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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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.

ARTICLE INFO

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.

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 Jr.,

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 (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, 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 to 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]