Published in final edited form as:

Subst Use Misuse. 2017 March 21; 52(4): 477–487. doi:10.1080/10826084.2016.1245333.

Adolescent Social Networks and Alcohol Use: Variability by Gender and Type

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Abstract

Background—Scientists have established that social networks influence adolescents' substance use behavior, an influence that varies by gender. However, the role of gender in this mechanism of influence remains poorly understood. Particularly, the role an adolescent's gender, alongside the gender composition of his/her network, plays in facilitating or constraining alcohol use is still unclear.

Objectives—This study examined the associations among the gender composition of adolescents' networks, select network characteristics, intra-personal, inter-personal factors and alcohol use among a sample of adolescents in the US.

Methods—We assessed cross-sectional data from a 2010 study of 1,523 high school students from a school district in Los Angeles. Analyses of adolescents' network characteristics were conducted using UCINET 6; logistic regression analyses testing the associations between gender composition of the network and alcohol use were conducted using SPSS 20.

Results—Our results indicate that the gender composition of adolescents' networks is associated with alcohol use, in our sample. Adolescents in predominantly female or predominantly male friendship networks were less likely to report alcohol use compared to adolescents in an equal/balanced network. Additionally, depending upon the context/type of network, intrapersonal and interpersonal factors varied in their association with alcohol use.

Conclusions/Importance—Based on these findings, we make several recommendations for future research. We call for researchers to further examine gender as a risk factor for alcohol abuse, particularly within the complex interplay between gender and network contexts.

Keywords

social networks; adolescent; alcohol; gender; adolescent health

Introduction

Adolescence is a complex and crucial developmental period in which adolescents attempt to cultivate new identities and parental influence gradually diminishes (Simons-Morton & Farhat, 2010; Labouvie & White, 2002; Osilla et al., 2014). While parent and sibling substance use have also been shown to influence adolescent substance use behavior, peer associations during this period are considered one of the strongest factors influencing adolescent substance use such as alcohol consumption (Bauman & Ennett, 1996; Bettes, Dusenbury, Kerner, James-Ortiz, & Botvin, 1990; Ennett & Bauman, 2000). Although such influence is well established, adolescent boys and girls differ in the manner in which they form, and are influenced by, peer relationships and interactions (Flannery, Vazsonyi, Torquati, & Fridrich, 1994; Leaper, Tenenbaum, & Shaffer, 1999; Rose & Rudolph, 2006). These differences influence susceptibility to, degree, and user rates for alcohol, tobacco, and other drugs (ATOD) (Flannery, Vazsonyi, Torquati, & Fridrich, 1994; Rose & Rudolph, 2006; Wallace et al., 2003).

In addition to peer influence on substance use varying based on the gender of the adolescents, there is also evidence suggesting the gender composition of a network can alter the strength of a network's influence on substance use (Hsieh & Hollister, 2004; Leaper, Tenenbaum, & Shaffer, 1999; Rose & Rudolph, 2006). For instance, adolescents within a same-sex friendship/network will experience a mutual influence pattern, whereas those in mixed-sex friendships/networks will experience a disproportionate amount of influence depending upon several factors, such as friendship context and the predominant gender in the friendship/network (Gaughan, 2006).

Types of Adolescent Social Networks

Adolescents are embedded in different networks of peers; some of these networks are friendship networks while others are networks based on attributes such as popularity, academic achievement, admiration, or aspirations to be like others (Bearman, Moody, & Stovel, 2004; T. W. Valente, Fujimoto, Unger, Soto, & Meeker, 2013). This is an important consideration given that different types of networks have varying levels of influence. For instance, while friends are influential, their influence may not be as strong as that of a romantic partner (Poelen, Engels, Van Der Vorst, Scholte, & Vermulst, (2007). Moreover, the dynamics and quality of a peer relationship (e.g. an admired friend vs a casual friend) is of particular importance when assessing how adolescent networks influence individual behavior (Urberg et. al. (2003). Thus, there is a need to explore these different adolescent network types and how they might influence behavior transmission among adolescents (Coleman, Katz, & Menzel, 1966; Cruz, Emery, & Turkheimer, 2012; Hoffman, Monge,

Chou, & Valente, 2007; Trucco, Colder, & Wieczorek, 2011; T. W. Valente, Fujimoto, Soto, Ritt-Olson, & Unger, 2013).

Theoretical Background

It has been well established in the literature that an adolescent's behavior is associated with the behavior of others within his/her network (Balsa, Homer, French, & Norton, 2011; Bauman, Faris, Ennett, Hussong, & Foshee, 2007; Haynie, 2002). The notion that an adolescent's behavior is associated with that of his/her peers is grounded in the theoretical principle of *homophily* (McPherson, Smith-Lovin, Cook, 2001). Homophily is the tendency for people with similar characteristics (e.g., age, gender, race, attitudes or behaviors) to associate with one another rather than with those who are dissimilar (McPherson, Smith-Lovin, & Cook, 2001). Homophily in substance use behavior among adolescents has been linked to both *influence* (i.e., adolescents modify their behavior to conform to that of their existing friends) as well as *selection* (i.e., adolescents seek out friends based on their similarity on substance use) (Fisher & Bauman, 1998; Simons-Morton, 2007; Mercken, Steglich, Sinclair, Holliday, & Moore, 2012; Hall & Valente, 2007).

Current Investigation

Although shown to be important, it remains unclear how the gender of the person and the gender characteristics of his/her network interact to facilitate or constrain adolescent alcohol use (Brady & Randall, 1999; Gaughan, 2006). Additionally, only a few studies have examined network types (other than friendship networks) in which adolescents are embedded and how these different network types might explain the dynamics of how social influence is transmitted within social networks. This study seeks to determine whether intrapersonal (i.e., gender) and interpersonal factors (i.e., parent and sibling substance use), network measures, and gender composition of one's network are associated with alcohol use. Additionally, we assessed whether these relationships varied as a function of network type (i.e. *friendship*, *popularity*, *romantic*, *succeed*, and *admiration* networks).

Methods

Data for this study were collected as part of a pilot for The University of Southern California Social Networks and Networking Study. Approval for the survey was also obtained from The University of Southern California's Institutional Review Board, as well as from the district superintendent, principal, and teachers in each of the schools. Cross-sectional samples of 1,523 tenth grade adolescents from four high schools in a school district in Los Angeles were asked to complete a paper and pencil survey in May 2010. Approximately 1,224 students returned their parental consent forms and 1,110 completed the surveys on a regular school day, during an English or History class. Overall participation rate was 73%.

Outcome variable

Alcohol use was assessed via the item "During the past 30 days, on how many days did you have at least one drink of alcohol?" Response options were 0 days; 1 or 2 days; 3 to 5 days; 6 to 9 days; 10 to 19 days; 20 to 29 days; and all 30 days. Given that the vast majority of the

respondents (64.5%) reported never consuming alcohol, for this study responses were dichotomized: ever drinkers versus never drinkers.

Network Types

Students' social networks were assessed by providing a roster of all 10th graders with an accompanying photo of each student and an ID number (created for each student by the researchers) printed on the bottom of the pictures. Students were asked to identify (1) their best friends, regardless of where they lived and went to school; (2) the closest friends in their classroom; and (3) the closest friends in their grade. In order to generate network types other than friendship networks, the students were asked to write the IDs of five students in the grade whom they thought: (a) were the most admired; (b) were the most likely to succeed; (c) with whom they would like to have a romantic relationship; and (d) who they thought were the most popular. The networks elicited by these questions will be subsequently referred to as "admire/admiration network/network of students who admire one another," "likely to succeed network," "romantic network," and "popularity network." The network boundary for this investigation was set to the grade level. This boundary was set for two reasons. First, a study published from similar data showed there was no difference in the magnitude of associations when the boundary was set as either the classroom or the grade (Valente, Fujimoto, Unger, Soto, & Meeker, 2013). Second, extending the boundary beyond the classroom provides the opportunity to capture a wider range of peer interactions.

Network gender composition

We created a network gender composition variable by counting the frequency of males and females in a student's outgoing ties (outdegree) for each of the different network types. A computer algorithm implemented in C++ was used in this analysis. If a student nominated more males than females for their admiration network, for example, that student was coded as having a predominantly male admiration network. If the student nominated equal numbers of males and females, the predominant gender for that student's network was coded as "equal/balanced."

Network Measures

Prior network studies have identified several network characteristics as central to the study of social networks and adolescents' substance use behavior (Valente, 2010; Ennett et. al., 2006). Guided by the concept of social embeddedness which is shown to be a predictor of adolescent substance use within networks, (Ennett & Bauman, 2005; Mundt, 2011, Lakon & Valente, 2012), three network measures were examined:

- indegree — number of directional links to an ego (student) from other actors (other students, also known as incoming nominations). This is a measure of social integration. Social integration, measured by indegree, has been found to be associated with substance use behavior among adolescents. For example, studies have found that adolescents who are isolates (not socially integrated) are more likely to use alcohol (Ennett & Bauman, 1993; Valente, 2010)
- outdegree — number of directional links from an actor to other actors (outgoing nominations). This measure is an indicator of an adolescent's personal attributes

such as their sociability or friendliness (Valente, 2010). There is evidence showing that the more sociable an adolescent is, the more exposed they are to different behaviors which can influence their attitudes toward alcohol use behavior (Ennett & Bauman, 1993; Hall & Valente, 2007).

- density — number of direct ties among other students to whom a student is connected as a proportion of the possible connections among all students. Density is also considered a measure of connectedness. Highly dense networks have been shown to exhibit more interconnected clusters which magnify the spread of behavioral influence, such as drinking, within networks (Mundt, 2011).

For each network type, these three network measures were calculated. All network analyses were conducted using UCINET 6.5 (Borgatti, Everett, & Freeman, 2002).

Covariates

Existing studies have shown that frequency and quantity of adolescent alcohol consumption is influenced by several covariates (Marschall-Lévesque, Castellanos-Ryan, Vitaro, & Séguin, 2014; Fujimoto & Valente, 2012). We controlled for the following covariates: sibling drinking and parent alcohol consumption (1=has a parent/sibling who drank; 0=has no parent/sibling who drank), age (in years), sex (1=female; 0=male), race (0= Non-Hispanic; 1=Hispanic), academic grades (ranged from 1=Mostly A's to 10=Wasn't in school last year), and qualifying for reduced lunch (1=Yes; 0=No).

Data Analysis

We ran descriptive/frequency analyses for the demographic variables and several ordered logistic regression models to test the effects of gender composition of the network on drinking status (whether a student consumed alcohol in the past month), while controlling for several covariates. Prior to analysis, the four schools sampled were compared to see if they were statistically similar based on the outcome of interest (alcohol consumption). Given the significant differences found, schools that were similar (no significant differences in alcohol use) were grouped into a single category. This classification resulted in three categories: Category 1, n=376 (School 1); Category 2, n=276 (School 2); and Category 3, n=458 (Schools 3 and 4). All logistic regression analyses were conducted in SPSS 20.

Results

Table 1 details the demographic characteristics of study participants across the four schools in our sample. Study respondents were evenly distributed across gender and were on average 15.6 (SD=0.584) years old. Consistent with the ethnic distribution in the area in which the data were collected, the students in the study were predominantly Hispanic/Latino. Socioeconomic status was represented by whether students qualified for reduced lunch and number of rooms per people in their household. Participants reported on average, 3.9 (SD=1.37) people in the household and 3.1 (SD=1.31) rooms in the home indicating a case of slight overcrowding (Myers, Baer, & Choi, 1996). While the schools were found to vary with regard to alcohol use rates among their 10th grade students, overall, 35.5% of the adolescents surveyed reported consuming alcohol within the past month, not including those

who drank for religious purposes. More than a third of the students (35.1%) reported having a sibling who consumed alcohol. Parental alcohol use varied across the schools (from 45 to 57%), but overall, more than half (52.1%) reported having a parent who drank alcohol.

Regarding network characteristics, mean outdegree, indegree, and density scores across the different networks are shown in Table 1. There were variations in these scores across the different networks and schools. Overall, the romantic network had the lowest mean outdegree (nominations made) scores, 0.64 (SD=1.42) across all four schools, while the friendship network had the highest mean outdegree score in all four schools, 2.99 (SD=2.18). For indegree scores (nominations received), again, the romantic network had the lowest mean indegree scores, 0.64 (SD=1.14) while friendship networks had the highest, 2.99 (SD=2.02). As a consequence, density scores also varied across the schools and the different network types: the romantic network had the lowest density, 0, while the friendship network had the highest density score, 17.66 (SD=21.32).

Gender composition of the networks is shown in Table 2. In general, girls were more likely to be nominated than boys such that all networks had more girls than boys with the two exceptions: there were slightly more boys than girls in the popularity network in School 3 and there was a predominance of equal/balanced (same number of female and male nominations) in the romantic network in School 4.

Gender Composition of Networks

As shown in Table 3, in the friendship network in School Category 1, there was a significant association between students in predominantly male and female networks and alcohol use, such that students in predominantly male networks were less likely (OR=0.32; $p<.05$) than students in a balanced network to report drinking in the past 30 days, holding all other factors constant. Similarly, students in predominantly female networks were also less likely (OR= 0.37; $p<.05$) than students in a balanced network to report drinking in the past 30 days, holding all other factors constant. There was no significant association between network gender composition and alcohol consumption in the past month in the other two school categories in the friendship networks.

In the romantic network in School Category 1, students who nominated mostly males (predominantly male network) were less likely (OR=0.062; $p<.05$) to report drinking in the past 30 days compared to students in networks composed of the same/equal number of males and females holding all other factors constant (See Table 4).

Network Characteristics

In the romantic network in School Category 3, there was a significant association between indegree and alcohol consumption in the past 30 days (See Table 4). For every additional romantic nomination received, the odds of reporting drinking in the past month was reduced (OR=0.68; $p<.05$) holding all other factors constant. In the network of students who admire one another in School Category 1, there was a significant association between past 30-day alcohol consumption and indegree. For every additional admiration nomination received, the odds of consuming alcohol within the past month was reduced (OR=0.723; $p<.05$), holding all other factors constant.

Covariates

Among the intrapersonal factors included in the models, only academic grade was consistently predictive of individual drinking across friendship, succeed and popular networks for all three school categories (Tables 3 – 7). Those with higher academic achievement were more likely to report drinking. In the Romantic network, academic grades were predictive of drinking in only School Category 2. In the Admire network, academic grades were predictive of individual drinking behavior in School Categories 2 and 3, but not in School Category 1.

Ethnicity was associated with drinking in the Admire and Popularity networks in School Category 3 only. In the Admire network, compared to non-Hispanic adolescents nominated as being admired, admired Hispanic adolescents were less likely ($OR=0.157$; $p<0.05$) to report consuming alcohol within the past month holding all other factors constant (see Table 6). Similar to results obtained for the admire network, Hispanic students nominated as being popular were less likely ($OR=0.241$; $p<0.05$) times less likely to report drinking in the past 30 days holding all other factors constant (see Table 7).

Qualifying for reduced lunch also predicted drinking in School Category 2 Friendship and Popularity networks and School Category 3 Admire networks. In all three instances, adolescents who qualified for reduced lunch were less likely to report consuming alcohol within the past month compared to students who did not qualify for reduced lunch, holding other factors constant.

Regarding interpersonal factors, for many of the School Categories, sibling *and* parental alcohol use were consistently predictive of drinking. However, parental alcohol use was predictive of drinking more often than sibling alcohol use (11 vs 7 times, respectively) across all three School Categories and network types.

Discussion

Despite the substantial variability in the findings described above, two common themes emerge: (1) depending on the type of network examined, the association between the determinants examined (intrapersonal and interpersonal factors and network measures) and alcohol use vary; and (2) the gender composition of the networks can be an important factor associated with alcohol use. Due to these two major findings, we believe this study makes an important contribution to the research on social network analyses to explore adolescents' risk behaviors. This study employed a sociometric network approach to examine whether factors implicated in alcohol use among adolescents vary by type of network and gender composition of those networks. The findings support our hypothesis that these two factors — type of network and the network's gender composition — are important factors to consider in network studies of adolescents. In fact, to the best of our knowledge, other than Gaughan (2006), this study is one of the few studies examining gender composition of adolescent networks as a factor that might influence adolescents' alcohol use.

Similar to Gaughan's (2006) findings, we report an association between network gender composition and alcohol use. This association was apparent in both the friendship as well as

romantic networks. Although some of these associations were small to moderate in size odds ratios, they indicate that adolescents in this sample, in both predominantly male or female friendship and romantic networks, were less likely to report having consumed alcohol in the past month compared to those in balanced gender networks (same number of female and male nominations).

The associations between gender composition of one's network and substance use can be interpreted in terms of Status Characteristic Theory. The theory posits that if a male is in a predominantly male network, or a female in a predominantly female network, there is a balance in influence and behavioral expectancy. In mixed sex groups, however, the theory posits that depending on behavioral or status expectancy, one gender might be more dominant/influential in the group (Lockheed & Hall, 1976). Hence, when adolescents are in mixed/balanced networks, there is usually a disproportionate amount of influence exerted depending upon the context of the associations and upon other characteristics of the network (Gaughan, 2006). Male adolescents have been identified as more likely to exhibit signs of problem drinking and also drink more in social contexts (Treiman & Beck, 1996; Pope, Smith, Wayne, & Kelleher, 1994).

Our findings that intrapersonal and interpersonal factors and network measures known to influence adolescent substance use vary across the different networks examined shed more light on the findings reported by Valente et. al. (2013), which concluded friendship networks were more frequently associated with alcohol use among adolescents than other network types. Part of the variation in network type associations with substance use may be a product of the gender composition of these networks.

A students' indegree was the only other network measure negatively associated with alcohol use across some of the network types (romantic and admire). With an increase in indegree, participants were less likely to report using alcohol in the past 30 days. Indegree is a measure of social integration (Valente, 2010), and as such, students who are more socially integrated (in other words, not isolates) are less likely to use alcohol. This perspective supports the existing literature indicating that isolates in a network are more likely to engage in substance use behaviors compared to those who are socially embedded in a network (Ennett & Bauman, 1993; Fujimoto & Valente, 2012).

It is noteworthy that our social network analysis lent credence to the powerful impact of familial influence on adolescents' alcohol use. Consistent with other studies, parental drinking but not sibling drinking was more often associated with adolescent drinking within our sample (Avenevoli & Merikangas, 2003; Vink, Willemsen, & Boomsma, 2003). This finding corroborates existing studies showing there is a strong association between parents' drinking patterns and the drinking patterns of their adolescent and young adult offspring (Cohen & Rice, 1997). One of the mechanisms proposed to explain this association is that parents who consume alcohol model this behavior directly to their children and are consequently the influential precursors of adolescent alcohol use within a family system (Kothari et al., 2014; Van Der Vorst, Engels, Meeus, Dekovi, & Van Leeuwe, 2005). While these results on familial determinants of adolescent drinking may differ from studies which have indicated that sibling substance use is the most influential predictor of adolescent

substance use, irrespective of the substance, (McGue, 1996; Windle 2000), these differing findings should be viewed in context. The sample in our study is 10th graders that are predominantly Hispanic/Latino and the results should be assessed with this in mind as studies have shown that there are ethnic differences in correlates of adolescent substance use behavior (Griesler, & Kandel, 1998). Additionally, our results, when viewed from a child development perspective, are in line with studies supporting the notion that effects of familial influences (parents and siblings) vary through the life course with parental influence stronger early on (during initiation) and sibling influence stronger later on (as behavior reinforcement or amplifier) (Duncan, Duncan, & Hops, 1996).

Overall, findings from this study show significant variability in how the different intra- and inter-personal factors, as well as adolescent network characteristics implicated in alcohol use among adolescents behave in different network and school contexts. This variability points to one overarching conclusion: *different contexts and network gender compositions result in different risks*. The implications of this conclusion for health promotion practice are not trivial: program planners must bear in mind that mere knowledge of adolescents' gender may not be enough to fully understand the kinds of risks girls and boys might be exposed to. While it is important to account for differences in patterns of alcohol use for males and females, it is perhaps equally (or even more) important to consider the gender composition of the various types of networks in which they are embedded. Program developers would do well to assess the gender composition and the types of networks to which program participants belong, in order to develop more appropriately-designed messages. For example, program developers can develop advertisements that depict the different possible gender compositions of adolescent friendships and teach adolescents how to resist pressures from within these networks.

This study's findings also have important implications for future research. One implication is the need for studies that do not gloss over the gendered patterns in which influence is assimilated or transmitted within a network. There is need for further research studies designed specifically to explore the extent to which adolescents in networks with different gender compositions and in different network types (or contexts) are influenced by their peers. More often than not, studies tend to control for gender, or to assume that being a girl or a boy places an adolescent at a fixed level of risk — based on their gender — without consideration of potential gender-by-context (or type of network) interactions.

There are limitations which must be considered in unison with our findings. First, some of the statistically significant results had only small or moderate odds ratios and may not exhibit practical significance. Given that this was a secondary data analysis, it is important to note that the original data collection was not designed to answer questions regarding gender composition mechanisms. Thus, the measures may have lacked sensitivity and resulted in the small associations found. Additionally, employing a bounded sociometric dataset for this analysis and limiting the study population to only 10th graders does not allow us to obtain a true/complete picture of the adolescents' networks or the potential inter-grade influences. Given the lack of information on contextual and endogenous structural properties of the networks in the different schools it is also unclear what might be the underlying factors driving the variable findings across the schools.

Despite these limitations, however, this study contributes to the body of knowledge regarding social network analysis of adolescents' substance use behaviors by providing support for the notion that intrapersonal and interpersonal factors vary considerably in their association with alcohol use (in our sample) depending upon the context/type of the network and its gender composition. Furthermore, findings from this study have shown that we cannot assume gender (of the individual or of the network) to have a fixed association with risk. Rather, the effects of gender are complex and dependent upon context. Gender composition of adolescent networks might play a significant role in how peer interactions might facilitate or constrain alcohol use among adolescents.

Acknowledgments

This study was supported by NIH grant number 1RC1AA019239-01 (PI: Thomas W. Valente) from the National Institute on Alcohol Abuse and Alcoholism. Our thanks to the El Monte Union High School District for their assistance with this study.

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Table 1

Characteristics of students in four schools in the Los Angeles area, participating in the Social Networks Study

	School 1 (%) n=376	School 2 (%) n=276	School 3 (%) n=204	School 4 (%) n=254
Age (Mean, SD)				
	15.6 (.63)	15.6 (.59)	15.5 (.56)	15.6 (.53)
Gender				
Female	51.1	55.1	51	52
Ethnicity				
Hispanic/Latino	54	53.1	67.2	59.4
Academic Achievement				
Mostly A's	12.3	17.0	5.1	7.1
Mostly A's and B's	24.6	23.6	21.5	25.0
Mostly B's	3.0	5.8	4.1	5.8
Mostly B's and C's	25.5	23.2	30.3	29.6
Mostly C's	8.7	6.2	10.8	5.8
Mostly C's and D's	15.0	13.9	17.9	15.4
Mostly D's	1.2	.4	1.5	.4
Mostly D's and F's	6.6	6.2	7.7	9.2
Mostly F's	2.4	3.9	1.0	1.7
Socioeconomic status				
Qualify for reduced lunch	79.7	93.4	95.4	88.0
# of rooms /people in the household (Mean, SD)	1.1(.74)	.82 (.54)	.83 (.63)	.85 (.47)
Have parents who drink alcohol				
Yes	45.9	49	59.5	57.1
No	54.1	51	40.5	42.9
Have siblings who drink alcohol				
Yes	67.1	36	36.4	36.2
No	32.9	64	63.6	63.8
Substance use (10th Grade)				
Alcohol	28.9	35.6	39.5	40.6
Outdegree (Mean, SD)				
Friend	2.99 (2.18)	2.51 (2.26)	2.12 (2.28)	2.65 (1.40)
Admire	1.63 (2.03)	1.43 (1.93)	1.17 (1.77)	1.24 (1.80)

	School 1 (%) n=376	School 2 (%) n=276	School 3 (%) n=204	School 4 (%) n=254
Succeed	1.98 (2.11)	1.67 (2.00)	1.53 (1.96)	1.65 (1.95)
Romantic	.96 (1.71)	.76 (1.5)	.88 (1.58)	.64 (1.42)
Popular	1.62 (2.05)	1.36 (1.92)	1.06 (1.75)	1.25 (1.9)
Indegree (Mean, SD)				
Friend	2.99 (2.02)	2.51 (1.81)	2.12 (1.63)	2.65 (1.97)
Admire	1.63 (2.53)	1.43 (2.05)	1.17 (1.26)	1.24 (2.46)
Succeed	1.98 (3.59)	1.67 (2.27)	1.53 (1.96)	1.55 (3.24)
Romantic	.96 (1.44)	.76 (1.1)	.88 (1.09)	.64 (1.14)
Popular	1.62 (2.74)	1.35 (2.41)	1.06 (1.39)	1.25 (3.24)
Density (Mean, SD)				
Friend	12.19 (18.9)	16.9 (20.51)	17.66 (21.32)	14.36 (20.23)
Admire	3.18 (9.6)	3.01 (12.9)	4.55 (10.18)	2.77 (6.22)
Succeed	5.3 (13.64)	5.25 (12.9)	4.15 (9.38)	3.16 (6.86)
Romantic	.86 (1.08)	0	0	0
Popular	1.80 (6.36)	3.34 (8.31)	1.83 (6.42)	3.88 (11.28)

Table 2

Network gender characteristics of students in the four schools sampled in the Social network Study

	School 1 (%) n=376	School 2 (%) n=276	School 3 (%) n=204	School 4 (%) n=254
Friendship network				
Predominantly male	34.1	36.5	39.2	33.1
Predominantly female	45.5	49.5	49.0	53.4
Equal	11.4	8.3	7.8	7.2
Admiration network				
Predominantly male	16.4	15.9	17.6	18.3
Predominantly female	31.0	31.8	28.4	27.1
Equal	4.8	5.8	4.4	6.8
Likely to succeed network				
Predominantly male	20.9	20.6	15.7	20.3
Predominantly female	32.3	36.8	33.3	34.7
Equal	8.7	9.7	14.2	5.2
Romantic network				
Predominantly male	13.8	14.1	8.3	13.9
Predominantly female	17.5	19.9	15.2	17.1
Equal	1.3	1.1	.5	0
Popularity network				
Predominantly male	16.4	16.2	16.2	18.3
Predominantly female	22.8	27.1	14.7	22.7
Equal	6.6	6.9	9.3	5.6

Logistic regression results of the effects of intrapersonal, interpersonal, and network characteristics on adolescents' alcohol use in a friendship network

Table 3

	School Category 1		School Category 2		School Category 3	
	OR	95%CI	OR	95%CI	OR	95%CI
Age	1.164	.734–1.848	.922	.589–1.445	.854	.479–1.521
Gender	1.264	.555–2.88	1.526	.931–2.501	1.094	.562–2.130
Ethnicity	1.348	.709–2.562	.712	.427–1.188	.598	.304–1.177
Grades	1.345**	1.154–1.567	1.316**	1.158–1.494	1.373**	1.185–1.591
Reduced Lunch	2.424	.988–5.949	.328*	.130–.828	.314	.087–1.131
Parent Alcohol	2.987**	1.558–5.728	3.079**	1.822–5.204	1.536**	.786–3.001
Sibling Alcohol	2.384**	1.254–4.531	1.575	.951–2.609	3.596**	1.807–7.158
Indegree	.894	.752–1.064	1.062	.934–1.208	1.034	.886–1.207
Outdegree	1.131	.880–1.454	1.074	.888–1.298	.960	.741–1.245
Density	1.008	.989–1.027	.989	.975–1.002	1.011	.993–1.030
NetPredomGender (Male)	.315*	.109–.915	1.218	.475–3.124	.641	.188–2.187
NetPredomGender (Female)	.371*	.140–.980	1.125	.445–2.845	.922	.289–2.947

* p<.05

** p<.01

Logistic regression results of the effects of intrapersonal, interpersonal, and network characteristics on adolescents' alcohol use in a network of adolescents with romantic aspirations for one another

Table 4

	School Category 1		School Category 2		School Category 3	
	OR	95%CI	OR	95%CI	OR	95%CI
Age	.993	.398–2.481	1.066	.467–2.433	1.198	.765–1.878
Gender	5.803 *	1.028–32.745	2.089	.867–5.032	1.526	.889–2.62
Ethnicity	1.533	.455–5.171	.785	.320–1.926	.769	.451–1.31
Grades	1.113	.849–1.461	1.471 **	1.167–1.853	1.338	1.181–1.516
Reduced Lunch	2.458	.411–14.685	.269	.055–1.328	2.932	1.153–7.453
Parent Alcohol	4.594 *	1.326–15.914	2.780 *	1.095–7.055	2.158	1.273–3.659
Sibling Alcohol	3.551 *	1.090–11.573	1.549	.648–3.705	3.363	1.965–5.756
Indegree	.636	.315–1.282	1.078	.749–1.551	.779 *	.618–.982
Outdegree	1.085	.687–1.713	.920	.604–1.399	1.008	.840–1.211
Density [†]					.000	.000
NetPredomGender (Male)	.062 *	.006–.621	1.359	.148–12.433	.712	.345–1.469
NetPredomGender (Female)	.434	.055–3.395	1.709	.192–15.192	.782	.413–1.477

* p<.05

** p<.01

[†] Density scores was mostly zeros for School Category 1 and 2

Logistic regression results of the effects of intrapersonal, interpersonal, and network characteristics on adolescents' alcohol use in a network of "likely to succeed" adolescents

Table 5

	School Category 1		School Category 2		School Category 3	
	OR	95%CI	OR	95%CI	OR	95%CI
Age	.846	.441–1.623	.915	.505–1.66	1.008	.462–2.198
Gender	1.193	.469–3.035	1.472	.764–2.834	1.211	.455–3.222
Ethnicity	1.706	.736–3.957	.785	.403–1.53	.390	.138–1.104
Grades	1.380*	1.112–1.712	1.445**	1.223–1.708	1.595**	1.257–2.026
Reduced Lunch	1.829	.580–5.769	.318	.091–1.113	.142	.018–1.108
Parent Alcohol	3.063**	1.359–6.904	2.790**	1.391–5.597	1.494	.57–3.913
Sibling Alcohol	2.777*	1.198–6.439	1.088	.548–2.16	3.696*	1.354–10.089
Indegree	.981	.860–1.118	1.029	.931–1.137	.960	.793–1.162
Outdegree	.941	.732–1.208	1.048	.859–1.28	.866	.641–1.172
Density	1.019	.991–1.047	.994	.957–1.032	1.005	.966–1.046
NetPredomGender (Male)	.462	.105–2.202	1.003	.383–2.631	1036522707.812	0
NetPredomGender (Female)	1.525	.428–5.433	.960	.399–2.309	786255699.241	0

* p<.05

** p<.01

Logistic regression results of the effects of intrapersonal, interpersonal, and network characteristics on adolescents' alcohol use in a network of students who admire one another

Table 6

	School Category 1		School Category 2		School Category 3	
	OR	95%CI	β	95%CI	β	95%CI
Age	1.061	.478–2.357	.738	.355–1.534	.702	.246–2.005
Gender	1.409	.48–4.14	1.798	.833–3.879	2.740	.716–10.489
Ethnicity	2.618	.955–7.177	.656	.29–1.488	.157	.037–.679
Grades	1.238	.969–1.581	1.609**	1.3–1.991	2.022**	1.428–2.864
Reduced Lunch	4.177	.934–18.688	.137	.017–1.106	.029**	.002–.396
Parent Alcohol	4.647**	1.708–12.644	3.364**	1.433–7.897	1.096	.295–4.074
Sibling Alcohol	6.429**	2.203–18.760	1.492	.667–3.339	7.710**	1.765–33.668
Indegree	.723*	.524–.998	1.035	.851–1.257	.956	.705–1.298
Outdegree	.904	.637–1.284	1.106	.818–1.496	1.171	.97–1.736
Density	1.027	.987–1.069	1.022	.947–1.102	.858	.71–1.037
NetPredomGender (Male)	5.326	.253–112.086	.743	.196–2.281	.333	.047–2.351
NetPredomGender (Female)	15.714	.834–295.980	.544	.146–2.034	.599	.096–3.727

* p<.05

** p<.01

Logistic regression results of the effects of intrapersonal, interpersonal, and network characteristics on adolescents' alcohol use in a network of students thought to be popular students

Table 7

	School Category 1		School Category 2		School Category 3	
	OR	95%CI	OR	95%CI	OR	95%CI
Age	.717	.306–1.684	.844	.36–1.975	.849	.354–2.034
Gender	1.062	.334–3.377	1.866	.772–4.51	1.318	.48–3.617
Ethnicity	1.640	.551–4.884	.713	.29–1.756	.241 *	.074–.789
Grades	1.282	1.003–1.64	1.454	1.158–1.826	1.326 *	1.057–1.663
Reduced Lunch	5.424 *	1.061–27.16	.029 **	.002–.337	.239	.017–3.446
Parent Alcohol	3.991 *	1.216–13.097	6.072 **	2.173–16.965	2.236	.765–6.535
Sibling Alcohol	2.799	.966–8.105	.972	.392–2.409	2.448	.789–7.592
Indegree	.837	.610–1.149	.972	.773–1.221	.920	.696–1.216
Outdegree	1.150	.789–1.676	1.120	.846–1.484	1.364	.998–1.865
Density	.930	.8–1.081	.968	.922–1.017	.981	.915–1.051
NetPredomGender (Male)	.424	.064–2.28	1.185	.351–4.003	1.289	.264–6.29
NetPredomGender (Female)	.920	.208–4.075	1.351	.402–4.539	3.087	.637–14.965

* p<.05
 ** p<.01