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## Family and Peer Influences on Substance Attitudes and Use among Juvenile Justice-Involved Youth

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### Abstract

Juvenile justice-involved youth experience high rates of substance use, which is concerning given associated negative consequences, including health and functional deficits. Family and peer factors are associated with a high risk of substance use among justice-involved youth. It is hypothesized that this risk process operates through pro-drug attitudes. However, limited research has been conducted on the mechanisms through which family and peer factors increase risk for substance use among juvenile justice involved youth. The current study examined both the direct and indirect effects of family and peer substance use on youth's substance use (alcohol and illicit drug use). We also examined whether this relationship differs by race. 226 detained youth (81.9% male; 74.3% Black) were recruited from an urban county in the Midwest and completed a clinical interview and substance use assessment battery. A direct effect of family/peer risk on illicit drug use was found for all youth, though the effect was stronger among White youth. Results also supported the indirect effect pathway from family/peer risk to both illicit drug use and alcohol use through pro-drug attitudes. This pathway did not vary by race. These findings suggest that interventions should focus on targeting both family/peer risk and pro-drug attitudes to reduce substance use. Given the racial difference in the direct effect of family/peer risk on illicit drug use, there may be other factors that influence risk more strongly for White youth, which warrants further investigation.

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Conflict of interest: All authors declare that they have no conflicts of interest.

#### Compliance of Ethical Standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Indiana University—Purdue University, Indianapolis provided IRB approval for this study.

Informed consent: Assent for clinical assessments was obtained from all individual participants included in the study. Participants were wards of the local justice system at the time of the assessment and that justice system provided consent for the clinical assessment from which data was drawn for the current study.

## Keywords

family; peer; substance use; attitudes; juvenile justice

Substance use is a prevalent concern among adolescent populations. By the 8<sup>th</sup> grade over a quarter of youth in the United States have tried alcohol, with 15 percent of youth reporting marijuana use, 13 percent reporting cigarette use, and 10 percent reporting illicit drug use other than marijuana (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016). These rates tend to double by 10<sup>th</sup> grade and triple by 12<sup>th</sup> grade with lifetime rates of use at 64 percent for alcohol, 44 percent for marijuana, 31 percent for cigarette use, and 21 percent for illicit drug use other than marijuana among high school seniors (Johnston et al., 2016). The use of substances during this developmental period is concerning due to the wide range of health and functional deficits associated with use (Hawkins, Catalano, & Miller, 1992; Aarons et al., 1999; Moss, Chen, & Yi, 2014). A subset of youth who are at particularly high risk for using substances are youth involved within the juvenile justice system (e.g., Chassin, 2008). It has been estimated that approximately one-quarter of youth (age 12 to 17) who had been in jail or a detention center report using alcohol, tobacco, or any other substance within the past year (Office of Applied Studies, 2003). This prevalence rate is nearly three times greater than that of their same-age peers who had never been in a jail or detention center, among which 8% reported using any substance within the last year (Office of Applied Studies, 2003). Substance use among juvenile offenders poses similar risk for negative health consequences that have been observed among general population youth (Chassin, 2008; Rowe, Wang, Greenbaum, & Liddle, 2008); however, unique to this subgroup of youth is the increased risk for reoffending and continued contact with the justice system (Chassin, 2008; Wiesner, Kim, & Capaldi, 2005). For example, van der Put, Creemers, and Hoeve (2014) found that substance use predicted risk for recidivism above and beyond other well-established risk and protective factors, such as school, free time, relationships, family, and aggression. Thus, understanding factors that may precipitate substance use among this at-risk group of youth is critical.

Social environments have been shown to play an important role in the development of substance use among youth within the general population (e.g., Allen, Donohue, Griffin, Ryan, & Turner, 2003; Bahr, Hoffmann, & Yang, 2005; Nelson, 2016; Deutsch, Crockett, Wolff, & Russell, 2012). For example, adolescents who affiliate with substance using friends/peers are more likely to engage in substance use risk behaviors (e.g., Dishion & Skaggs, 2000; Prinstein, Boergers, & Spirito, 2001). As for familial influences, several factors predict substance use and substance use disorders (SUDs) including having a family substance abuse history, poor family support and communication, limited discipline and monitoring, and high parent-child conflict (Feldstein Ewing, Filbey, Loughran, Chassin, & Piquero, 2015; Wills & Yaeger, 2003). Similar effects of parents and peer factors have been studied in relation to risk for substance use among justice-involved youth (e.g., Ewing et al., 2015; Mauricio et al., 2009) and delinquency (e.g., Chung & Steinberg, 2006; Mulder, Brand, Bullens, & Van Marle, 2011). Consistent with this evidence, family and peer factors have also been identified as an important components of substance use interventions for justice-involved youth (Greenwood, 2008). Yet, what has received less attention within this

body of literature are the mechanisms through which family or peer factors operate to increase risk for substance use. Based on the social learning theory (Akers, 1977; Bandura, 1986), it is presumed that the influence of family and peers on substance use risk operates indirectly through learned attitudes regarding substance use (Cooper, May, Soderstrom, & Jarjoura, 2009; Petraitis, Flay, & Miller, 1995; Reed & Rountree, 1997), however only a small body of literature has been conducted explicitly testing the full pathway.

Among samples with general population youth, positive parenting practices (i.e., parental monitoring, communication regarding substance use, and parental warmth) has been found to reduce willingness and intentions to use substances indirectly through endorsement of less favorable risk images or prototypes of substance use (Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005). Although providing some support for the proposed indirect pathway, this study was limited in that substance beliefs or expectancies were not explicitly examined. More closely related to the social learning theory, Blanton, Gibbons, Gerrard, Conger, and Smith (1997) found that parental drinking and smoking was related to adolescent use indirectly through youth's favorable evaluations of individuals who drink or smoke, respectively. A similar pathway was observed by Miller, Siegel, Hohman, and Crano (2013), finding that the positive relationship between parental and youth marijuana use operated indirectly through youth's positive attitudes regarding their personal use and lower negative expectancies regarding outcomes from their use. In regards to peer influences, the relationship between peer smoking and current adolescent cigarette use has been shown to operate through negative affect control expectancies (Hine, McKenzie-Richer, Lewko, Tilleczek, & Perreault, 2002). Lastly based on more general substance use, Krohn, Lizotte, Thornberry, Smith, and McDowall, (1996) observed an indirect relationship between peer drug use and later drug use through increases in positive drug attitudes.

Thus, although the body of literature is not large, there is evidence that substance-related cognitions do mediate the relationship between both parental and peer factors on substance use. However, most of the literature is focused on specific substances and was not conducted among juvenile-involved youth. Although there is no reason to believe a similar effect would not be found among juvenile-involved youth, finding support for the indirect effect of substance attitudes on the relationship between family/peer risk and substance outcomes among justice-involved youth is important as it will expand the generalizability of the findings for this risk pathway. These findings can also inform interventions by identifying important mechanisms through which targeted behaviors are influencing risk, which can in turn provide proxy assessment points to assess the effectiveness of interventions (Kazdin & Kendall, 1998; Kazdin, 2007). Moreover, given that services and drug treatment programs are often fragmented within the justice system, reducing the ability to adopt evidence-based practices to fidelity (Henderson et al., 2007), findings can help identify specific behaviors that can be incorporated within existing modalities of care.

We will also examine whether the effects of family/peer risk on attitudes and subsequent substance use varies by race, as national data have documented higher rates of substance use among White youth within the justice system compared to Black youth (Chassin, 2008; McClelland, Teplin, & Abram, 2004; Office of Applied Studies, 2003; Vaughn, Wallace, Davis, Fernandes, & Howard, 2008; Vincent, Grisso, Terry, & Banks, 2008; Welty et al.,

2016). Additionally, although based on studies among general population youth, there is evidence to suggest that the risk process between family/peer use on substance use outcomes through pro-drug attitudes may differ across racial groups. Specifically, family and peer factors associated with substance use have been shown to be stronger among White youth in comparison to racial/ethnic minority youth (Conn & Marks, 2014; Fagan, Van Horn, Hawkins, & Jaki, 2013; Mason, Mennis, Linker, Bares, & Zaharakis, 2014). Moreover, studies have shown that White adolescents are also more likely to report positive attitudes toward substance use than Black youth (Watt, 2005; Wallace & Muroff, 2002). The current study aims to build upon this literature among general populations youth to examine the mediating role of pro-drug attitudes on the relationship between parent/peer factors and substance use among juvenile justice youth. We hypothesize that parent/peer risk (i.e., family and peer substance use) will have a direct effect on youth substance use (i.e., alcohol and illicit drug use) and this risk process will operate indirectly through youth's positive attitudes about substance use (i.e. pro-drug attitudes). Moreover, based on evidence of race differences in the effect of family/peer factors on substance use and levels of pro-drug attitudes, we hypothesize that the mediation pathway will be stronger for White youth than Black youth.

## Method

### Participants

The present sample included 226 juvenile justice-involved youth derived from a total of 305 youth referred for psychological assessment by the juvenile court. All youth provided assent for the psychological assessments. Out of the 305 youth referred, 45 were not assessed for substance use and thus, were excluded from the current study. An additional 35 youth were excluded for not identifying their race as White or Black (Hispanic/Latino:  $n = 9$ ; multiracial:  $n = 12$ ; no answer:  $n = 14$ ). The majority of participants in the current sample were male ( $N = 185$ ; 81.9%) and self-identified as Black ( $N=168$ ; 74.3%). The age of participants ranged from 12–18 ( $M=15.53$ ,  $SD=1.27$ ).

### Procedure

Following involvement with the juvenile justice system (e.g., arrested, probation violation) in a large Mid-Western city, youth were referred to the university's medical school to complete a court ordered psychological assessment. Following referral, a licensed clinical psychologist or supervised doctoral student reported to the Juvenile Detention Center or the youth's current placement (home or residential facility) to complete the court ordered psychological assessment. As youth were wards of the local justice system at this time, the justice system provided consent for the youth's psychological assessment and youth provided assent. Afterwards, clinicians conducted a structured clinical interview and administered an assessment battery, which included the measures described below and other measures unrelated to the present study. The clinician composed an integrated assessment report for each of the youth, which was subsequently submitted to the juvenile court. Following IRB approval, two trained research assistants coded and de-identified these archival assessment reports for each youth. Twenty percent of the data were re-coded by a third coder; there were no discrepancies between coders.

## Measures

**Demographics**—Each participant self-reported their age, gender, and race, which was confirmed by court documents. Only youth who self-identified as either White or Black were included in the current study due to low frequencies of other races.

**Externalizing symptomology**—The Youth Self-Report (YSR; Achenbach & Rescorla, 2001) is a questionnaire for youth ages 11–18 on which they rate themselves on various behavioral and emotional problems and competencies. The externalizing broad-band scale was used to assess symptoms related to *externalizing* problems. The *externalizing problems* broadband scale is composed of 3 subscales: rule breaking (e.g. lacks guilt, runs away, truant), attention problems (e.g. can't concentrate, impulsive, poor schoolwork), and aggression (e.g. argues a lot, destroys own things, teases a lot). Response options for each item range from 0 (not true) to 2 (very often or often true), and a total scale score is computed. Scale scores are converted to t-scores with scores of 60 at the 85<sup>th</sup> percentile and scores of 65 at the 95<sup>th</sup> percentile. T-scores < 65 on YSR scales are considered to fall in the “normal” range, and increases in t-scores over 65 correspond with increases in symptom severity. The factor structure of the YSR has been replicated in over 24 countries (Ivanova et al., 2007) and the reliability and validity of these scales are well documented (e.g. Achenbach & Rescorla, 2001; Gomez, Vance, & Gomez, 2014). Further, the YSR has been validated for use in samples of juvenile justice involved youth (Vreugdenhil, van den Brink, Ferdinand, Wouters, & Doreleijers, 2006). The externalizing scale has shown convergent validity with related scales (Thurber & Hollingsworth, 1992; Krischer, Sevecke, Lehmkuhl, & Pukrop 2007) and is related to DSM diagnoses of disruptive behavior disorders in juvenile justice-involved youth (Vreugdenhil et al., 2006).

**Drug and alcohol use**—Drug and alcohol use were assessed using the Adolescent Substance Use Subtle Screening Inventory (SASSI-A2; Miller, Renn, & Lazowski, 2001), a questionnaire used to help determine if further assessment and/or treatment are needed for a SUD in youth. The SASSI-A2 Face Valid Alcohol (FVA) subscale includes 12 alcohol use frequency-related items used to evaluate problematic levels of past year alcohol use and related problems (e.g. “Tried to kill yourself while drunk”, “Drank alcohol during the day”). The SASSI-A2 Face Valid Other Drugs (FVOD) subscale includes 16 “other drug use” frequency-related items used to evaluate problematic levels of past year illicit drug use and related problems (e.g. “Taken drugs to improve your thinking and feeling”, “Taken drugs so you could enjoy sex more”). Response options for the FVA and FVOD scales range from 0 (never) to 3 (repeatedly). For the present study, raw scores on the SASSI-A2 scales were converted to t-scores with scores of 50, 60, and 70 representing the 50<sup>th</sup>, 85<sup>th</sup>, and 98<sup>th</sup> percentiles of scores among youth of the same gender, respectively. On the FVA, T-scores > 63 (males) and > 65 (females) are indicative of high probability of an SUD; on the FVOD, T-scores > 58 (males) and > 60 (females) are indicative of high probability of an SUD (Miller & Lazowski, 2001). The SASSI-A2 FVA and FVOD scales have demonstrated acceptable to excellent reliability ( $\alpha=0.61$  and  $0.95$ , respectively; Perera-Diltz & Perry, 2011) and test-retest reliability ( $r$ 's  $0.71$ - and  $0.92$ , respectively; Miller & Lazowski, 2001; Stein et al., 2005).

**Family/friends risk for substance use**—Family/friends risk for substance use was measured using the SASSI-A2 FRISK scale. The SASSI-A2 FRISK scale is a 6-item measure that assesses the extent to which the youth is part of a family or social system that promotes substance use and related problems (e.g., “Many of my friends drink or get high regularly,” “I’m friends with some people who sell drugs,” “One of my parents was/is a heavy true drinker or drug user”). Response options items of the FRISK scale are “true” or “false”, with raw scores ranging from 0–9. T-scores of  $> 61$  (males) and  $> 60$  (females) correspond to the percentiles noted above, which are indicative of high risk for an SUD (Miller & Lazowski, 2001). The FRISK scale has shown excellent two-week test-retest reliability ( $r=.90$ ), acceptable internal consistency (Cronbach’s  $\alpha=0.67$ ) and has demonstrated a 99% correct classification rate for DSM SUD diagnosis (Miller & Lazowski, 2001).

**Pro-drug use attitudes**—Drug use attitudes were assessed through the SASSI-A2 Attitudes scale (Miller et al., 2001), a 10-item measure used to assess youth’s beliefs and attitudes towards drug use (e.g., “Adults shouldn’t hassle kids so much about drugs,” “People who use drugs have more fun,” “Drugs help people to be creative”). Response options for each item are “true” or “false”, with raw scores ranging from 0–10. The Attitudes scale has been shown to have good reliability ( $\alpha = 0.76$ ; Miller et al., 2001; Perera-Diltz & Perry, 2011) and test-retest reliability ( $\alpha = 0.92$ ) and has been validated for use in discriminating between youth with and without a SUD (Lewis & Mobley, 2010).

## Data Analysis

All analyses were performed using SPSS 24.0. Only participants who provided complete data were included in the current study, thus no imputation of missing data was required. The PROCESS macro (Model 4: simple mediation, specified by Hayes, 2013) was used to examine the mediating role of drug attitudes on the relationship between family/peer risk and the substance use outcomes. The PROCESS macro estimates the total and direct effect of the independent variable on the dependent variable, the direct effect of the independent variable on the mediator, and the effect of the mediator of the dependent variable. To examine the second set of hypotheses of racial differences in on the risk pathway, a moderated mediation analysis was performed using the PROCESS macro Model 59 (moderated mediation, specified by Hayes, 2013). This model in the PROCESS macro estimates the conditional indirect effect of the independent variable on the dependent variable through the mediator and conditional direct effect of the independent variable on the dependent variable at each value of the moderator.

Two separate analyses were run for each model, one for alcohol use and another for other drug use as the outcome variable of interest. All analyses included age, gender, and externalizing behaviors as covariates. The PROCESS macro used bootstrapping to generate bias-corrected confidence intervals for the indirect effect and various indices of effect size for the indirect effect (Hayes, 2013). For all mediation analyses in the current study, we used 5,000 bootstrap samples.

## Results

### Preliminary Analysis

Means and standard deviations for the measures of interest are shown in Table 1. Initial bivariate and point-biserial correlations between all study variables are shown in Table 2. Regarding the variables of interest, family/peer risk was positively associated with pro-drug attitudes, alcohol use, and other drug use. Pro-drug attitudes were also positively associated with alcohol use and other drug use. Differences were observed based on demographic variables, with White youth reporting more alcohol and other drug use than Black youth and females reporting stronger pro-drug attitudes and alcohol use than males.

### Relationship between Family/Peer Risk, Drug Attitudes, and Drug Use

**Alcohol use**—After controlling for gender, age and externalizing behaviors, a main effect was found for each leg of the path model, such that family/peer risk predicted pro-drug attitudes ( $b = .47, p < .001$ ) and pro-drug attitudes predicted alcohol use ( $b = .18, p < .001$ ). The indirect effect between family/peer risk, pro-drug attitudes, and alcohol use was significant (estimated indirect effect = 0.086, Boot CI [95] = 0.023–0.173). A remaining direct effect of family/peer risk on alcohol use was also observed ( $b = .12, p = .016$ ). When examining the moderating effect of race, a conditional indirect effect was not found, as the indirect effect was positive for both White (estimated indirect effect = 0.198 SE = 0.111, Boot CI [95] = 0.028–0.455) and Black youth (estimated indirect effect = 0.070, SE = 0.038, Boot CI [95] = 0.010–0.171), with a non-significant difference in indirect effects across groups (index of moderated mediation =  $-0.128, SE = .115, Boot CI [95] = -0.377-0.069$ ). Additionally, although the direct effect of family/peer risk on alcohol use was significant for White youth ( $b = .22, p = .042$ ), but not for Black youth ( $b = .06, p = .210$ ), these differences were not statistically significant. See Figure 1 for path coefficients.

**Other substance use**—After controlling for gender, age and externalizing behaviors, a main effect was found for each leg of the path model, such that family/peer risk predicted pro-drug attitudes ( $b = .47, p < .001$ ) and pro-drug attitudes predicted other drug use ( $b = .39, p < .001$ ). A direct effect of family/peer risk on other drug use was also observed ( $b = .34, p < .001$ ). Additionally, as hypothesized, an indirect effect between family/peer risk, pro-drug attitudes, and other drug use was significant (estimated indirect effect = 0.185, Boot CI [95] = 0.059–0.302). When examining the moderating effect of race, although the indirect effect was non-significant for White youth (estimated indirect effect = 0.180, SE = 0.136, Boot CI [95] =  $-0.041-0.495$ ) but significant for Black youth (estimated indirect effect = 0.182, SE = 0.061, Boot CI [95] = 0.064–0.310), the difference of effect across groups was non-significant (index of moderated mediation = 0.001, SE = .141, Boot CI [95] =  $-0.262-0.282$ ). However, the direct effect of family/peer risk on other drug use did significantly differ across racial groups, with a stronger effect observed for White youth ( $b = 0.72, p < .001$ ) than Black youth ( $b = 0.24, p = .002$ ). See Figure 2 for path coefficients.

## Discussion

Family and peer influences, such as a substance use history and association with delinquent peers, have been shown to increase risk for engagement in substance use among justice-involved youth (e.g., Ewing et al., 2015; Mauricio et al., 2009). However, limited research has been conducted examining the mechanisms through which this risk process operates among this population of at-risk youth. The current study aimed to fill this gap, finding that family/peer risk was directly associated with increased likelihood for past year illicit drug use, and this risk pathway operated indirectly through pro-drug attitudes. Although a direct effect of family/peer risk on alcohol use was not found, a significant indirect pathway through pro-drug attitudes was found. Lastly, given evidence of greater substance use and stronger effects of family/peer influences on substance use for White youth compared to Black youth, we examined whether the risk pathway differed across racial groups in our sample. Although the direct effect of family/peer risk on illicit drug use was stronger for White youth compared to Black youth, contrary to our hypothesis, the mediation pathway operated similarly for both racial groups.

These findings suggest that focusing interventions on family/peer relationships can help reduce substance use among justice-involved youth, in part by changing the youth's views on substance use. Yet, within juvenile corrections facilities the most commonly used substance use treatment are drug and alcohol education programs (Young, Dembo, & Henderson, 2007), with fewer more intensive services available for youth with problematic levels of substance use (Chassin, 2008; Young et al., 2007). Moreover, as noted by Chassin, Knight, Vargas-Chanes, Losoya, and Naranjo (2009), although the involvement of families within the treatment process results in better substance outcomes, this does not consistently occur within juvenile corrections facilities. Additionally, very few facilities adopt developmentally appropriate treatment programs that incorporate specific needs based on family, school, and peer influences (Henderson et al., 2007). Thus, future research can build upon our findings to test the inclusion of family and peers factors within substance use interventions among juvenile justice populations.

Additionally, in cases when evidence-based intervention programs are implemented in juvenile justice setting, there is evidence to suggest that family-based interventions (Chassin et al., 2009; Henderson et al., 2007; Young et al., 2007), such as functional family therapy (Gordon, Graves, & Arbutnot, 1995), multidimensional family therapy (Liddle, Dakof, Henderson, & Rowe, 2011), and multisystemic therapy (MST; Henggeler, Melton, & Smith, 1992) are effective at producing small to moderate effects on youth substance use (Tripodi & Bender, 2011). Of note, there has been strong support for the utility of MST, as it was developed specifically for juvenile offender populations and addresses the influence of not only family factors, but also individual, peer, school, school, neighborhood, and social network factors on the identified problem behavior through individualized interventions (Curtis, Ronan, & Borduin, 2004; Greenwood, 2008; Thompson, Pomeroy, & Gober, 2005). However, findings are mixed on the long-term effectiveness of MST in reducing substance use among justice-involved youth (Chassin, 2008; Curtis et al., 2004; Henggeler, Pinkrel, & Brondino, 1999; Henggeler, Clingempeel, Brondino, & Pickrel, 2002; Henggeler et al., 2006; Randall, Henggeler, Cunningham, Rowland, and Swenson 2001). It is plausible that



the lack of long-term effects for youth substance use is due to the failure of addressing important mechanistic factors within the risk process, such as substance related cognitions. However, to our knowledge, no published study has examined substance-use cognitions as a mechanism within MST or other family-focused interventions (Henggeler et al., 2009; Ozechowski & Liddle, 2000). Thus, studies are warranted assessing the mediating role of parental/peer risk factors and substance cognitions within family-based treatment programs among justice-involved youth. If these factors are not being addressed, it is plausible that treatment effectiveness in reducing substance use outcomes may be improved by explicitly drawing the connection between family/peer influences on youth's pro-drug attitudes, as well as addressing and challenging parent, peer, and youth pro-drug attitudes.

We also examined whether the effect of family/peer risk on substance use outcomes through pro-drug attitudes varied across racial groups. This is critical given evidence of higher rates of substance use and abuse among White youth than Black youth in the juvenile justice system (Office of Applied Studies, 2003; Vaughn et al., 2008). Moreover, among general population youth, family and peer influences on substance use has been found stronger for White youth than Black youth (Fagan et al., 2013; Mason et al., 2014). Our findings suggested that although the effect sizes for the indirect pathway were stronger for White youth than Black youth, differences were not statistically significant. This suggests that treatment programs aimed at reducing substance use through addressing pro-drug attitudes would be equally beneficial for both White and Black youth. However, the direct effect of family/peer risk on illicit drug use was stronger for White youth than Black youth. It is plausible that there are family/peer factors that directly impact substance use, such as parental or peer substance use, that may be stronger among White youth than Black youth (e.g., Fagan et al., 2013). Alternatively, there may be other factors that are associated with parent or peer risk that are stronger for White youth. Some potential mechanisms include parental support, parent/child conflict, negative life events, tolerance drug attitudes (Ashby Wills & Yaeger, 2003; Bahr et al., 2005). Thus, future work is needed to examine alternative mechanisms involved in risk for substance use as a consequence of family/peer factors and potential racial differences within the risk process.

### Limitations and Future Research Directions

There are several strengths of this study, including the examination of family/peer influences for substance use among an at-risk population of youth and the use of reliable and valid clinical assessments. However, there are limitations that should be considered when interpreting the data. First, while the juvenile justice population is an important one to study, our sample comprised youth from one large Mid-western city; thus, it is possible the findings do not generalize to justice-involved youth from other regions of the United States or rural settings. Second, while our sample was characteristic of juvenile justice system demographics (Hockenberry & Puzanchera, 2015), the sample was mostly male (82%) and youth who self-identified as African American/Black (74%). Thus, replication of these findings among youth of varying demographics could aid in determining the generalizability of the study findings. Third, the assessments used to evaluate participants in this study are clinical measures that do not separate drug use categories, which is important to consider evidence that the influence of familial and peer factors varies based on substance type (Allen

et al., 2003). In addition, other social factors, such as level of attachment to family, peers, and school attachment are associated with substance use risk (Henry, Oetting, & Slater, 2009), but were not assessed in the current study. It is plausible that such factors may also mediate the pathway between family/peer risk and substance use and warrants exploration in future research. It is also important to consider the reciprocal nature of drug use and peer influence. Krohn et al. (1996), expanding upon Thornberry's (1987) Interactional Theory of Delinquency, found that there are many interacting factors that contribute to adolescent drug use and that these relationships are reciprocal, such that drug use may lead to choosing a particular type of friend as well as choosing a certain type of friend may lead to drug use. However, given the cross-sectional nature of our data, we were unable to control for prior attitudes or substance use. Thus, future studies employing a longitudinal design is warranted to include these variables. Future research in this area that employs a longitudinal study would also allow for the examination of both the short and long-term effects of family/peer influences on substance use attitudes and subsequent substance use outcomes among juvenile justice involved youth.

Our results support previous evidence that family/peer risk factors are associated with greater pro-drug attitudes (Hemovich, Lac, & Crano, 2010) and that pro-drug attitudes result in higher likelihood of substance use (Barkin, Smith, & DuRant, 2002; Johnston et al., 2016). Moreover, we found evidence to support the full indirect pathway, such that family/peer factors were associated with greater likelihood of engagement in problematic alcohol and illicit drug use through pro-drug attitudes. We examined this risk pathway among youth involved in the juvenile justice system, whom are at risk for severe consequences related to their substance use, including recidivism (Chassin, 2008; van der Put et al., 2014; Wiesner et al., 2005), finding that this risk pathway held for both White and Black youth. Future studies can build from these findings by testing the inclusion of developmentally appropriate family and peers factors within substance use interventions among juvenile justice populations.

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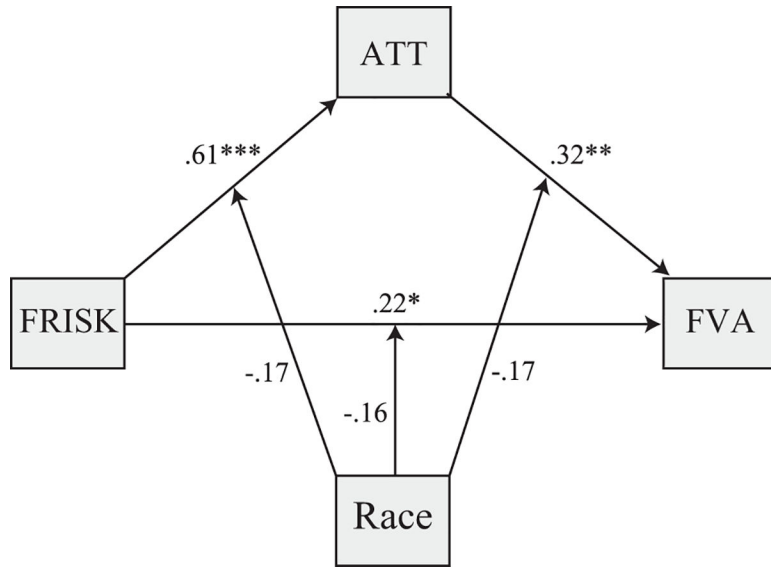


Figure 1.

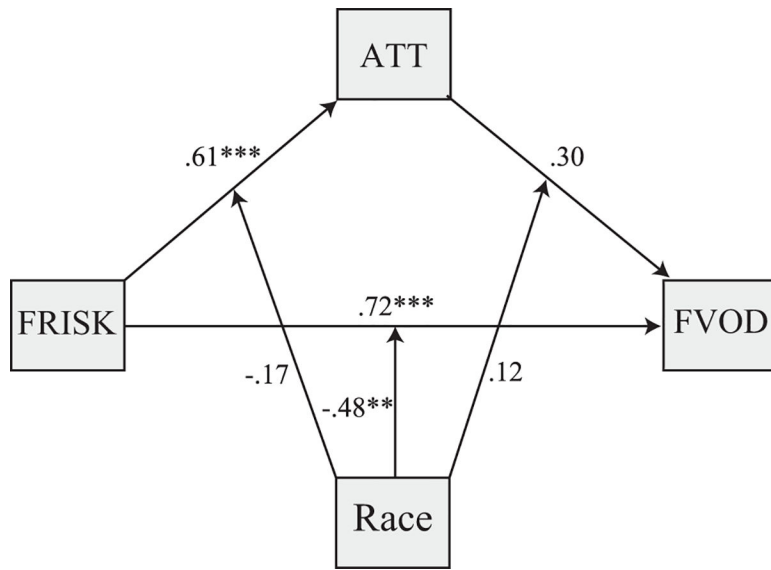


Figure 2.



**Table 1**

## Demographics and Descriptive Statistics for the Sample

Variable	Total Sample N or Mean (% or SD) N=226
Age	15.53 (1.27)
Gender	
Male	185 (81.9%)
Female	41 (18.1%)
Race/Ethnicity	
African American/Black	168 (74.3%)
White	58 (25.7%)
Externalizing Behaviors	67.04 (58.76)
Attitudes	51.93 (10.56)
Family/Peer Risk	53.22 (11.03)
Face Valid Alcohol	46.21 (7.74)
Face Valid Other Drugs	56.26 (12.07)

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**Table 2**

## Correlation Coefficient Matrix

	Age	Gender	Race	EXT	ATT	FRISK	FVA	FVOD
Age	—	-0.13	-0.15*	0.04	-0.12	-0.03	0.09	0.08
Gender		—	-0.04	-0.01	0.15*	-0.02	0.19**	-0.03
Race			—	-0.16*	0.07	-0.06	-0.27***	-0.13
EXT				—	0.03	0.13*	0.23**	0.14*
ATT					—	0.49***	0.35***	0.47***
FRISK						—	0.31***	0.49***
FVA							—	0.51***
FVOD								—

Notes: N=226. Gender: male = 0, female = 2. Race: White = 0, Black = 1. EXT=Externalizing Behaviors ATT= Attitudes; FRISK = Family/Peer Risk; FVA=Face Valid Alcohol; FVOD= Face Valid Other Drug.

\*  
 $p < .05$

\*\*  
 $p < .01$

\*\*\*  
 $p < .001$