns
Gender		2.48	.21	<.01
AvgPEQ		-1.74	-.15	ns
Devpeer		-3.87	-.33	<.001
Pardrugalc		-.45	-.04	ns
<u>DV:Maxdrinks24hrs</u>	.203	-	-	-
Gender		.09	.01	ns
AvgPEQ		-.69	-.05	ns
Devpeer		6.45	.47	<.001
Pardrugalc		.47	.04	ns

Gender was coded with females=0 and males =2. Parent substance use problems were coded, with 0=no and 1=yes. *ns* statistically non-significant, *DV* dependent variable, *Pardrugalc* parent drug times parent alcohol problem, *Devpeer* deviant peer scale, *AvgPEQ* average PEQ *Notes: n= 194; β = standardized beta weight*

**Table 5** Individual variable contributions predicting substance use with deviant peer substance use \*

	<u><math>\Delta R^2</math></u>	<u><i>t</i> (each predictor)</u>	<u><math>\beta</math></u>	<u><i>P</i></u>
DV: Freqquale	.27			
Gender		.31	.021	ns
AvgPEQ		-2.27	-.15	<.05
Devpeersub		7.76	.52	<.001
Pardrugalc		-.34	-.02	ns
DV: Freqquasmoke	.10			
Gender		-1.69	-.13	ns
AvgPEQ		-.54	-.04	ns
Devpeersub		4.45	.33	<.001
Pardrugalc		-.73	-.06	ns
DV:Freqpotuse	.17			
Gender		-.65	-.05	ns
AvgPEQ		1.07	.08	ns
Devpeersub		5.97	.43	<.001
Pardrugalc		-.595	-.04	ns
DV: Agefirstpotuse	-.010			
Gender		.89	.11	ns
AvgPEQ		-.49	-.06	ns
Devpeersub		-1.51	-.19	ns
Pardrugalc		-.797	-.101	ns
DV:Agefirstdrink	.13			
Gender		2.28	.18	<.05
AvgPEQ		-1.77	-.14	ns
Devpeersub		-4.18	-.34	<.001
Pardrugalc		-.58	-.047	ns
DV:Maxdrinks24hrs	.31			
Gender		.72	.047	ns
AvgPEQ		.38	.025	ns
Devpeersub		8.62	.56	<.001
Pardrugalc		.12	.008	ns

Gender was coded with females=0 and males =2. Parent substance use problems were coded, with 0=no and 1=yes. *ns* statistically non-significant, *DV* dependent variable, *Pardrugalc* parent drug times parent alcohol problem, *Devpeersub* deviant peer substance, *AvgPEQ* average PEQ *Notes: n= 194;  $\beta$  = standardized beta weight*



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