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Being well-liked predicts increased use of alcohol but not tobacco in early adolescence

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HIGHLIGHTS

- Being well-liked may contribute to escalations in substance use during adolescence.
- Existing research is limited by conventional statistical methods.
- We used social network analysis to examine links between liking and substance use.
- We found bidirectional links between liking and use of alcohol but not tobacco.
- Being well-liked may represent a heretofore unknown risk factor in adolescence.

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ABSTRACT

Although substance use has traditionally been linked to peer deviance, a parallel literature has explored the influence of peer social status (being "well-liked"). This literature hypothesizes that adolescents with higher status will anticipate shifts in social norms and modify their behavior earlier and/or more substantially than lower-status students. As substance use becomes more socially acceptable during early-to-mid-adolescence, higher status youth are hypothesized to reflect this shift in norms by accelerating their use more rapidly than lower status youth. Although some evidence exists to support this hypothesis, it has never been evaluated in conjunction with the opposing hypothesis (i.e., that substance use contributes to elevated peer status). In this study, we evaluated reciprocal links between peer status and substance use (i.e., alcohol and tobacco) using 3 years of data from 8 middle schools in the Pacific Northwest. Social network analysis enabled us to model standard network effects along with unique effects for the influence of the network on behavior (i.e., increased substance use as a result of being well-liked) and the influence of behavior on the network (i.e., increased status as a result of substance use). Our results indicated significant bidirectional effects for alcohol use but no significant effects for tobacco use. In other words, being well-liked significantly predicted alcohol use and vice versa, but these processes were not significant for tobacco use. Prevention efforts should consider the dynamics of peer status and peer norms in adolescence with the goal of preventing escalations in problem behavior that can compromise future adjustment.

1. Introduction

Adolescence is a developmental period during which many youth begin to experiment with tobacco and alcohol (Johnston, O'Malley, Bachman, & Schulenberg, 2010); however, escalating use of these substances can have negative long-term impacts on health and well-being (Brook, Brook, Zhang, Cohen, & Whiteman, 2002; Chassin, Pitts, & DeLucia, 1999; Kandel, Davies, Karus, & Yamaguchi, 1986; Lennings, Copeland, & Howard, 2003; Soyka, 2000). In particular, early substance use implies an elevated risk for substance abuse and dependence in late adolescence or adulthood (Grant, Stinson, & Harford, 2001; Hingson & Zha, 2009; Pitkänen, Lyyra, & Pulkkinen, 2005; Van Ryzin & Dishion, 2014). For example, alcohol use before age 14 or 15 has been linked to elevated risk for later abuse and dependence (Dawson, Goldstein, Chou, Ruan, & Grant, 2008; Hingson, Heeren, & Winter, 2006), and similar results have been found for tobacco use (Behrendt, Wittchen, Höfler, Lieb, & Beesdo, 2009; Vega & Gil, 2005).

Research exploring peer influences on substance use in adolescence has typically focused on the influence of deviant peers (e.g., Van Ryzin, Fosco, & Dishion, 2012), who provide facilitation, peer pressure, and various types of reinforcement for substance use and other delinquent behavior (Dishion, Capaldi, Spracklen, & Li, 1995; Van Ryzin & Dishion, 2013), and who, in turn, can promote increased risk of later substance

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dependence (Van Ryzin & Dishion, 2014). As a result, prevention programs tend to emphasize skills for resisting deviant peer influence, such as peer refusal (e.g., Botvin, 2000).

The concept of peer influence has recently evolved from an interpersonal dynamic (i.e., reinforcement for substance use and other deviant behavior) to include a consideration of more implicit macrodynamics (Dishion, 2014) such as social status, which reflects the extent to which the primary peer group likes and seeks out a specific individual for inclusion in activities. A key strategy for gaining status in peer environments is reading and reflecting the changing social norms of the group; in other words, social norms can exert a socializing effect on group members, and this effect is hypothesized to be more powerful for those who have greater social status (Allen, Porter, McFarland, Marsh, & McElhaney, 2005). Thus, as social norms evolve to favor substance use during adolescence, higher-status youth may exhibit increased use of substances as compared to lower-status youth, including higher levels of tobacco and alcohol use (Allen et al., 2005; Ennett et al., 2006; Mayeux, Sandstrom, & Cillessen, 2008; Tucker et al., 2011; Valente, Unger, & Johnson, 2005).

Although this literature has established a link between status and substance use, the direction of effects isn't entirely clear. It may be that peer socialization results in higher-status youth being more eager to embrace substance use, but other research has found effects in the opposite direction, in which some forms of antisocial or "adult-like" behavior, such as substance use, can enhance social status (Becker & Luthar, 2007; Killeya-Jones, Nakajima, & Costanzo, 2007). Very little research has evaluated these two hypotheses simultaneously within a single analytic framework; thus, the direction of effects is unclear, as are the implications for substance use prevention and public health.

There are several additional complications that prevent us from drawing strong conclusions from this body of research. One such complication is the different approaches to assessing social status. For example, some studies assess status using the number of "friendship" nominations (Ennett et al., 2006; Valente et al., 2005). This literature hypothesizes a specific type of socialization that relies on direct social contact; specifically, increased numbers of friends are hypothesized to provide increased opportunities for deviant influence, such as increased access to substances and/or social functions were substances may be available.

Other studies assess social status in terms of student perceptions of who is most popular (Mayeux et al., 2008). These perceptions of popularity are often related to students' visibility within the social group, which can be a function of both prosocial and antisocial behavior (Gest, Graham-Bermann, & Hartup, 2001; LaFontana & Cillessen, 2002; Parkhurst & Hopmeyer, 1998).

In this study, we assessed social status in terms of the number of "liking" nominations, which is more closely aligned with the theoretical case for peer socialization presented above, where well-liked individuals tend to more strongly reflect the social norms of the group. We take particular care to differentiate between "liking" and other measures of status, such as perceived popularity; as discussed above, perceived popularity has been associated with both prosocial and antisocial behavior, so the existence of links between this form of status and substance use (e.g., Mayeux et al., 2008) should not be surprising. In contrast, being well-liked has generally been associated exclusively with positive outcomes, such as higher levels of prosocial behavior and lower levels of aggression (Gest et al., 2001; Parkhurst & Hopmeyer, 1998). The unique contribution of Allen et al. (2005) was to create an initial link between social status as measured by "liking" and a form of deviant behavior (i.e., elevated substance use). In other words, the findings of Allen et al. (2005) suggested that peer status as measured by "liking" nominations may be a heretofore undiscovered risk factor for escalations in substance use during adolescence. Unfortunately, little research to date has extended these findings.

We aim to evaluate the peer socialization hypothesis presented by Allen et al. (2005) using modern social network analytic techniques, which not only account for interdependence among individuals in a network (which can bias the findings generated by conventional analytic methods), but also simultaneously model change over time in both individual behavior (e.g., substance use) and network processes (e.g., liking, or status; Snijders, 2001; Snijders, van de Bunt, & Steglich, 2010). Recent research using social network methods has found reciprocal links between substance use and peer status as assessed by the number of friendship nominations (Osgood et al., 2013), which mirrors previous work using more conventional methods that linked number of friends to elevated substance use (Ennett et al., 2006; Valente et al., 2005). Thus far, however, there has been no research using social network methods that has linked substance use to peer status as measured by "liking" nominations. Such a distinction is important, given that research has found that the correlations between number of friends and various other measures of social status decline across early adolescence (Bukowski, Pizzamiglio, Newcomb, & Hoza, 1996), suggesting that these concepts are becoming increasingly distinct. In addition, friendship nominations imply a degree of close social contact and shared experiences (and ample opportunity for the microdynamics of social influence, such as facilitation, peer pressure, and reinforcement; Dishion & Tipsord, 2011), whereas "liking" does not have the same developmental implications (Hartup, 1996). Thus, while research has established that friendships can serve as a context for peer influence on substance use, it is unclear whether a more distal, macrodynamic form of social interaction such as "liking" can impact, or be impacted by, substance use. Our research questions were as follows:

1. Does being well-liked lead to increased use of tobacco and alcohol among middle school students?
2. Does the use of tobacco and alcohol lead to being more well-liked among middle school students?

Our findings will address the question of whether being well-liked can serve as a risk factor for substance use and suggest new avenues for substance use prevention.

2. Material and methods

2.1. Participants

Our sample included 1289 students from 8 middle schools in an urban area in the Pacific Northwest who were surveyed annually starting in 2000 in the fall of sixth, seventh, and eighth grades. The sample represents a 74% recruitment rate, and 82% of participants completed all 3 waves of assessment (for recruitment data by school, see Light & Dishion, 2007). The network size per school varied between 129 and 230 students ($M = 165$). The overall sample was 53.2% female, 77.4% European American, and had an average age of 12.14 years at the first wave of measurement; see Table 1 for demographic data by school and Table 2 for substance use data by school. Network data are presented in Table 3 according to the format provided by Veenstra and Steglich (2012).

2.2. Measures

2.2.1. Substance use

Students' reports of substance use (tobacco and alcohol) were collected once a year in sixth, seventh, and eighth grades. Students were asked to indicate the number of occasions they had used each substance during the past month. Substance use was coded as follows: 1 (*none*), 2 (*1–3 times*), 3 (*4–6 times*), 4 (*7–9 times*), and 5 (*more than 9 times*). Descriptive data by school are presented in Table 2, and data across schools are presented in Table 3.

2.2.2. Sociometric nominations

Students were asked to name those individuals in their grade with whom they would like to be in a group, and they were allowed to