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Addict Behav. Author manuscript; available in PMC 2019 January 02.

Published in final edited form as:

Addict Behav. 2019 January ; 88: 99–105. doi:10.1016/j.addbeh.2018.08.025.

Relative influence of perceived peer and family substance use on adolescent alcohol, cigarette, and marijuana use across middle and high school

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Abstract

Purpose: Substance use by peers and family may affect adolescent substance use, yet the relative influence may shift during adolescence as youth differentiate themselves from family and more closely affiliate with peers. This study examined trends in concordance of adolescent cigarette, alcohol and marijuana use and corresponding perceived use by friends and family members during middle and high school.

Methods: Data are from a longitudinal cohort of 12,038 youth who completed up to five surveys during grades 6-12. At each wave, adolescents reported past month use of cigarettes, alcohol and marijuana, as well as perceived use by their best friend, older sibling and most important adult figure. For each substance, we used time-varying effect models to estimate how associations between adolescent use and perceived use varied across grade.

Results: For all substances, concordance with best friend use was positive and stronger than concordance with older sibling or adult use at all grades. Concordance with both best friend and older sibling use of all substances was pronounced in 6th grade. Concordance peaked again during mid-high school for smoking (best friend, older sibling) and marijuana (best friend). Concordance with adult marijuana use peaked in middle school, yet associations with adult alcohol and cigarette use were relatively stable.

Conclusions: Substance use prevention efforts that seek to counter peer normative pressures should begin prior to middle school and span high school. Such efforts should address the role of peer and family environments, as both were found to be relevant during middle and high school.

Keywords

adolescence; youth; cigarette; alcohol; marijuana; substance use; longitudinal

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1. Introduction

Adolescence is a critical period for initiation and experimentation with substances, a process shaped by social factors (Fagan & Najman, 2005). The tendency for adolescents to behave similarly to peers and family likely reflects both social influence and selection processes. Social learning theory posits that adolescents mimic behavior or perceived behavior of influential individuals and behaviorally respond to social environment incentives (Bandura, 1977). Individuals are particularly influenced by those they are close to and value, such as family and friends. During adolescence, "peer pressure" may strongly shape substance use behavior, as peers may provide access to substances or actively encourage or discourage use (Bachman et al., 2002). Selection processes likely also play in role in adolescents substance use, as adolescents choose friends similar to themselves (e.g., substance-using adolescents seeking out substance-using friends; (de la Haye, Green, Kennedy, Pollard, & Tucker, 2013). Research has shown significant peer selection effects with respect to both substance use behavior and attitudes (Becker & Curry, 2014; Leung, Toumbourou, & Hemphill, 2014).

Both socialization and selection processes may be driven by actual peer substance use, as well as an adolescent's perception of substance use in their social environment. Prior studies have demonstrated strong correlations between adolescent use and perceived peer use across multiple substances, including cigarettes (O'Loughlin et al., 2017; Villanti, Boulay, & Juon, 2011; Windle, Haardorfer, Lloyd, Foster, & Berg, 2017), alcohol (Pedersen et al., 2013; Salvy, Pedersen, Miles, Tucker, & D'Amico, 2014; Tsakpinoglou & Poulin, 2017) and marijuana (Goldstick et al., 2018; Patrick, Kloska, Vasilenko, & Lanza, 2016; Pinchevsky et al., 2012; Tucker, de la Haye, Kennedy, Green, & Pollard, 2014). Further, some studies have found adolescent use to be more highly correlated with perceived peer use than actual peer use (Bauman & Ennett, 1996; Iannotti & Bush, 1992); in this context, what adolescents think their peers are doing is more influential than their peers' actual behavior. When studies have examined substance use concordance with different types of peers, adolescent use has been most strongly associated with perceived use of their best friend (Salvy et al., 2014; Tsakpinoglou & Poulin, 2017).

Perceived use among family members has also been linked to adolescent use, including adolescent smoking (Liao, Huang, Huh, Pentz, & Chou, 2013; O'Loughlin et al., 2017; Villanti et al., 2011), and perceived parental use of tobacco, alcohol and marijuana has been shown to be associated with college student substance use (Windle et al., 2017). Concordances with perceived family use are generally weaker than for perceived peer use, potentially reflecting the greater social salience of peers during adolescence (Brooks-Russell, Simons-Morton, Haynie, Farhat, & Wang, 2014; Liao et al., 2013; Windle et al., 2017). The influence of older siblings has been less studied than parents, yet evidence suggests that both perceived use (O'Loughlin et al., 2017; Serafini & Stewart, 2015; Windle et al., 2017) and sibling self-reported use (Fagan & Najman, 2005; Kothari, Sorenson, Bank, & Snyder, 2014; Whiteman, Jensen, & Maggs, 2013) are associated with adolescent use. Concordance with sibling use is generally stronger than with parental use, likely due to the more peer-like relationship between siblings (O'Loughlin et al., 2017; Serafini & Stewart, 2015; Whiteman et al., 2013; Windle et al., 2017). Indeed, sibling effects may be larger for same-gender siblings, siblings close in age and those with a strong sibling relationship

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(Kothari et al., 2014; Whiteman et al., 2013). Additionally, older siblings may be an important source of substances for younger siblings, particularly at early ages when adolescents and their same-age peers have more limited access to substances.

The extent to which associations between adolescent use and peer/family use, particularly perceived use, vary across age during adolescence has not been fully examined. Adolescents have an increasing need for autonomy from their family, typically spending more time with peers and less with family as they transition from middle school to high school (Van Ryzin, Fosco, & Dishion, 2012). As adolescents seek to differentiate themselves from family, conforming to peer behavior (including perceived behavior), may become increasingly important. Dynamics of peer socialization and selection may change across age (Bauman, Carver, & Gleiter, 2001), with prior research suggesting that pressure for social conformity peaks in mid-adolescence (Steinberg & Silverberg, 1986). Overall, adolescence involves significant changes regarding social and family relationships, academic responsibilities, and physical and emotional development, which all may contribute to changing susceptibility to the influence of peer and family substance use (Hummel, Shelton, Heron, Moore, & van den Bree, 2013).

The limited number of existing studies examining age variation in peer and family associations with adolescent use have primarily focused on smoking, with mixed findings. One cross-sectional study found a stronger effect of peer use on smoking during early adolescence relative to middle adolescence (Villanti et al., 2011), and two longitudinal studies observed a stronger association between smoking and perceived peer smoking during middle school than high school (Liao et al., 2013; O'Loughlin et al., 2017). Yet other studies found that peer smoking had increasing influence on smoking initiation during adolescence (Mahabee-Gittens, Xiao, Gordon, & Khoury, 2013) or a stable association across adolescence (Bauman et al., 2001). Several studies found that concordance between perceived parental smoking and adolescent smoking is relatively constant (Liao et al., 2013; O'Loughlin et al., 2017; Villanti et al., 2011). The literature is scant regarding time-varying influences for alcohol and marijuana. One longitudinal study found stronger concordance between youth and sibling alcohol use during adolescence compared to young adulthood (Kothari et al., 2014), and two studies of young adults found that marijuana use was differentially associated with perceived peer marijuana use across age (Goldstick et al., 2018; Patrick et al., 2016).

Understanding the relative influence of these different groups on use across the adolescent developmental period is important for prevention and intervention efforts. The current study adds to this literature by examining age-varying trends in associations between adolescent cigarette, alcohol, and marijuana use and perceived peer, sibling and most important adult (likely a parent) use from grades 6 to 12. Data come from a longitudinal study of youth recruited in 6th and 7th grade and followed across 5 annual survey waves to 12th grade. At each wave, adolescents reported on past month use of cigarettes, alcohol, and marijuana, as well as perceived use by their best friend, older sibling, and most important adult figure. We used time-varying effect modeling (TVEM) to estimate associations of adolescent use with perceived best friend, older sibling and adult use across grades. Specifically, we hypothesize that concordance with best friend use will increase for all substances across grades,

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reflecting increasing similarity of peers due to both selection and socialization effects, whereas concordance with an older sibling and most important adult will remain stable or decrease across grades, as youth seek greater autonomy from family and adults.

2. Methods

2.1. Data Source

Our sample comprised participants in a substance use prevention program evaluation conducted in 16 middle schools in southern California; schools were chosen to provide a diverse study population with similar alcohol and substance use rates at baseline (D'Amico et al., 2012). The study began in 2008, enrolling cohorts of 6th and 7th graders; in both 2009 and 2010, a new 6th grade cohort was enrolled. Follow-up rates during the five surveys in middle school ranged from 74% to 90%. When adolescents transitioned to over 200 high schools, they were re-contacted and re-consented to complete annual web-based surveys; follow-up rates for web-based surveys ranged from 61% to 80%. Non-participation in a given wave did not render a participant ineligible for future waves and was not significantly associated with demographics or substance use (D'Amico et al., 2016). Our survey sample comprised 12,038 youth enrolled in grades 6-12 who participated in at least one wave from 2008-2014, yielding 26,354 unique observations.

2.2. Measures

Adolescent substance use was assessed with well-established measures for adolescents (Johnston, O'Malley, Bachman, & Schulenberg, 2005). Adolescents reported how many days during the past month they used cigarettes, "at least one drink of alcohol," and marijuana. Responses choices were on a 7 point Likert scale from 0 to 20-30 days; use was dichotomized into "no use" and "any use" given low prevalences at younger ages (D'Amico et al., 2016).

Best friend use was assessed with binary items: "Do you think your best friend smokes cigarettes [drinks alcohol; uses marijuana] sometimes?" Answers included "yes" or "no."

Sibling substance use was assessed with the following items: "Do any of your older brothers or sisters smoke cigarettes [drink alcohol; use marijuana] sometimes? Answers included "I don't have any older brothers or sisters," "yes," or "no."

Adult substance use was assessed with respect to "the adult who is most important to you and that you spend time with." This item was designed to focus on an influential adult figure and is assumed to be a parent for many respondents. Items ask how often this adult smokes cigarettes [drinks alcohol, uses marijuana]; responses included "never," "less than once a week," 1-3 days a week," and "4-7 days a week." Responses were dichotomized into "no use" and "any use." These measures of best friend, sibling and adult perceived use have been used in prior studies (Ellickson, McCaffrey, Ghosh-Dastidar, & Longshore, 2003; Salvy et al., 2014; Tucker, Orlando, & Ellickson, 2003).

Demographics included race/ethnicity (White, Black, Hispanic, Asian, American Indian, Native Hawaiian/Pacific Islander, and multi-ethnic), maternal education and paternal

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education (no high school, high school, some college, college, don't know), gender, and intervention status in original prevention trial (treatment, control).

2.3. Statistical Analysis

We used TVEM to estimate grade-specific prevalence of adolescent cigarette, alcohol and marijuana use, as well as grade-specific perceived rates of best friend, sibling and adult substance use, across grades 6-12. TVEM is a semi-parametric spline regression that estimates associations between predictor and outcome as a continuous function of time (e.g., grade) (Tan, Shiyko, Li, Li, & Dierker, 2012). As such, TVEM is particularly well-suited to investigate dynamic associations across developmental age. First, we used separate, intercept-only TVEM to model trends across grade in prevalence of adolescent cigarette, alcohol and marijuana use, as well as trends across grade in perceived best friend, sibling, and adult substance use. To examine age-varying associations between adolescent substance use and perceived substance use, we used TVEM to regress adolescent use on perceived use; models were implemented separately by substance and for best friend, sibling and adult use, respectively. All models controlled for demographic variables and accounted for repeated observations within participants. Missingness rates across demographic and substance use variables did not exceed 7%; each regression model was implemented with all available observations. Sibling analyses excluded adolescents who reported that they did not have older siblings; in total, 8,053 adolescents had an older sibling. Analyses were conducted in SAS 9.4 using the TVEM macro. For each substance, we present figures of estimated functions of grade-specific odds ratios and corresponding 95% confidence intervals for best friend, sibling and adult use; time periods in which confidence intervals for two groups do not overlap provide a conservative estimate of significant differences between groups.

3. Results

3.1. Descriptive characteristics of study population

Half of the participants were female, and the majority identified as Hispanic (53%). Mean age at first survey wave was 11.9 (Table 1). On average, youth participated in 2 waves, with 46% participating in one wave and 26% participating in 3 or more waves.

3.2. Adolescent use and perceived use across grades

Rates of adolescent past-month cigarette use were low, increasing from 1% in 6^{th} to 5% in 12^{th} grade (Figure 1, Panel A). Perceived smoking among best friends increased from 5% in 6^{th} grade to 13% in 12^{th} grade; in every grade, adolescents thought that their best friend was more likely to smoke than they were. Perceived smoking among older siblings rose from 10% in 6^{th} grade to 20% in 12^{th} grade. Perceived adult smoking declined from 18% in 6^{th} grade to 14% in 12^{th} grade.

Adolescent past-month alcohol use increased from 3% drinking in 6^{th} grade to 25% in 12^{th} grade (Figure 1, Panel B). Perceived drinking among best friends increased from 9% in 6^{th} grade to 48% in 12^{th} grade; in every grade, adolescents thought that their best friend was more likely to drink than they were. Perceived drinking among older siblings rose from 18%

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in 6th grade to 56% in 12th grade. Perceived adult alcohol use increased from 38% in 6th grade to 55% in 12th grade.

Adolescent past-month marijuana use increased from 1% in 6th grade to 16% in 12th grade (Figure 1, Panel C). Perceived marijuana use among best friends increased from 5% in 6th grade to 34% in 12th grade; in every grade, adolescents thought that their best friend was more likely to use marijuana than they were. Perceived marijuana use among older siblings rose from 6% in 6th grade to 26% in 12th grade. Notably, rates of adolescent marijuana use exceeded perceived adult use after 8th grade.

3.3. Grade-specific concordance between adolescent smoking and perceived smoking

Adolescent smoking was significantly positively associated with perceived best friend, older sibling and adult smoking at every grade, with the exception of older sibling use in 12th grade (Figure 2). The association between adolescent and best friend smoking was greatest during 10th grade (OR=25.7, 95% CI=[15.5, 42.7]) and smallest in 7th grade (OR=12.1, 95% CI=[9.3, 15.8]). The association between adolescent and older sibling smoking peaked in 10th grade (OR=8.3, 95% CI=[4.6, 15.1]) and was non-significant in 12th grade (OR=1.5, 95% CI = [0.5, 5.0]). The association between adolescent and adult smoking was relatively flat, with the odds of association ranging between 2.8 and 3.7. Concordance with best friend smoking was significantly stronger than concordance with adult smoking consistently in all grades 6-12 and was significantly stronger than concordance with older sibling smoking during grades 7-12.

3.4. Grade-specific concordance between adolescent alcohol use and perceived alcohol use

Adolescent drinking was significantly positively associated with perceived best friend, older sibling, and adult drinking at every grade (Figure 3). The association between adolescent and best friend drinking was greatest in 6th grade (OR=15.5, 95% CI=[10.9, 22.0]) and smallest in 12th grade (OR=8.9, 95% CI=[6.9, 11.6]). The associations between adolescent and older sibling drinking peaked in 6th grade (OR=8.3, 95% CI=[5.5, 12.6]) and was weakest in 12th grade (OR=2.8, 95% CI = [1.9, 7.4]). The magnitude of the concordance with adult drinking was relatively flat, with the odds of association ranging between 3.2 and 3.5. Concordance with best friend drinking was significantly stronger than concordance with adult drinking in all grades 6-12 and was significantly stronger concordance with older sibling drinking during the majority of grades 6-8 and from mid 10th grade to nearly 12th grade. Concordance with older sibling drinking was significantly stronger than concordance with adult drinking from 6th grade to early 10th grade.

3.5. Grade-specific concordance between adolescent marijuana use and perceived marijuana use

Adolescent marijuana use was significantly positively associated with perceived best friend, older sibling, and adult marijuana use at every grade (Figure 4). The associations between adolescent and both best friend and older sibling marijuana use were greatest during 6th grade and smallest in 12th grade. Specifically, odds of concordance with best friend marijuana use declined from 25.8 (95% CI=[15.4, 43.1]) in 6th grade to 16.2 (95% CI=[11.7.

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22.3]) in 12th grade; odds of concordance with older sibling marijuana use declined from 18.2 (95% CI=[10.1, 32.6]) to 4.6 (95% CI=[2.2, 9.8]) in 12th grade. The association between adolescent and adult marijuana use peaked in 7th grade (OR=8.5, 95% CI=[6.5, 11.1]) and was smallest in 10th grade (OR=3.5, 95% CI = [2.3, 5.3]). Concordance with best friend marijuana use was significantly stronger than concordance with adult marijuana use in every grade and significantly stronger than concordance with older sibling marijuana use during grades 7-12.

4. Discussion

This study is the first to examine age-varying associations between adolescents' cigarette, alcohol, and marijuana use and perceived use among their best friends, older siblings, and important adults in a diverse sample of adolescents across grades 6 to 12. Our results highlight that adolescent alcohol, cigarette and marijuana use is positively associated with corresponding perceived use by friends and family members in their social network throughout middle and high school. However, concordance varied across grades, as well as by relationship and substance.

Concordance between adolescent and best friend use was positive for alcohol, cigarettes and marijuana in all grades 6-12, highlighting the enduring influence of peers across middle and high school. The observed concordances with best friend use may reflect both social conformity pressures and peer homophily due to peer selection processes (Burk, van der Vorst, Kerr, & Stattin, 2012; Steinberg & Silverberg, 1986). Consistent with prior studies and our hypotheses, associations with perceived best friend use were stronger than those with older siblings and adults for all substances. However, concordances with best friend use did not consistently increase across grades for all substances as hypothesized. For alcohol, cigarettes and marijuana, concordance with best friend use was very strong in 6th grade and then declined across middle school. This peak in concordance in early middle school fits with developmental research highlighting that younger adolescents are more influenced by peer behavior, as they have not fully developed techniques to resist peer pressure (Steinberg & Monahan, 2007). Alcohol, the most prevalent substance, generally had the lowest concordance with best friend use; alcohol concordance remained essentially flat across high school and then declined in 12th grade. In contrast, smoking and marijuana use were significantly less prevalent than alcohol use, yet concordance rates with best friend use were notably higher than for alcohol. Furthermore, concordance magnitude increased up to mid-high school modestly for marijuana and markedly for smoking. These differential trends across substances may reflect the fact that peer selection and social conformity factors may be stronger for smoking and marijuana use if they are viewed as less normative behaviors, leading to greater peer concordance.

Overall, the associations with perceived older sibling use were consistently positive for alcohol, cigarettes and marijuana (with the exception of concordance with older sibling smoking at grade 12), reflecting the significant influence of older siblings on adolescent behavior. Concordance with older sibling use was high for cigarettes, alcohol and marijuana in 6th grade and generally decreased to 12th grade, providing general support for the hypothesis that concordance with older sibling use declines with age or remains relatively

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stable for all substances. However, concordance trends did not strictly decline, as concordance peaked again in grades 8-10 for alcohol and grade 9-11 for cigarettes. We observed differential trends across substances, as concordance with older sibling use was higher for marijuana than for alcohol and cigarettes, particularly during early middle school. One potential explanation is that adolescents have more limited options for obtaining marijuana at younger ages (relative to alcohol and alcohol), so having an older sibling who uses marijuana may significantly impact concordance by providing access. As adolescents get older and substance use becomes more prevalence in their same-age peer groups, the salience of their older siblings may decline. Additionally, declining sibling concordance across grades may be due to older siblings moving away from home (e.g., to attend college); decreased time siblings spend together may lead to less influence of older siblings' behavior.

Concordance with adult alcohol and cigarette use were positive and relatively stable across grades. These findings are consistent with our hypothesis and previous studies showing that concordance with adult drinking and smoking are less variable across time (Liao et al., 2013; O'Loughlin et al., 2017). In contrast to the developmental trajectories of peer and older sibling alcohol and cigarette use, adult smoking and drinking may be more constant. Thus, it is likely that the social learning effects of adults' alcohol and cigarette use on adolescent behavior were present prior to middle school and are relatively constant. Also, for the nominated "most important adults" who were adolescents' parents, concordance may also reflect shared genetic or environmental risk factors (Cambron, Kosterman, Catalano, Guttmannova, & Hawkins, 2018), which may be relatively stable across time. In contrast, concordance with adult marijuana use did vary by grade, peaking in middle school and then remaining more constant throughout high school. The increased influence of adult marijuana use in middle school may in part reflect growing awareness of adult marijuana use, which may be less frequent and visible to adolescents compared to alcohol and cigarette use.

Our results also indicate that rates of adolescent use of alcohol, cigarettes and marijuana were lower than rates of perceived use by best friends and older siblings at each grade. These findings are consistent with other studies showing that adolescents overestimate others' substance use rates, resulting in distorted descriptive norms (Pedersen et al., 2013). These norms are posited to influence youth behavior by promoting substance use among abstainers in order to "fit in" and to sustain substance use among users due to perceived approval. Thus, substance use prevention programs have targeted these misperceptions as a means to reduce substance use (D'Amico et al., 2012; Ringwalt, Clark, Hanley, Shamblen, & Flewelling, 2009). Findings regarding high perceived rates of older sibling use and significant associations between adolescent use and both adult and older sibling use highlight that prevention programs should also incorporate a discussion of family environment. In particular, older siblings may play an influential role that combines aspects of both peer and family influence.

Several study limitations warrant consideration. Measures of adolescent substance use are based exclusively on self-report and thus are subject to measurement error. The measures of substance use were dichotomous, due both to the format of some survey items and the low prevalence of use in early middle school; additional insight would be provided with continuous measures. We do not have measures of perceived parental use, but rather

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perceived use of an adolescent's "most important adult;" we presume this represents a parent for many, but not all, respondents. Variation in results across grades may reflect to some extent changing composition of the study population or changes in the individuals nominated as "best friend," "older sibling" or "most important adult." We lack information on contextual factors that may influence substance use concordance (e.g., gender of older siblings and adults, age difference between siblings and measures of relationship quality), nor are we able to control for other substance use risk factors (e.g., mental health). Though likely limited, it is possible that there may be some overlap in responses to the items about best friend, older sibling, and most important adult use (e.g., considering their older sibling to be "the most important adult" in their life or their "best friend"). Finally, we do not purport to identify causal relationships regarding adolescent use and perceived use; indeed, the true causal pathways linking these may be reversed, bidirectional or explained by exogenous common factors.

Overall, findings provide evidence that associations between adolescent substance use and perceived best friend, older sibling and adult substance use vary in magnitude across the developmental period spanning middle and high school, with peer use having the strongest associations. As highlighted by Villanti et al. (2011), substance use prevention efforts that seek to address peer influence should begin prior to middle school and should be sustained throughout high school. Our findings also suggest a sustained influence of older siblings and, to a lesser extent, important adults which prevention programs generally do not address. Like peer influences, family influences are present during middle school; thus, prevention efforts should also address the important role that family environment may play in an adolescent's life.

Acknowledgments:

The authors wish to thank the adolescents who participated in this project. We would also like to thank Kirsten Becker for overseeing survey administrations.

Funding:

This work was funded by grants from the National Institute on Alcohol Abuse and Alcoholism (R01AA016577 and R01AA020883, PI Elizabeth J. D'Amico).

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Highlights

- Adolescent substance use was strongly associated with perceived best friend use
- Association with best friend use varied across grade and by substance
- Adolescent substance use was associated with perceived sibling and adult use
- Across grades, sibling associations were generally stronger than adult associations
- Prevention programs should incorporate a discussion of family environment

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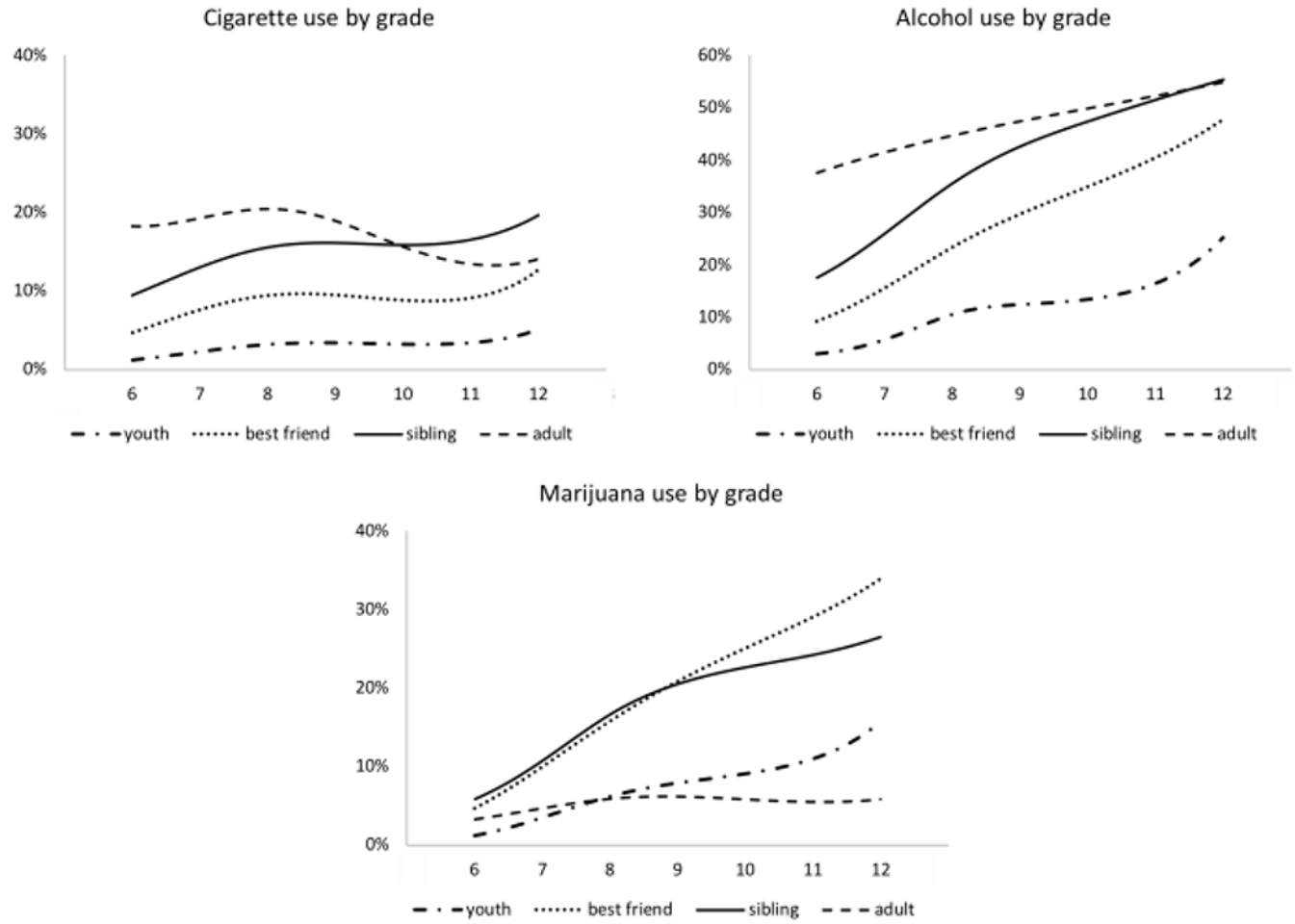

Figure 1.

Grade-specific prevalence of adolescent cigarette, alcohol and marijuana use and perceived use by best friend, older sibling, and most important adult

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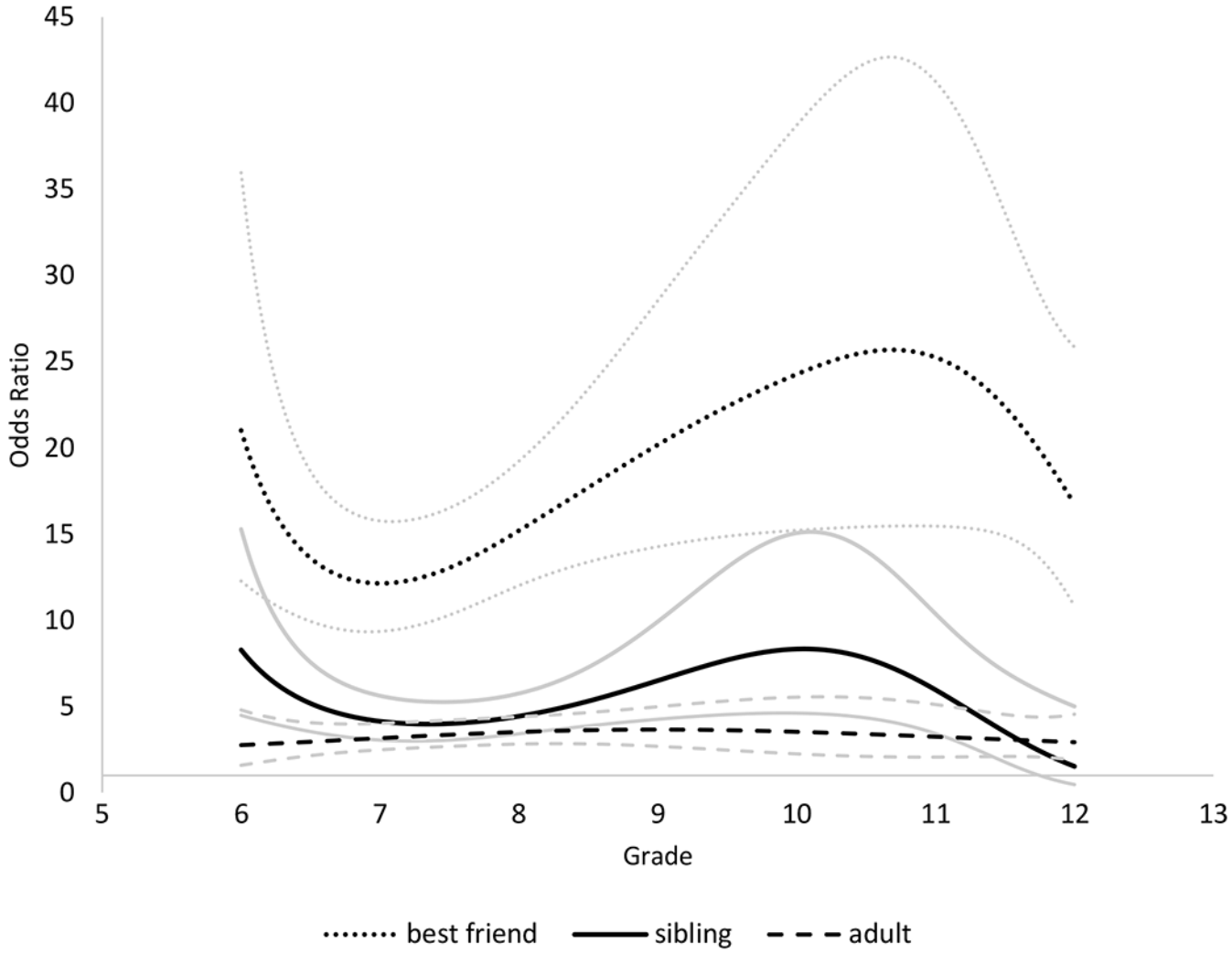

Figure 2.

Grade-specific estimates of the odds ratio (OR) and 95% confidence interval (CI) for the association between youth smoking and perceived best friend, sibling, and adult smoking

Note: Black lines denote OR estimates and gray lines denote 95% confidence intervals. Separate models of smoking concordance were implemented for best friend (25,084 observations), older sibling (14,695 observations) and most important adult (24,747 observations). All models controlled for race/ethnicity, gender, maternal and paternal educational level, and intervention status.

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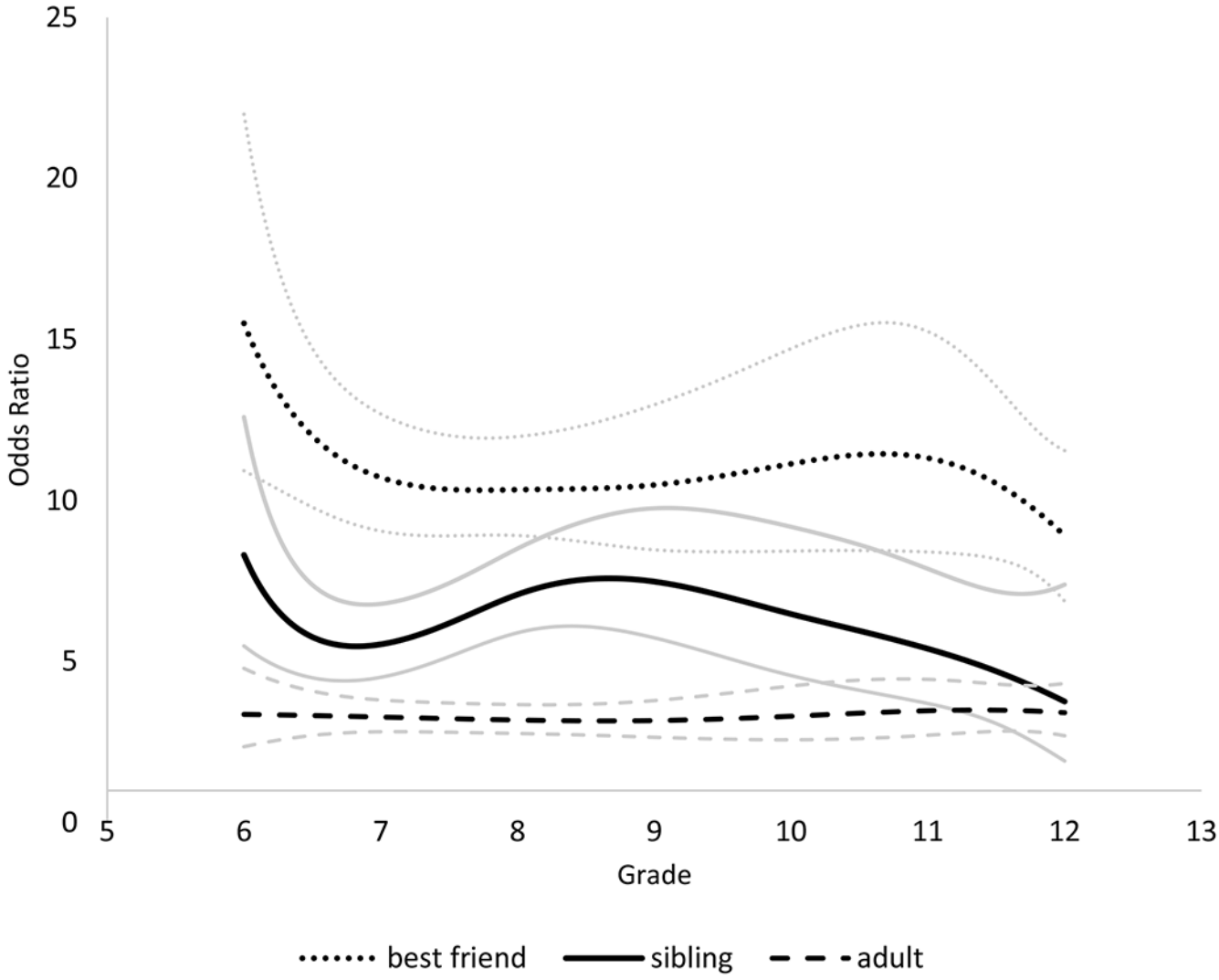

Figure 3.

Grade-specific estimates of the odds ratio (OR) and 95% confidence interval (CI) for the association between youth alcohol use and perceived best friend, sibling, and adult alcohol use

Note: Black lines denote OR estimates and gray lines denote 95% confidence intervals. Separate models of alcohol use concordance were implemented for best friend (25,062 observations), older sibling (14,800 observations) and most important adult (24,674 observations). All models controlled for race/ethnicity, gender, maternal and paternal educational level, and intervention status.

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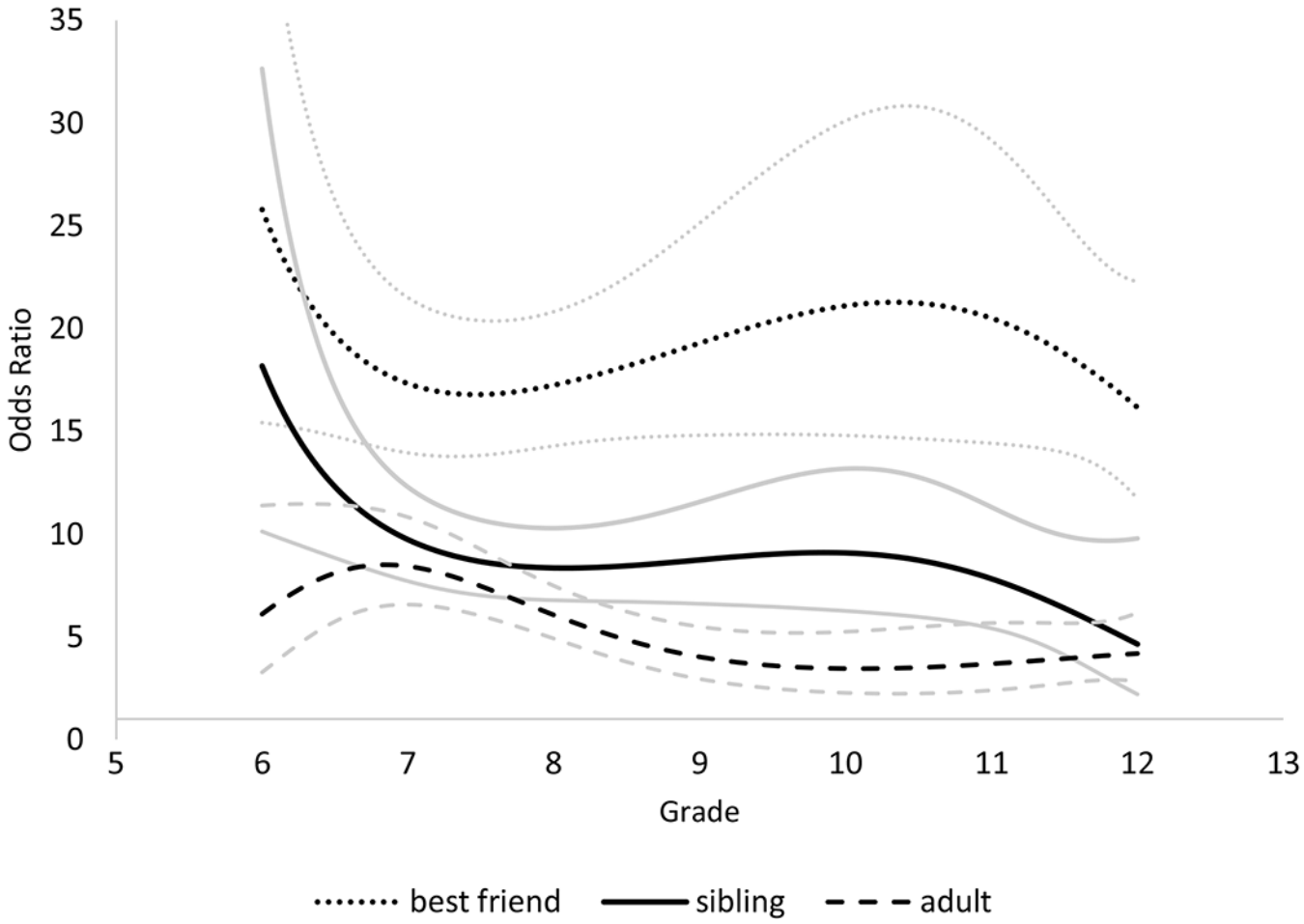

Figure 4.

Grade-specific estimates of the odds ratio (OR) and 95% confidence interval (CI) for the association between youth marijuana use and perceived best friend, sibling, and adult marijuana use

Note: Black lines denote OR estimates and gray lines denote 95% confidence intervals. Separate models of marijuana concordance were implemented for best friend (25,058 observations), older sibling (14,604 observations), and most important adult (24,677 observations). All models controlled for race/ethnicity, gender, maternal and paternal educational level, and intervention status.

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Table 1.

Characteristics of the study population (n=12,038).

Demographics	**n**	**%**
Female	6,034	50.1
Race/ethnicity		
White	1,878	15.6
Black	402	3.3
Hispanic	6,401	53.2
Asian	2,010	16.7
American Indian	99	0.8
Native Hawaiian / Pacific Islander	108	0.9
Multi-ethnic	1,133	9.4
Maternal education		
Less than high school	1,765	14.7
High School	2,114	17.6
Some college	1,407	11.7
College	5,088	42.3
Don’t know	1,656	13.8
Paternal education		
Less than high school	1,857	15.4
High School	2,109	17.5
Some college	1,220	10.2
College	4,643	38.6
Don’t know	2,196	18.3
Treatment arm in prevention trial	5,964	49.6
Mean age at first survey wave	11.9	
Grade at first survey wave		
6	5,582	46.4
7	3,174	26.4
8	3,217	26.7
9	30	0.3
10	3	0.0
11	15	0.1
12	17	0.1
Number of participating waves		
1	12,038	45.54
2	7,653	28.95
3	3,726	14.1
4	2,025	7.66
5	991	3.75