

# Social Risk Factors of Black and White Adolescents' Substance Use: The Differential Role of Siblings and Best Friends

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**Abstract** Efforts to understand peer influence among adolescents have established the robust relationship between having substance using peers and future substance use. Still, research suggests that peer influence affects different types of adolescents in different ways. Black adolescents may be less susceptible to friends compared to white adolescents and possess stronger family-orientation, suggesting that siblings may affect deviance of Black adolescents whereas friends will have a minimal impact. This study used data from the first two waves of the National Longitudinal Study of Adolescent to Adult Health to evaluate the relative strength of best friend and siblings' influence as risk factors for Black and White adolescents' alcohol and cigarette use. Approximately 182 Black sibling pairs (37 % male) and 657 white sibling pairs (46 % male) that ranged in ages from 11 to 19 were in the longitudinal analyses for the current study. The findings demonstrated that sibling and best friends' substance use explained white adolescents' cigarette and alcohol use, whereas Black adolescents' cigarette and alcohol use was predominantly explained by siblings' substance use. Ultimately, the results indicated the nuanced role that two types of peers have in explaining variation in substance use across Black and White adolescents.

**Keywords** Siblings · Substance use · Peer influence

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## Introduction

Research on substance use has consistently demonstrated differences in rates of use across race and ethnicity, with fewer African American youth indicating that they engage in alcohol and cigarette use (e.g., Bachman et al. 1991; Bersamin et al. 2005; Kandel et al. 2004). The most recent 2014 estimates from the Monitoring the Future National Survey found that by 12th grade 42 % of White adolescents compared to only 26 % of Black adolescents reported a 30-day prevalence rate of alcohol use. Similarly, approximately 18 % of White adolescents compared to only 9 % of Black adolescents indicated a 30-day prevalence rate for smoking cigarettes (Meich et al. 2015). Despite the lower use of substances by Black adolescents, Black youth and adults experience substance-related problems at levels that are considerably higher than white adolescents and adults (Bachman et al. 2002; Wallace and Muroff 2002). The social and economic consequences that disproportionately affect Black individuals heighten the importance of identifying key risk factors that can predict substance use and abuse (Bersamin et al. 2005).

A limited body of research has attempted to understand how Black and White adolescents may experience differences in exposure and vulnerability to particular risk factors to explain the gap in rates of substance use (e.g., Catalano et al. 1992; Wallace and Muroff 2002). Despite the fact that influence from substance using friends has been considered one of the strongest risk factors for predicting adolescent substance use, a number of studies and theoretical perspectives have actually suggested that Black adolescents were less vulnerable to influence from their friends and were more family oriented (e.g., Brechwald and Prinstein 2011; Giordano et al. 1993). A unique socialization process among Black adolescents

based on family and parenting practices may lead Black adolescents to become less vulnerable to influence from friends, but enable a particular peer found in the home to wield stronger influence over behavior. Namely, Black siblings are posited by the current study to assume a powerful role in explaining Black adolescent substance use. Recognizing the unique social ecology of Black adolescents may lend itself toward understanding differences in the source and strength of key risk factors for Black and White substance use (e.g., Bersamin et al. 2005; Wallace 1999).

Ultimately, while research converges around the importance of peer influence broadly, less attention has been given to understanding how the influence from particular peers is experienced by Black and White adolescents separately. By integrating research that identifies siblings as important in explaining adolescent development with research that seeks to understand differential susceptibility to certain peers, the current study examines how a wider range of peers affect adolescent substance use among Black and White adolescents net a range of relevant control variables. The current study used a sample of Black and White adolescents from the Adolescent Household Pair Sample, which is a subset of the National Longitudinal Study of Adolescent to Adult Health (AddHealth). These data provided a unique opportunity to simultaneously capture demographic and objective substance use measures on both siblings and best friends of the youth in the study. Cross-classified hierarchical logistic models are implemented to examine the differential role that siblings and best friends play in explaining alcohol and cigarette use.

### Differential Socialization Experiences of Black Adolescents

Black adolescents are situated within the historical context of racial discrimination and the competing domains of their culture and the world of the majority (Coll and Patcher 2002). As such, the structure of Black families and the experience of Black adolescence contributes to the development of a unique black-adolescent identity (McAdoo 2002; McLoyd 1990). For example, there has been a fairly consistent growth in the number of single parent Black households and the number of Black children living without both parents (Annie E. Casey Foundation 2011). This difference is not without consequence. Research has demonstrated that single parent and extended family households often coincided with more negative psychosocial and economic outcomes (e.g., Coley 1998; Mandara and Murray 2000).

These structural differences were initially used to explain why Black adolescents were assumed to be

significantly more friend-oriented than White adolescents (Silverstein and Krate 1975). Silverstein and Krate (1975) argued that Black adolescents failed to receive the necessary support from their parents and therefore turned to peers to fulfill that void. More recent research by Gillmore et al. (1990) evaluated the impact of peer alcohol use among 5th-grade White, Black, and Asian-American adolescents and found that across these groups there were no differences in the proportion who had friends that used alcohol and that peer use significantly predicted substance initiation for all three groups. Additional empirical research has challenged the assumption that the influence of friends is consistent across racial groups. Qualitative research by Furstenberg et al. (1999) sought to evaluate family management practices in Philadelphia and found that because Black families were situated in the poorest areas with limited neighborhood-based resources, parents engaged in “lock-in” parenting to protect their children from negative peer influences on the streets. More recent research that focused on parenting strategies of Black families similarly found that Black parents were more likely to be proactive family managers that monitored the whereabouts of their children, exercised tighter control over friendship selection by their children (Catalano et al. 1992), and felt more empowered to affect children’s behavior (Clark et al. 1999; Peterson et al. 1994). This type of stricter parental control been linked to reducing adolescent affiliations with deviant friends outside of the home environment (e.g., Deutsch et al. 2012; Lansford et al. 2004).

In total, Black socialization experiences have the capacity to uniquely alter behavioral outcomes of adolescents. Once oriented towards the home, siblings may be the primary similarly aged and situated “peers” for adolescents to interact with during key developmental periods. This orientation is consistent with the ecological perspective offered by Wallace (1999) to explain differences in substance use between Black and White adolescents. Wallace’s (1999) framework described how extremely adverse conditions experienced by minority adolescents can actually serve to suppress rates of substance use due to direct contact with the negative consequences of substance use among adults, the increased vigilance of caretakers, and the lack of disposable income to use on drugs. Further, Wallace (1999) suggested that exposure to such an environment reduced peer-orientation and susceptibility to peer-norms supportive of substance use (see also Wallace and Bachman 1991). Nonetheless, given the research that suggests that there might be *variation* by race in the experience of key sources of influence the current inquiry sought to clarify how these different associates in a youth’s social network contribute to engagement in substance use.

## Differential Influence of Siblings and Friends by Race

Several studies have attempted to assess the saliency of peer influence across race and generally converge around findings suggesting that Black youth are less susceptible to influence from friends and are considerably more family oriented (e.g., Bersamin et al. 2005; Deutsch et al. 2012). Giordano et al. (1993) conducted 942 interviews with Black and White adolescents to understand their relations with family and friends. Giordano et al. (1993) offered two major conclusions consistent with framework for the current study: (1) Black adolescents experience higher levels of parental control and family intimacy, and (2) Black adolescents perceived their friendships to be less intimate and felt a lesser need for approval from peers compared to White adolescents. Steinberg and Monahan (2007) utilized a new self-report measure, *Resistance to Peer Influence* (RPI), to assess age, gender, and racial differences in resistance to peer influence. Steinberg and Monahan (2007) concluded that Black adolescents were characterized by a higher resistance to peer influence compared to individuals from other races or ethnicities. The socialization and rearing of Black adolescents at a minimum seems to lead to weaker attraction toward friends, and at most develops a reservation toward these “traditional” peers. Indeed, Giordano et al. (1993) argued that Black adolescents viewed their families as a “safe haven” and as source of support that was not readily detached from during adolescence. This distinction highlights the traditional focus placed on vertical relationships (e.g., parent and child) and the relative oversight of horizontal relations (e.g., siblings) in evaluations of family influence on development that could potentially illuminate how siblings influence adolescent, behavior particularly among Black adolescents (Stormshak et al. 2004).

Despite the critical importance of Black siblings, a much larger body of research has evaluated the extent to which friends affect substance use (e.g., Barnes et al. 1994; Deutsch et al. 2012). Each of these studies generally concluded that Black youth had less substance using friends and that their own substance use was less influenced by their friends. Using the AddHealth data, Watt and Rogers (2007) found significant differences in reported alcohol use between Black youth (37 %) and White youth (50 %), however there were no differences in heavy drinking or drug use. These scholars also concluded that Blacks were not as easily influenced by peers when compared to Whites and that family support was significantly more important in explaining alcohol use among Black adolescents (Watt and Rogers 2007). Griesler and Kandel (1998) evaluated risk factors for cigarette smoking with the National Longitudinal Survey of Youth and noted large differences in the

prevalence of lifetime and current cigarette smoking use by race with Black youth reporting significantly less use than White or Hispanic youth. Additionally, Griesler and Kandel (1998) found that while Black, Hispanic, and White adolescents indicated similar rates of peer pressure to smoke, the relationship between peer smoking and an adolescents’ own cigarette use was only significant for White and Hispanic youth. Ultimately, while the state of current research suggests that Black and White youth are not equally vulnerable to substance using friends, it does not preclude Black adolescents from being susceptible to peers other than friends and actually calls for additional research to address this void in understanding peer processes for Black adolescents.

A body of research primarily conducted among White adolescents has also identified siblings as a strong interpersonal risk factor for the use of tobacco and alcohol (e.g., Low et al. 2012; Trim et al. 2006; Whiteman et al. 2007). This research is largely based on the premise that sibling relationships serve as the “training grounds” for learning behavior and reinforce learned behavior as a result of the extensive amount of time spent together (Cicirelli 1995; Dunn 1983). For example, Slomkowski et al. (2005) analyzed sibling pairs in the AddHealth and found that siblings influenced adolescent smoking behavior, particularly for those siblings with a strong social connectedness, even after controlling for genetic effects and influence from friends. Similarly, Whiteman et al. (2014) concluded that, among a sample of two-adolescent sibling families, social influence processes that operated through modeling behaviors and admiration for older siblings predicted adolescent alcohol use and attitudes conducive to alcohol use. In a four-wave panel study focusing on risk factors for adolescent substance use and alcohol problems, Windle (2000) concluded that sibling substance significantly contributed to adolescent substance use by increasing the likelihood of adolescents having substance using friends and coping motives for alcohol abuse. Still, many of the studies that have evaluated sibling influence did not separate the analyses of the sample by race and have only occasionally alluded to some differences in the role of siblings for Black youth (e.g., Stormshak et al. 2004).

In the case of Black siblings, research has suggested that interactions with siblings are likely to be formative in their uniquely structured path characterized as one less dependent on friends and should be evaluated as a potentially important risk factor (Brody et al. 2003; McHale et al. 2007). With some notable exceptions, existing research on adolescent risk factors for substance use has often bifurcated peer and family processes without consideration of the fact that uniquely situated peers within the family may assume a powerful role in explaining the adoption of substance using values and engagement in substance use

(Stormshak et al. 2004; Windle 2000) By precluding a direct comparison between siblings and best friends, this may result in an overestimation of the effect of friends and an underestimation of the effect of siblings, particularly for Black adolescents.<sup>1</sup>

## The Current Study

Research and theory have both suggested that an individual's network of "peers" is not limited to school-based friends, but rather that the influence of different types of peers may be conditioned by important structural anchors such as race (e.g., Matsueda and Heimer 1987; Wallace 1999). The aims of this study were to (1) provide a richer depiction of the nature of peer influence processes to more precisely understand the role of various peers in explaining substance use and (2) address the notable inability of existing research to identify salient risk factors that predict Black substance use (e.g., Bersamin et al. 2005; Wallace and Muroff 2002). This study specifically evaluated how Black and White adolescents differentially experience sibling and best friend's influence on substance use by testing the following hypotheses that assess both within and between race differences.<sup>2</sup>

First, based on research that suggested Black adolescents were less susceptible to influence from friends and were more family oriented, it was expected that siblings of Black adolescents would have a stronger influence in explaining substance use when compared to best friends of Black adolescents (Hypothesis 1) (e.g., Steinberg and Monahan 2007). Consistent with past research primarily conducted on White adolescents that identified friends as key sources of influence, best friends of White adolescents were expected to have a stronger influence on substance use than their siblings (Hypothesis 2) (e.g., Pratt et al. 2010; Bersamin et al. 2005). To capture whether Black and White adolescents were differentially vulnerable to sibling

and best friend influence, the remaining hypotheses addressed between race effects of these two types of peers. While sibling substance use may explain adolescent use for both White and Black adolescents, given the elevated importance of siblings for Black adolescents it was expected that the effect of siblings for Black adolescents would be stronger than the effect of siblings for White adolescents (Hypothesis 3). Similarly, it was hypothesized that the effect of best friends for White adolescents would be stronger than the effect of best friends for Black adolescents in predicting adolescent substance use (Hypothesis 4).

## Methods

This study used data from the National Longitudinal Study of Adolescent to Adult Health (AddHealth). One of the main benefits of the AddHealth data for researchers is the rich set of measures directly reported by subjects, their siblings, and their friends. This allows for a unique assessment of multiple sources of influence on deviant behavior. Participants were clustered within 132 randomly selected schools that were stratified by region, urbanicity, school size and type. All of the students from selected schools (grades 7–12) were able to complete an in-school questionnaire during the 1994–1995 school year. Data from approximately 90,000 students were collected during the in-school survey. In this survey, adolescents were asked to nominate up to 10 in-school friends, who also participated in the study (if they were present on the day of data collection and took part in the study). A much smaller subsection of these students were given an in-home interview in 1995 (Wave I) and then again in 1996 (Wave II).

Supplemental samples of adolescent pairs were drawn based on responses to questions on the in-school survey. Various types of pairs were included in the adolescent pair dataset including twins, full siblings, half-siblings, cousins, and non-related adolescents (step siblings, adopted siblings, boyfriend/girlfriends, etc.). All non-related adolescents, except for adopted siblings, were excluded from the current analyses. It is argued that the shared environment of siblings, particularly among Black adolescents, is what contributes to the socialization processes that affect the strength of sibling influence. Thus, this exclusion was done to ensure that included pairs in the sample were likely reared together for an extended period of time and shared the same environment from childhood to adolescence.

The analyses in the current study utilized a dyadic modeling technique, which shifts the unit of analysis to the dyad or sibling pair. The current study began with a total of 2133 Black and White sibling pairs. Many of the participants did not have valid substance use measures or their

<sup>1</sup> The influence of siblings across a range of studies have been found to be conditioned by whether the sibling pair was of the same sex, closer in age, birth order, and from higher conflict families (e.g., Rowe and Gulley 1992; Slomkowski et al. 2001, 2005; Trim et al. 2006). Thus, the strength and presence of sibling influence may not be uniformly experienced by all individuals and is conditioned by several of the structural features of the "sibling constellation" (see review in Dunn 1983). The current study assessed whether the age-gap or birth order of the sibling pairs impacted the results in supplementary analyses. Neither of these factors conditioned the influence of siblings for Black or White adolescents and are therefore not included in the main results.

<sup>2</sup> Past research has demonstrated the importance of best-friends in explaining delinquent behavior (e.g., Rees and Pogarsky 2011; Selfhout et al. 2008; Vitaro et al. 2000). Additionally, compared to the entire friendship group a best friend provides a more suitable comparison to an individual sibling.



sibling or best friend were missing valid substance use measures, resulting in a loss of a number of sibling pairs. Nearly 384 pairs were missing in-school measures or outcome measures of substance use and 57 pairs did not have valid substance use measures on their sibling or information on their best friend. Additionally, the analyses focused only on those youth who identified and had available data on same sex siblings and same sex best friends further reducing the sample by 384 pairs. A number of studies have demonstrated how the gender composition of sibling conditioned sibling influence, therefore this study only focused on same-sex pairs as the unit of analysis (e.g., Rowe and Gulley 1992). This data attrition resulted in final sample sizes of  $N = 182$  Black dyads and  $N = 651$  White dyads for the drinking models; and  $N = 182$  Black dyads and  $N = 657$  White dyads for the smoking models. In order to accommodate the specifications of a hierarchical linear model (HLM—to be discussed below), siblings must also only appear in one sibling dyad (that is, a subject cannot be nested in two different dyads). If a subject belonged to more than one sibling pair that had complete data, a sibling pair was chosen at random to remain and the additional pair was dropped from the sample.

### Dependent Variables

The AddHealth study captured substance use measures during the in-school survey, questions to which subjects, siblings and friends responded. Using these in-school measures, permits comparing consistent behaviors across both types of peers under study. Consistent with past research identifying notable gaps in alcohol and smoking behavior for Black and White adolescents, the focus of these analyses was on alcohol and cigarette use (Meich et al. 2015). Some scholars have noted that the risk factors for substance use may depend on whether the outcome of interest reflects experimentation or more serious involvement with substances (e.g., Chassin et al. 2004; Scheier and Newcomb 1991). Thus, the current analyses included indicators reflecting whether youth have tried alcohol or cigarettes and more serious markers of use for each of these substances.

#### Smoking

Each respondent was asked during the Wave 2 in-home survey the following question about their behavior in the past year: “have you tried cigarette smoking, even just one or two puffs?” Subjects were able to respond either “yes” (1) or “no” (0). Approximately 27 % of Black adolescents and 50 % of White adolescents indicated they smoked. Additionally, respondents were asked: “have you smoked regularly that is at least one cigarette every day for

30 days?” Subjects were able to respond either “yes” (1) or “no” (0). Approximately, 9 % of Black adolescents and 21 % of White adolescents indicated that they smoked at least one cigarette every day for 30 days (see Table 1).

#### Drinking

Each respondent was asked during the Wave 2 in-home survey the following question about their behavior in the past year: “have you had a drink of beer, wine, or liquor—not just a sip or taste of someone else’s drink—more than two or three times?” Subjects were able to respond either “yes” (1) or “no” (0). Approximately 40 % of Black adolescents and 52 % of White adolescents indicated that they had engaged in drinking more than two or three times in the past year at Wave 2. Additionally, respondents were asked: “Over the past 12 months, on how many days did you drink five or more drinks in a row?” Scores on this item were dichotomized such that a value of 1 indicated that the respondent reported binge drinking at least once in the past 12 months and 0 if they had not. Approximately, 16 % of Black adolescents and 33 % of White adolescents indicated that they have engaged in binge drinking (see Table 1).

### Independent Variables

#### Sibling Substance Use

Each sibling was asked questions about their involvement in smoking cigarettes and drinking alcohol at Wave 1. Responses to how often a subject smoked cigarettes or drank included: “never” (0), “once or twice” (1), “once a month or less” (2), “2 or 3 days a month” (3), “once or twice a week” (4), “3–5 days a week” (5), and “nearly every day” (6). Higher values indicate that the subject had a sibling who engaged in more serious levels of smoking or drinking.

#### Best Friend Substance Use

During the in-school interview, subjects were asked to nominate up to 5 female and 5 male in-school friends. These individuals were also administered the in-school survey; therefore, in-school friends report their own smoking and drinking. Responses to how often a best friend smoked cigarettes or drank included: “never” (0), “once or twice” (1), “once a month or less” (2), “2 or 3 days a month” (3), “once or twice a week” (4), “3–5 days a week” (5), and “nearly every day” (6). The same sex best friend of the subject was identified as the first listed friend that had valid substance use data, was not the subject’s sibling, and also was not a mutual friend of the

sibling pair. Past sibling research has emphasized the role of parsing out unique and shared influences when examining siblings and has found a larger impact on deviant behavior from unique friends (Haynie and McHugh 2003). For Black adolescents, the average best friend response was .50 (S.D. = 1.19) for smoking and .90 (S.D. = 1.36) for drinking. For White adolescents, the average best friend response was 1.17 (S.D. = 1.99) for smoking, 1.16 (S.D. = 1.45) for drinking.

## Control Variables

### *Impulsivity*

A criticism of peer influence is the possibility that some underlying characteristic explains why certain individuals are more likely to engage in risky and deviant behavior and why they have friends that do the same (i.e., selection). Scholars have posited that low self-control explained both an individual's propensity to engage in delinquent behaviors and the deviance of their peers; therefore, impulsivity, one of the main components of self-control, will be used as a control variable for the measure of self-control (Pratt and Cullen 2000; see also Paternoster and Pogarsky 2009, which has used the same measure). This measure captured a subject's inability to fully consider the consequences of one's actions, which reflects the general tenor of the concept of self-control and has been used by previous research to account for self-control (e.g., Paternoster and Pogarsky 2009). Respondents were asked the following statements about themselves: "When making decisions, you tend to think over the options carefully rather than go with your gut." Responses to this item included "Not at all true of myself", "Slightly true of myself", "About halfway true of myself", "Mostly true of myself", and "True of myself". Therefore, lower values on this measure indicated higher levels of impulsivity.

### *Parental Attachment*

Research on adolescents has found that individuals who had strong ties to their parents were less likely to engage in deviant behavior (e.g., Cernkovich and Giordano 1987; Rankin and Kern 1994; Rankin and Wells 1990). Therefore, parental attachment was controlled for. Respondents were asked about how much they believed their parents cared about them with higher values indicating a stronger attachment (1 = not at all, to 5 = very much).

### *Parental Supervision*

Respondents were asked two questions about how often their mom is at home when they leave for school and how

often their mom is home when they return from school. Responses to these questions (1 = always, to 5 = never) were averaged together for each individual. Some literature has suggested that youth who indicated that their parents engaged in a lower amount of supervision more often engaged in problem behaviors (Hawkins et al. 1992; Warr 2005).

### *Parental Substance Use*

Past literature has identified parents' own use of alcohol and other drugs to be risk factors for youth engagement in substance use (Watt and Rogers 2007). To account for this, parents of subjects were asked about their own drinking and smoking behaviors. During the in-home parent interview, the parent respondent was asked "How often do you drink alcohol?" Responses to this item included "never", "once a month or less", "2 or 3 days a month", "3–5 days a week", and "nearly every day". To capture parental smoking, the parent respondent was asked "Do you smoke?" and responses were either "yes" (1) or "no" (0).

### *Demographic Characteristics*

Consistent with previous peer research, a series of demographic characteristics were accounted for that might also affect peer selection and underlying processes related to deviant behavior (e.g., Sewell et al. 1969; Warr 1993). Age, biological sex, family structure, and measures of socioeconomic status were included as controls. Age was a continuous variable from Wave 1 of the survey and ranged from 12 to 19. Biological sex was measured as a binary variable that indicated whether the subject was female or male (0 = female, 1 = male). Family structure was measured by a binary variable that indicated whether each subject lived with two married parents (1 = yes, 0 = no). Given research has shown the younger sibling is more influenced by an elder sibling, birth order was considered as a control variable (Dunn 1983; Furman and Buhrmester 1992). Finally, socioeconomic status was measured by whether the mother received public welfare assistance during the past year (1 = yes, 0 = no).

### *Interaction-Variables and Level-Two Predictors*

Consistent with research by Haynie and McHugh (2003) and Slomkowski et al. (2005), the genetic similarity between siblings may explain some of the sibling resemblance on delinquent behavior. Therefore, a genetic coefficient that specified the degree to which siblings were genetically related was interacted with sibling substance use (0 = adopted siblings, .25 = half siblings/cousins, .50 = dizygotic/full siblings, 1 = monozygotic siblings).

Age-spacing between siblings has also been demonstrated to be an important consideration in understanding when sibling influence was most salient and therefore was accounted for at level-two (Samek et al. 2015; Stormshak et al. 2004). This was measured as a dichotomous variable indicated by whether the siblings were 0–2 years apart or 2 or more years apart in age (1 = 0–2 years, 0 = 2+ years).

### Analytic Plan

The dyadic models were implemented with the use of hierarchical linear models, consistent in part with Kreager and Haynie's (2011) study on romantic partners. The use of dyads as the unit of analysis seeks to simultaneously assess the impact of subjects' attributes on their sibling's outcome and the effects of siblings' attributes on the subjects' own outcomes. As each individual sibling is nested within sibling dyads, ignoring the violation of independence between dyad members could result in biased standard errors and inefficient coefficient estimates (Kreager and Haynie 2011). The Actor-Partner Interdependence Model has been used to evaluate the simultaneous actor-partner effects that was desired for this particular study of siblings. This model presents a multi-level structure that consists of level-one data for individual members of the dyad and level-two data

that indicates the dyad unit and accounts for between-dyad attributes.

There was a noteworthy complication in the nature of the data, as subjects in the AddHealth were also nested within schools. This would imply the use of a three-level hierarchical model to account for interdependencies within schools; however, not all sibling pairs attended the same school. This fact challenged the use of traditional hierarchical linear models that require rigid structural nesting within each level. Thus, a more flexible framework was required in order to account for the simultaneous membership in different sibling pair and school settings. A cross-nested or cross-classified model offered one potential solution to address the structure of the data (Johnson 2012). Specifically, a cross-nested model allows for the simultaneous nesting of primary units in multiple level-2 units. The use of this model still required that each sibling only belong to a single dyad; therefore one major consequence of this analysis was the loss of siblings who belonged to more than one sibling pair. Separate models will be run for each dependent variable by race to account for the possibility that sibling influence is conditioned by genetic heritability.

Lastly, in order to determine whether the strength of the effect for siblings and friends on deviance was significantly

**Table 1** Descriptive statistics of variables used in analyses

	White adolescents Mean (SD)	Black adolescents Mean (SD)	Min	Max
<i>Controls</i>				
Age	14.9 (1.64)	14.9 (1.75)	11	19
Male	.460 (.499)	.370 (.484)	0	1
Impulsivity	3.08 (1.01)	2.92 (1.16)	1	5
Mom welfare	.100 (.294)	.230 (.422)	0	1
Parental attachment	4.81 (.527)	4.85 (.411)	1	5
Family structure	.840 (.363)	.490 (.501)	0	1
Parental supervision	2.23 (1.07)	2.25 (1.10)	0	5
Genetic relatedness	.546 (.210)	.506 (.224)	0	1
Birth order	.3471 (.476)	.341 (.475)	0	1
Age gap	.774 (.419)	.794 (.405)	0	1
Parent smoke	.270 (.445)	.260 (.442)	0	1
Parent drink	2.07 (1.15)	1.53 (.826)	1	6
<i>Sibling and best friend substance use</i>				
Sibling smoke	1.17 (1.98)	.640 (1.39)	0	6
Sibling drink	1.15 (1.49)	1.01 (1.50)	0	6
Best friend smoke	1.17 (1.99)	.500 (1.19)	0	6
Best friend drink	1.16 (1.45)	.900 (1.36)	0	6
<i>Outcomes</i>				
Subject smoking experimentation	.500 (.500)	.270 (.448)	0	1
Subject drinking experimentation	.520 (.500)	.400 (.491)	0	1
Subject heavy smoking	.210 (–)	.090 (–)	0	1
Subject binge drinking	.327 (–)	.165 (–)	0	1

different between independent samples of White and Black adolescents, I relied on the equality of coefficients test (Paternoster et al. 1998). These analyses utilized multiple imputation to account for missing information on the control variables. I estimated models using multiple imputation with Stata’s Imputation with Chained Equation command (Royston 2004; StataCorp, College Station, TX).

**Results**

The following tables present each of the cross-classified HLM models for both trial and heavier use of alcohol and cigarettes. Table 2 presents the results from the models that predicted Black adolescent drinking behavior. Models 1 and 2 refer to whether youth have tried alcohol, whereas Models 3 and 4 refer to subject reported binge drinking. For ease of interpretably results are presented as odds-ratios. The results from Model 1 for Black adolescents indicated that only sibling alcohol use significantly increased the likelihood of whether an adolescent reported experimenting with alcohol. A one-unit increase in the frequency that a sibling drank in the previous year at Wave 1 led to an increase in the odds the subject reported experimenting with alcohol at Wave 2 by 1.30 ( $p < .05$ ). The results from Model 3 for Black adolescents indicated

that neither sibling nor best friend alcohol use significantly increased the likelihood of whether an adolescent reported binge drinking. To compare the magnitude of the effects of sibling and best friend influence within the models, the standardized coefficients for these sources of influence were calculated. The standardized coefficients indicated that sibling alcohol use (1.49) was larger in magnitude than best friend alcohol use (1.09) for alcohol experimentation, whereas the standardized coefficient for best friend alcohol use (1.57) was larger in magnitude than sibling alcohol use (1.39) for binge drinking. Support for Hypothesis 1, which expected the effect of siblings for Black adolescents to be stronger than that of best friends was therefore limited to alcohol experimentation. The results from Models 2 and 4, which assessed whether there was an interaction between the genetic similarity of the sibling pair and sibling influence did not indicate that genetic heritability conditioned the influence of siblings on both alcohol related outcomes.

Table 3 present the results from the models that predicted White adolescent drinking behavior. Models 1 and 2 similarly refer to whether youth have tried alcohol, whereas Models 3 and 4 refer to youth reported binge drinking. According to Model 1, White adolescents’ best friend and sibling alcohol use were both significant predictors of subsequent experimentation with alcohol and binge drinking. A one-unit increase in the frequency of sibling drinking led to a 1.42 odds increase in alcohol

**Table 2** Cross-classified HLM predicting black adolescent alcohol use (OR)

	Model 1 Alcohol experimentation Coef (SE)	Model 2 Alcohol experimentation Coef (SE)	Model 3 Binge drinking Coef (SE)	Model 4 Binge drinking Coef (SE)
<i>Level 1 variables</i>				
Sibling drinking	1.30 (.123)*	1.36 (.132)*	1.24 (.158)	1.43 (.177)
Best friend drinking	1.07 (.133)	1.08 (.133)	1.39 (.179)	1.46 (.188)
Male	1.38 (.365)	1.44 (.371)	1.02 (.560)	1.19 (.592)
Age	1.05 (.121)	1.06 (.123)	1.14 (.186)	1.13 (.194)
Self-control	.638 (.157)**	.645 (.159)**	.460 (.259)**	.483 (.266)**
Parental attachment	.369 (.415)*	.357 (.418)*	.343 (.552)	.304 (.568)*
SES	1.41 (.441)	1.42 (.445)	6.17 (.641)**	5.87 (.656)**
Parental supervision	1.08 (.165)	1.06 (.168)	1.40 (.260)	1.34 (.269)
Family structure	.811 (.358)	.820 (.362)	1.00 (.550)	1.09 (.577)
Parent drinking	1.51 (.213)	1.54 (.216)	1.98 (.271)*	2.05 (.278)*
Birth order	.751 (.439)	.731 (.443)	1.20 (.669)	1.03 (.701)
<i>Level 2 variables</i>				
Genetic relatedness	1.21 (.845)	1.17 (.859)	1.94 (.734)	1.14 (1.40)
Age-gap	.873 (.465)	.881 (.465)	1.73 (1.23)	1.60 (.740)
<i>Cross-level interactions</i>				
Genetic relatedness × sibling drinking		1.64 (.581)		5.47 (.837)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$



**Table 3** Cross-classified HLM models predicting white adolescent alcohol use (OR)

	Model 1 Alcohol experimentation Coef (SE)	Model 2 Alcohol experimentation Coef (SE)	Model 3 Binge drinking Coef (SE)	Model 4 Binge drinking Coef (SE)
<i>Level 1 variables</i>				
Sibling drinking	1.42 (.067)***	1.44 (.068)***	1.45 (.064)***	1.49 (.066)***
Best friend drinking	1.23 (.067)**	1.23 (.067)**	1.14 (.067)*	1.14 (.068)*
Male	1.05 (.181)	1.04 (.182)	1.81 (.194)**	1.80 (.195)**
Age	1.14 (.064)*	1.13 (.065)	1.20 (.073)*	1.19 (.074)*
Self-control	1.02 (.080)	1.02 (.081)	.890 (.087)	.891 (.088)
Parental attachment	.985 (.165)	1.01 (.167)	1.02 (.179)	1.05 (.183)
SES	1.17 (.304)	1.17 (.306)	1.08 (.334)	1.05 (.338)
Parental supervision	1.17 (.086)	1.17 (.087)	1.19 (.091)	1.18 (.092)
Family structure	1.51 (.248)	1.56 (.251)	1.29 (.269)	1.39 (.276)
Parent drinking	1.26 (.079)**	1.24 (.080)**	1.30 (.081)***	1.29 (.082)
Birth order	.875 (.222)	.874 (.223)	1.22 (.241)	1.22 (.241)
<i>Level 2 variables</i>				
Genetic relatedness	.403 (.450)*	.485 (.480)	.373 (.501)*	.375 (.525)
Age-gap	1.31 (.219)	1.29 (.219)	1.72 (.245)*	1.67 (.244)*
<i>Cross-level interactions</i>				
Genetic relatedness × sibling drinking		1.73 (.356)		2.32 (.356)*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ 

experimentation ( $p < .001$ ), whereas a one-unit increase in the frequency of best friend drinking led to a 1.23 odds increase in alcohol experimentation ( $p < .01$ ). For both alcohol experimentation and binge drinking respectively, the standardized coefficients of White sibling alcohol use (1.69, 1.35) were larger than the standardized coefficients (1.73, 1.21) for best friend alcohol use. These findings countered the expected relationship specified by Hypothesis 2 that expected the effect of best friend influence for White adolescents to be larger in magnitude than sibling influence. The results from Model 4, which evaluated whether sibling influence for White adolescent binge drinking was conditioned by the genetic similarity of the sibling pair indicated that the effect of sibling influence was stronger as the genetic similarity of the sibling pair increased.

In comparing the effect of siblings and best friends for alcohol use between Black and White adolescents, an equality of coefficients test indicated there were no statistically significant differences across races. Although there were differences in the presence of statistical significance in the effect of siblings and best friends, this statistical test provided a more conservative estimate of differences across the models. This suggested that there was no support for Hypothesis 3 or Hypothesis 4 for drinking outcomes that predicted differences in strength of siblings and best friends respectively across Black and White adolescents.

Table 4 presents the results for the effects of sibling and best friend smoking on adolescent experimentation with cigarettes and heavier cigarette use among Black adolescents. Models 1 and 2 refer to whether youth have tried cigarettes, whereas Models 3 and 4 refer to whether the subject reported heavier cigarette use. For Black adolescents, sibling smoking significantly predicted future engagement in smoking at Wave 2 across each of the outcomes, whereas best friend substance only significantly predicted heavier cigarette use. According to Models 1 and 3, a one unit increase in Black adolescent sibling smoking led to an increase in the odds of adolescent cigarette experimentation by 1.63 ( $p < .01$ ) and an increase in the odds of heavier cigarette use by 1.56 ( $p < .01$ ). In comparing the magnitude of the effects of sibling and best friend smoking for both smoking behavior outcomes respectively, the standardized coefficients for sibling smoking (1.98, 1.85) were larger than the standardized coefficients of best friend smoking (1.23, 1.68). In consideration of adolescent cigarette use, this result provided support for Hypothesis 1 as it was expected that the effect of sibling influence would be larger than that of best friend influence for Black adolescents. The results from Model 2 indicated that siblings had a strong positive effect on predicting experimentation with cigarettes that was conditioned by genetic similarity, such that the strength of

**Table 4** Cross-Classified HLM models predicting Black adolescent smoking (OR)

	Model 1 Cigarette experimentation Coef (SE)	Model 2 Cigarette experimentation Coef (SE)	Model 3 Heavy cigarette use Coef (SE)	Model 4 Heavy cigarette use Coef (SE)
<i>Level 1 variables</i>				
Sibling smoking	1.63 (.163)**	2.13 (.239)**	1.56 (.164)**	1.59 (.167)**
Best friend smoking	1.19 (.170)	1.13 (.180)	1.54 (.203)*	1.53 (.204)*
Male	1.23 (.426)	1.40 (.440)	.589 (.693)	.621 (.703)
Age	.884 (.143)	.912 (.142)	1.15 (.240)	1.17 (.239)
Self-control	.539 (.189)**	.563 (.196)**	.815 (.304)	.860 (.313)
Parental attachment	1.16 (.568)	1.15 (.556)	.598 (.746)	.594 (.740)
SES	2.97 (.526)	2.60 (.532)	1.17 (.911)	1.11 (.917)
Parental supervision	1.39 (.201)	1.31 (.210)	1.31 (.291)	1.30 (.290)
Family structure	1.19 (.424)	1.17 (.435)	.869 (.693)	.880 (.700)
Parent smoking	1.32 (.454)	1.40 (.464)	3.10 (.694)	3.32 (.707)
Birth order	2.46 (.479)	2.09 (.483)	2.69 (.765)	2.60 (.762)
<i>Level 2 variables</i>				
Genetic relatedness	1.29 (1.05)	1.96 (1.19)	1.94 (1.68)	1.47 (1.79)
Age-gap	1.79 (.561)	1.91 (.565)	3.06 (.963)	3.19 (.969)
<i>Cross-level interactions</i>				
Genetic relatedness × sibling smoking		27.1 (1.41)*		2.16 (.998)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

sibling influence increases as the sibling pair genetic similarity increases.

Table 5 presents the results for the effects of sibling and best friend smoking behavior on White adolescent experimentation with cigarettes and heavier cigarette use. For White adolescents, sibling and best friend smoking significantly predicted future engagement in both smoking outcomes at Wave 2. According to Models 1 and 3, a one unit increase in White adolescent siblings smoking led to an increase in the odds of cigarette experimentation by 1.23 ( $p < .001$ ) and an increase in the odds of heavier cigarette use by 1.32 ( $p < .001$ ). In contrast, a one unit increase in best friend’s smoking led to an increase in the odds of cigarette experimentation by 1.28 ( $p < .001$ ) and an increase in the odds of heavier cigarette use by 1.27 ( $p < .001$ ). The standardized coefficient for best friend influence (1.63) was larger than the standardized coefficient for sibling influence (1.57) for cigarette experimentation; whereas, the standardized coefficient for best friend influence (1.61) was smaller than the standardized coefficient for sibling influence (1.72) for heavier cigarette use. In consideration of smoking, this result provided mixed support for Hypothesis 2, as it was expected that the effect of best friends would be larger than that of siblings for White adolescents.

An equality of coefficients test indicated that the effect of siblings for Black adolescents on experimentation with

cigarettes was significantly larger than the effect of siblings for White adolescents, providing support for Hypothesis 3 for this outcome. There were no statistically significant differences in the influence of siblings and best friends for heavier cigarette use, nor were there any statistically significant different in the effect of best friends across both smoking outcomes. Although there were noticeable differences in the statistical significance of the coefficients for best friend influence for Black and White adolescents, the equality of coefficients test indicated that there were no statistically significant differences in the effect of best friends between Black and White adolescents. This conclusion suggested a lack of support for Hypothesis 4, which anticipated the effect of best friend influence for White adolescents to be stronger than the effect of best friend influence of Black adolescents.

With regard to the control variables across the models, a few findings are worth mentioning. Self-control acted as an inhibitory factor of alcohol experimentation, binge drinking, and cigarette experimentation for Black adolescents. Self-control only served as an inhibitory factor for White adolescent heavy cigarette use. Black and White adolescents whose parents reported higher levels of drinking were more likely to subsequently experiment with alcohol and binge drink. Black adolescents with higher levels of reported parental attachment were less likely to experiment with alcohol, whereas White adolescents with higher levels

**Table 5** Cross-classified HLM models predicting white adolescent smoking (OR)

	Model 1 Cigarette experimentation Coef (SE)	Model 2 Cigarette experimentation Coef (SE)	Model 3 Heavy cigarette use Coef (SE)	Model 4 Heavy cigarette use Coef (SE)
<i>Level 1 variables</i>				
Sibling smoking	1.26 (.050)***	1.26 (.050)***	1.32 (.050)***	1.32 (.050)***
Best friend smoking	1.28 (.050)***	1.28 (.050)***	1.27 (.050)***	1.27 (.050)***
Male	1.01 (.182)	1.00 (.182)	1.30 (.223)	1.30 (.225)
Age	1.07 (.063)	1.06 (.064)	1.13 (.079)	1.12 (.081)
Self-control	.923 (.080)	.923 (.080)	.794 (.101)*	.794 (.101)*
Parental attachment	.919 (.176)	.920 (.176)	.721 (.184)	.725 (.185)
SES	1.17 (.319)	1.17 (.319)	2.04 (.343)*	2.08 (.346)*
Parental supervision	1.03 (.085)	1.03 (.085)	.985 (.104)	.984 (.105)
Family structure	.967 (.256)	.977 (.258)	.691 (.290)	.725 (.296)
Parent smoking	1.34 (.208)	1.34 (.208)	1.37 (.240)	1.39 (.242)
Birth order	1.39 (.218)	1.38 (.218)	1.88 (.271)*	1.39 (.272)*
<i>Level 2 variables</i>				
Genetic relatedness	.681 (.458)	.628 (.509)	2.67 (.562)	1.55 (.666)
Age-gap	1.09 (.222)	1.09 (.222)	1.47 (.291)	1.45 (.290)
<i>Cross-level interactions</i>				
Genetic relatedness × sibling smoking		1.10 (.246)		1.50 (.262)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

of reported parental attachment were less likely to have reported engaging in heavier cigarette use.

In total, the results indicated a more nuanced depiction of the role that siblings and best friends play among both Black and White adolescents. Across the drinking and smoking outcomes for Black adolescents, best friends only emerged as statistically significant risk factors for heavier cigarette use, whereas sibling substance use was significantly related to experimentation with alcohol and cigarettes, and heavier smoking. Interestingly, for White adolescents, siblings and best friends emerged as statistically significant predictors for each of the drinking and smoking outcomes. Many of these findings confirmed past research that suggested friends were important risk factors of White adolescent substance and less powerful risk factors for Black adolescents (e.g., Brechwald and Prinstein 2011; Griesler and Kandel 1998); however, the results clearly demonstrate a need to further broaden our understanding of the layered nature of an adolescent's social world and continue to consider the role of similarly situated associates in explaining adolescent delinquent behavior.<sup>3</sup>

<sup>3</sup> Of note, the same models were run with subject's same-sex friendship group smoking and drinking behavior as a comparison to sibling smoking and drinking instead of only focusing on the same-sex best friend. The same substantive results emerged.

## Discussion

Past research has consistently identified differences in rates of Black and White adolescent cigarette and alcohol use, with Black adolescents reporting lower levels of substance use (e.g., Meich et al. 2015). As a result of these differences, a small body of literature has sought to assess whether Black and White adolescent substance use can be explained by similar correlates and whether such correlates were differentially experienced by these two groups (e.g., Griesler and Kandel 1998; Wallace and Muroff 2002). While there are some similarities in risk factors for alcohol and cigarette use across Black and White adolescents, findings associated with traditionally powerful risk factors, such as substance using friends, were actually suggestive of weaker associations between these correlates and Black adolescent substance use (e.g., Bersamin et al. 2005; Ellickson and Morton 1999). Substance using friends have been forwarded as a salient risk factor for adolescent substance use, however, a number of studies have challenged such assumptions for Black adolescents and have suggested Black adolescents were less vulnerable to this source of influence (e.g., Griesler and Kandel 1998; Watt and Rogers 2007). The current study posited that differential vulnerability to substance using friends may not necessarily generalize to all types of peers, but rather due to varying levels of parental control and cultural values Black and White adolescents

would be socialized to experience certain peers differently (Wallace 1999). The current study provided a longitudinal evaluation of best friend and sibling influence on substance use using data from the AddHealth and confirmed that the relationship between these two peers and substance use varied for Black and White adolescents.

Consistent with the expectation that Black adolescents would be less susceptible to the influence of their best friend, the results indicated that there is no relationship between best friend substance use and later adolescent substance use for alcohol experimentation, binge drinking, and cigarette experimentation. Siblings also emerged as statistically significant and stronger predictors of Black adolescents' alcohol experimentation, cigarette experimentation and heavier cigarette use consistent with the expectations of Hypothesis 1. Interestingly, for White adolescents, siblings and best friends emerged as a statistically significant risk factor for each of outcome for alcohol and smoking; however, opposite to the expectation of Hypothesis 2, the magnitude of these effects suggested that sibling influence was stronger than best friend influence. While these results have affirmed past findings indicative of the role that siblings have in predicting substance use, the results also provided additional clarity to the role these two types of peers have even for White adolescents (e.g., Slomkowski et al. 2005; Trim et al. 2006).

The results of the equality of coefficients test provided mixed support for Hypotheses 3 and 4. Sibling influence for Black adolescents was significantly different and larger than the effect of White siblings for only experimentation with cigarettes, suggesting that Black youth may be particularly vulnerable to sibling influence for this type of cigarette use. Although research has suggested Black parents demonstrated stronger efficacy in anti-tobacco socialization, these strong findings for cigarette use suggest the need to consider how siblings facilitate access to and reinforcement of smoking cigarettes (e.g., Clark et al. 1999). There were also no statistical differences in the effects of best friends for either drinking or smoking outcomes. To be sure, although the equality of coefficients tests generally indicated a lack of statistical differences for both peers across Black and White adolescents, these findings still provide a more refined specification of how two types of “peers” matter for Black and White adolescents and lead to a few key takeaways for our theoretical understanding of peer influence.

These results suggest that the dominant perspective that describes how normative developmental processes lead adolescents to become heavily influenced by their friends may not apply to Black adolescents, particularly those with siblings (Giordano et al. 1993; Youniss and Smollar 1985). Consistent with past research that identified reduced vulnerability to substance using friends for Black youth, best friends only emerged as significant factors for explaining

heavy cigarette use for Black adolescents and that effect was smaller in magnitude than the significant effect of sibling smoking (e.g., Steinberg and Monahan 2007; Watt and Rogers 2007). These results further highlight the important role that siblings continue to play beyond childhood in explaining substance use for both Black and White adolescents. Siblings should be incorporated into a routine operationalization of “peers” across disciplines, as both White and Black substance use are affected by sibling substance use. To be sure, the findings from the current study do not necessarily solve the existing paucity in research that adequately identifies risk factors for Black adolescents, however, they do provide an example of how scholars can continue to incorporate new risk factors or reassess existing ones to further explain differences in Black and White substance use (e.g., Bersamin et al. 2005).

The fact that both siblings and friends are involved to some extent in explaining substance use reaffirms the fact that theories that describe normative influence processes never intended to exclusively focus on friends as the *only* peer worth studying. Rather, theories of normative influence include all peers who have the capacity to transmit values, reinforce behaviors, or alter one's self-image (Akers 1998; Mead 1934; Sutherland 1947). Indeed, although Sutherland (1947) recognized friends as important peers, his own consideration of who matters in the learning process is best characterized by a range of close associates or intimates that vary in importance depending on the frequency, duration, priority, and intensity of contacts. Differential association theory arguably emphasizes the importance of siblings as they are likely one of the first similarly situated youth that individuals have extensive contact with (Sutherland 1947). This evidence additionally suggests that efforts to understand the social-ecology of individuals must take into account key structural anchors such as race that affect the multiple peer, school, and neighborhood contexts youth are situated in (Deutsch et al. 2012; Hussong 2002; McGloin et al. 2014). Although some of the evidence in this study is consistent with prior work that identified how differences in context conditioned the experience of particular risk factors, prior work has largely overlooked the role that different peers within these contexts actually matter. Ultimately, this notion is in line with Giordano's (1995) effort to consider an adolescents' “wider circle of friends” recognizing that adolescents have a variety of peer interactions beyond just close friends. The current study adds to the existing literature that has expanded the focus past friends to include co-workers, romantic partners, indirect friends (i.e., friends of friends), and co-offenders (e.g., Haynie et al. 2005; McCarthy et al. 2004; Payne and Cornwell 2007; Wright et al. 2002).

In moving forward with this type of research, there are a few limitations in the current study that are important to

consider. Although different types of alcohol and cigarette use outcomes were considered, it is unclear whether the patterns uncovered in this study would extend to other delinquent behavior. Due to the differences in Black and White substance use and risk factors during adolescence, there may be differences in how peer influence from friends and siblings operate across delinquent behavior other than substance use. Of course, it may also be the case that the underlying differences in socialization experiences among Black and White adolescents that alter the experience of influence from friends and siblings explains the relative strength of influence consistently across other types of delinquent behavior. In the end, the generalizability of the findings here to other forms of deviance is an empirical question, waiting for the elusive data set that has information on peers, siblings and a wide range of deviant outcomes. Another limitation of the current analyses is that they rely on a comparison of same-sex sibling and best friend influence. While same-sex relationships have been found to be important in understanding normative processes, understanding how adolescents negotiate the experience of influence from opposite-sex peers is likely a worthwhile endeavor given research suggesting such relationships are particularly important as individuals move towards more heterogeneous friendship groups (i.e., Kreager and Haynie 2011; Rowe and Gulley 1992).

Lastly, the notion that Black adolescents are socialized to experience friends differently due to a history of cultural and structural barriers may also apply to other minority groups. For instance, Hispanic adolescents—particularly first generation immigrants—have been found to be protected against deviant youth as a result of parental control and obligation to their families (e.g., see Myers et al. 2009).<sup>4</sup> Given the similarity in cultural and structural obstacles that Hispanic and Black families face, siblings may similarly emerge as important sources of influence among these family-oriented minority groups. This clearly reveals the need to explore the context in which adolescents from a variety of backgrounds may condition their experience of social risk factors.

## Conclusion

This study has furthered our understanding of peer influence as a risk factor for substance use by building on a conceptual framework that underscored the notion that Black and White youth may be differentially vulnerable to certain types of

peers (e.g., Wallace 1999). Assuming that peer influence processes were largely invariant across these two racial groups has led to a naïve understanding of the reality of Black and White adolescent life and has perpetuated notions that important risk factors for substance use during adolescence were equivalent across these groups (e.g., Bersamin et al. 2005; Griesler and Kandel 1998). This assumption has also arguably led to a more restricted focus on friends as the predominant source of peer influence at the expense of considering siblings as risk factors for substance use. This study addressed limitations in the existing literature and highlighted the nuanced social worlds of Black and White adolescents by illustrating that peers matter differently for different people. In particular, sibling's substance use emerged as an important risk factor for explaining Black and White adolescent alcohol and cigarette use, whereas best friend's substance use predominantly only explained White adolescent substance use. These findings contribute to the growing literature that suggests there is differential susceptibility of Black and White adolescents to the same set of risk factors (e.g., Bersamin et al. 2005; Watt and Rogers 2007). They also reinforce the need for adolescent focused interventions to consider the context(s) in which different adolescents are a part of. For example, a substance use intervention program designed to target substance using friends for Black and White adolescents may not necessarily achieve the desired results if it ignores exposure to substance using siblings that may not be present in schools or other settings common to juvenile delinquency interventions. Ultimately, the current study reaffirmed that “peers” were significant risk factors of adolescent substance use; however, a more detailed and clearer depiction of the role that various types of peers played in affecting Black and White adolescent substance use emerged.

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**Conflict of interest** The authors report no conflict of interest.

**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.

<sup>4</sup> Of note, DiPietro and McGloin (2012) found that first generation immigrant youth are less likely to have deviant friends, however, when exposed to deviant friends these youth were more susceptible to deviant influence.



**Informed Consent** For this type of study formal consent is not required.

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