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Interpersonal Goals and Susceptibility to Peer Influence: Risk Factors for Intentions to Initiate Substance Use during Early Adolescence

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Abstract

Though peer socialization theories are prominent in the adolescent substance use literature, variability in the degree to which adolescents are vulnerable to peer influence is likely, and few studies have examined this issue. This study examines the association between perceived peer substance use/approval of substance use and adolescent intentions to initiate alcohol and cigarette use, and how social goals moderate this relationship. Results support the moderating role of social goals, and suggest important differences across alcohol and cigarette use. Peer use and approval of cigarette use was associated with future intentions to smoke for adolescents with strong agentic goals, and peer use and approval of alcohol use was associated with intentions to drink for adolescents with strong communal goals. These findings suggest that adolescent substance use theories and prevention programs focusing on peer socialization should consider individual differences in social goals and potential differences in peer influence across drugs.

Introduction

The peak period of initiation of cigarette (grades 6–7) and alcohol use (grades 7–11) begins during the middle school years (Johnston, O'Malley, Bachman, & Schulenberg, 2005). Accordingly, the early stages of acquisition and escalation of substance use occur during early adolescence. During this developmental period (10–14 years), the amount of time spent with peers increases and peer relationships typically become the primary social context that influences social development (Rubin, Bukowski, & Parker, 2006). Peer relationships during this period provide companionship and they act as primary venues for gaining status, as well as providing opportunities for self-disclosure while seeking independence from parents (Collins & Steinberg, 2006). Given these developmental changes, it is not surprising that one of the strongest correlates of adolescent substance use is peer influence (Bauman & Ennett, 1996; Kobus, 2003). Understanding factors that contribute to the susceptibility of peer influence may be particularly important for designing preventive interventions. The aim of the current study was to examine the association between peer approval/use of cigarettes/alcohol and intentions to use, and the degree to

which social goals, which are thought to be important motivators of social behavior (e.g., Wentzel, 1994), increase vulnerability to peer influence in an early adolescent sample.

Peer Influence on Adolescent Substance Use Initiation

Peer influence is one of the most prominent determinants of substance use initiation in adolescence (Bauman & Ennett, 1996) and it is believed to operate through both direct and indirect socialization mechanisms: peers provide support and social opportunities to engage in substance use, and peers reinforce and shape attitudes toward substance use (Leventhal & Cleary, 1980; Prinstein & Wang, 2005). Change in the quality and amount of time spent with peers during early adolescence suggests that this period may be marked by heightened susceptibility to peer influence (Brown, Dolcini, & Leventhal, 1997). Yet, the prevalence of substance use is very low during early adolescence (Bauman & Phongsavan, 1999), suggesting it may be important to examine perceived peer approval and use of cigarettes and alcohol when considering mechanisms of peer influence during this period. Research suggests that perceived peer approval and use in the elementary years predicts intentions to use alcohol and cigarettes in adolescence, which then predicts use of both alcohol and cigarettes one year later (Andrews, Hampson, Barckley, Gerrard, & Gibbons, 2008). Moreover, these associations are stronger during initial stages of use in early adolescence compared to later stages of use (Chassin, Presson, Sherman, & Edwards, 1991).

In the current study we examine the association between perceived peer approval/use of substances and intentions to drink alcohol and smoke cigarettes. We focus on intentions because the prevalence of substance use is expected to be very low in our sample of early adolescents, and because intentions are significant predictors of future use (Andrews et al., 2008). Moreover, we limit our study to alcohol and cigarettes because these tend to be the substances that are first tried in the early stages of substance use (Kandel, 1975; Kandel & Yamaguchi, 2002).

Interpersonal Goals in Susceptibility to Peer Influence

There is evidence for variability in the degree to which adolescents are susceptible to peer influence (Brown, Bakken, Ameringer, & Mahon, 2008). This suggests that it is important to consider potential moderators of peer influence, and this is the primary aim of the current study. We propose that a key construct from social information-processing models, namely social goals, may increase or decrease the influence of peers on intentions to use alcohol and cigarettes.

According to social information-processing models (e.g., Crick & Dodge, 1994; Rubin & Krasnor, 1986), encoding and interpretation of social cues as well as an individual's desired goals influence decisions about enactment of social behavior. The process starts with interpretation of social cues and activation of a search for behavioral strategies likely to maximize the achievement of a desired goal and minimize negative consequences. Hence, the perception of a social context leads to enactment of certain behaviors depending on an individual's social goals. Research on social schemas (Salmivalli & Peets, 2009) also suggests that examining perceptions of social context and desired outcomes is important for understanding adolescent behavior.

Although social information-processing models have largely been applied to social conflicts and aggressive behavior, the tenets of these models have been employed more broadly (e.g., socio-moral and prosocial behavior development; Arsenio & Lemerise, 2004; Nelson & Crick, 1999) and may inform peer influence on substance use behavior. Specifically, perceived peer use and approval of use may lead certain adolescents to want to drink and

smoke when these behaviors are viewed as a viable means of achieving their desired social goals.

The interpersonal circumplex model (IPC) may help identify specific social goals that function as moderators of the association between perceived peer approval/use of substances and intentions to use (e.g., Locke, 2000; Ojanen, Gronroos, & Salmivalli, 2005). This is one of the most widely used models for conceptualizing and assessing social goals and is comprised of two orthogonal axes: a horizontal axis representing communion (i.e., friendliness, solidarity, and warmth) and a vertical axis representing agency (i.e., dominance, power, and control). Those high on agentic goals (+A) value appearing confident, independent, and dominant; while those low in agentic goals (−A) value avoiding conflict by pleasing others and appearing submissive. Those high on communal goals (+C) value feeling close with others and developing friendships; while those low in communal goals (−C) value appearing detached and aloof. Each point on the circumplex is defined as a weighted combination of levels of both communion and agency, reflecting all combinations of agency and communion (Ojanen et al., 2005). An adolescent's standing on these dimensions, and hence their social goals, may impact their susceptibility to peer influence.

Prior research suggests that adolescents who place a high value on achieving high social status are particularly vulnerable to peer influence (Baumrind & Moselle, 1985; Cillessen & Mayeux, 2004), and that popularity and high levels of agency prospectively predict risky adolescent behaviors such as sexual behavior and substance use (Mayeux, Sandstrom, & Cillessen, 2008; Markey, Markey & Tinsley, 2005). In short, an adolescent's social status (or desired social status) among peers may increase vulnerability to peer influence and the likelihood of engaging in risk behavior. Agentic adolescents place a high value on appearing confident, independent and dominant over peers, and may believe that endorsing positive views of substance use will make them "look cool" or garner respect from peers. That is, agentic adolescents may believe that endorsing attitudes supportive of substance use will help them achieve their desired high social status. Accordingly, adolescents characterized by high levels of agency are hypothesized to respond to perceived peer approval/use of substances with strong intentions to smoke and drink in the future.

Adolescents characterized by low levels of agency value avoiding conflict by pleasing others and appearing submissive and they are at decreased risk for alcohol and cigarette use (Markey et al., 2005). This suggests that substance use during this period may not serve the social goals of low agency adolescents. Peer influence during early adolescence is often not direct (e.g., pressure through coercion and teasing), rather it typically operates indirectly through perceived pressure to adopt attitudes of one's friends to foster cohesiveness, and by establishing certain ways of thinking and behaving as normative (Bauman & Ennett, 1996; Denscombe, 2001). Despite the emphasis on unity, young adolescents afford each other discretion over their own behavior, allowing for flexibility in choosing behaviors that project a desired social image (Denscombe, 2001). Thus, abstinence in a peer group that engages in or approves of substance use but does not directly pressure its members to think or behave similarly is not expected to result in conflict. Accordingly, low agency adolescents are unlikely to feel pressure to engage in substance use to avoid conflict, and we hypothesize that peer approval/use will be weakly associated with intentions to use for adolescents low in agency.

Adolescents characterized by high levels of communion place a high value on being close to their peers for fear of rejection, and may be motivated to endorse attitudes and behaviors similar to their peers as a means of achieving closeness and cohesion. Indeed, prior research suggests that peer influence to use substances is strongest when an individual values bonding to their peers or being a member of the group (Baumrind & Moselle, 1985; Kiesner,

Cadinu, Poulin, & Bucci, 2002). Accordingly, the impact of peer approval/use of substances on intentions to drink or smoke may be particularly strong for communal adolescents. In contrast, adolescents low on communal goals value appearing aloof and detached, and may place a low value on being a member of the group, making them less susceptible to peer approval/use of substances.

Although socialization theories (Bauman & Ennett, 1996; Leventhal & Cleary, 1980) explain the mechanisms by which peers influence substance use outcomes, individual differences in social goals may clarify who is at greatest risk from such influence. Social information-processing theory and research suggest that the perception of a social context activates a search for behavioral strategies that will increase the likelihood of obtaining desired social goals. Accordingly, we propose that high levels of agency and high levels of communion will increase susceptibility to peer influence on intentions to smoke and drink because engaging in substance use represents a viable means of meeting desired social outcomes of dominance and belongingness, respectively.

Current Study

The aim of the current study was to examine social goals as a moderator of the relationship between peer approval/use of alcohol and cigarettes and intentions to drink and smoke in early adolescence. It was hypothesized that perceived peer approval and use of substances would predict intentions to smoke cigarettes and drink alcohol for adolescents characterized by strong communal or strong agentic social goals. Though specific hypotheses were not made regarding how social goals would operate differently across alcohol and cigarettes, given differences in rates of alcohol and cigarette use in epidemiological research (Johnston et al., 2005), and differences in social images of alcohol and cigarette users in early adolescence (e.g., smokers as rebellious and drinkers as social; Andrews & Paterson, 2006), it was important to test our hypotheses separately for cigarette and alcohol intentions.

Method

Sample

This community sample was part of a larger three-year longitudinal study investigating behavior problems and substance use initiation. The study utilized a random-digit-dial (RDD) sample of telephone numbers from ASDE Survey Sampler, Inc., that was generated specifically for Erie County, New York. RDDs provide a representative sample from a specific area because both listed and unlisted telephone numbers are included. Erie County is especially well-suited for this type of sampling because it has an extremely high rate of households with telephones (98.5%), which is not the case for all areas in the United States. Calls were made by trained telephone recruiters utilizing scripts that explained the study (longitudinal research on the behavioral development of children), what was needed for participation (an 11 or 12 year-old son or daughter and a parent interview), and the level of compensation for participation ($75 for each assessment lasting approximately two to three hours). Multiple telephone contacts (including scripted messages for telephone answering machines) were made to each number, and letters describing the study were sent to addresses (when available) of households that hung up or initially refused to identify whether a child of the eligible age range was present. Recruitment began in April 2007 and was completed in February 2009. The participation rate for those completing the interview was 52.4% (387/739), which is well within the range of population-based studies (Galea & Tracy, 2007).

Interviews were conducted in a research laboratory on a university campus and transportation through a local taxi service was provided to families as needed. Before the

interview, the caregiver was asked to give consent and the adolescent was asked to provide assent. Adolescents completed self-report measures reflecting their own behavior (e.g., intentions to use substances), their parent's behavior (e.g., messages regarding substance use) and the behavior of their peers (e.g., approval of substance use). Caregivers also completed a variety of self-report measures reflecting their own behaviors (e.g., parenting practices) in addition to measures reflecting their perception of their child's behavior (e.g., aggression, shyness). Data for the present study are taken from the first assessment and are based only on adolescent reports. Parents and children were interviewed in separate rooms to enhance privacy and all questionnaires were computer administrated. Items were read aloud to participants and entered directly into a computer by the interviewer. For questions deemed "sensitive" (intentions to use and peer approval/use of substances), adolescents input their responses directly into the computer. Demographic information of the 387 adolescents is presented in Table 1.

Measures

Social goals—Social goals were assessed using a revised version of the Interpersonal Goals Inventory for Children (IGI-C; Ojanen et al., 2005). The IGI-C is adapted from an adult self-report measure, the Circumplex Scales of Interpersonal Values (CSIV; Locke, 2000), and included 33 self-report items representing eight goal scales of the circumplex. Each of the eight scales represents a different combination of agentic (dominance, status, power) and communal (belongingness, friendliness, warmth) social goals: agentic (+A), agentic and communal (+A+C), communal (+C), submissive and communal (−A+C), submissive (−A), submissive and separate (−A−C), agentic and separate (+A−C), and separate (−C). The IGI-C scales have been shown to have a circumplex structure and good stability (zero-order correlations ranged from 0.59–0.74, all statistically significant at $p < .001$) across a 2-week period (Ojanen et al., 2005).

The IGI-C was originally developed for a Finnish sample, so several changes were made to the measure to provide more culturally relevant instructions and items for an American sample. One item was deleted and two items, adapted from the CSIV (Locke, 2000), were added to have a more equal representation of items per scale. The response options were expanded to a 5-point response-scale ranging from 0 (not at all important to me) to 4 (extremely important to me).

Preliminary analyses of the IGI-C revised (IGI-CR) suggested convergent and discriminant validity with measures of interpersonal behaviors and adequate reliability (Trucco, Bowker, & Colder, 2008). Internal consistencies of the scales in our sample were generally satisfactory. On one scale the Cronbach's alpha coefficient was below .70 (agentic, $\alpha = .59$), but otherwise, the alphas ranged from .75 to .87 which are comparable to the original IGI-C.

We also examined whether the correlations among the eight subscales conformed to the expected circumplex structure. Consistent with prior research (e.g., Alden, Wiggins, & Pincus, 1990; Locke, 2000; Ojanen et al., 2005), subscales were *ipsatized* in order to account for variation in subjective response style. That is, subscales are expressed as deviations from their mean score across all of the scales. For the subscales to be consistent with a circumplex structure, the highest negative correlations should be between opposite subscales (e.g., separate [−C] and communal [+C]) while the highest positive correlations should be between adjacent subscales on the circumplex (agentic-communal [+A+C] and communal [+C]). Overall, the intercorrelations among the ipsatized subscales are similar to those presented by Ojanen (2005; see Table 2), and supportive of a circumplex structure.

For subsequent analyses, the eight scales were combined to form agency and communal vector scores (Ojanen et al., 2005; originally provided by Wiggins, Phillips, & Trapnell, 1989):

$Agentic_{vect}$ = agentic – submissive + [.707 × (agentic and communal + agentic and separate – submissive and communal – submissive and separate)].

$Communal_{vect}$ = communal – separate + [.707 × (agentic and communal + submissive and communal – agentic and separate – submissive and separate)].

The circumplex model suggests that the two vector scores should form two orthogonal dimensions (Locke, 2000; Ojanen et al., 2005; Wiggins et al., 1989), and the bivariate correlations for vector scores in our sample were consistent with this expectation ($r = -.08$, *ns*).

Perceived peer approval/use—Participants responded to items adapted from the Monitoring the Future study (Johnston et al., 2005) that reflect both perceived peer approval and use of substances. Using a response-scale ranging from 1 (strongly disapprove) to 5 (strongly approve) participants were asked to evaluate how their three closest friends would feel if they were to do the following: smoke cigarettes either occasionally or regularly, and drink occasionally, drink regularly, or have 5 or more drinks at a time. Using response options ranging from 1 (none) to 6 (all), participants were also asked to estimate how many of their friends engage in these same behaviors. Approval and use items were standardized and then averaged to form two measures of peer approval/use: cigarettes and alcohol scales. Internal consistencies (Cronbach's alpha) were 0.87 for alcohol and 0.69 for cigarettes.

Intentions to use alcohol and cigarettes—Four items were used to assess future intentions to use. Response options ranged from 1 (I definitely will) to 5 (I definitely will not). The participant was asked two questions assessing intentions to smoke (in the next year and 5 years from now) and two questions regarding future intentions to drink alcohol (in the next year and 5 years from now). These items were adapted from the Monitoring the Future study (Johnston, O'Malley, & Bachman, 2003). The items assessing intentions to use in the next year and five years from now were strongly correlated ($r = .56$ for cigarette intentions and $r = .80$ for alcohol intentions), so they were averaged to represent intentions to use alcohol and intentions to smoke. Items were also recoded so that a higher value reflected greater intentions to use.

Data Analytic Plan

The two dependent variables, intentions to use alcohol and cigarettes, were not normally distributed. Therefore, a log transformation was performed on the intentions to use alcohol variable (skewness = 1.01 and kurtosis = −0.39 for transformed variable) and a reciprocal transformation was performed on the intentions to use cigarettes variable (skewness = 2.02 and kurtosis = 2.78 for transformed variable). Chauvenet's criterion (Taylor, 1997) suggested the existence of one outlying observation with respect to substance use intentions, so this participant was removed from subsequent analyses. A small number of adolescents reported having used alcohol (4.15%) or cigarettes (2.33%), and these observations were removed to examine intentions to initiate use. To eliminate non-essential multicollinearity first-order terms were standardized before forming the cross-product interaction terms (Aiken & West, 1991).

Ordinary least squares (OLS) regression was run using the regression procedure in SAS 9.1.3 (SAS Institute Inc., 2004). Intentions to use cigarettes and intentions to use alcohol were analyzed in separate models. Of interest were two two-way interactions (agentic goals

× perceived peer attitudes and communal goals×perceived peer attitudes)1. In cases where interactions contained continuous moderators (e.g., social goals), Cohen and Cohen's (1983) recommended guideline of using values corresponding to one standard deviation above and below the sample mean was used to probe the interactions. We probed marginally significant interaction terms ($p \leq .10$) because statistical interactions are often difficult to detect in the social sciences (McClelland & Judd, 1993) and because we had *a priori* predictions about the nature of the interactions. Squared semi-partial correlations (sr^2) are presented to provide information about effect sizes. In addition, given that some research suggests gender differences in social goals (Locke, 2003; Salmivalli, Ojanen, Haanpaa, & Peets, 2005) and in substance use (e.g., Luthar & D'Avanzo, 1999), gender and gender interactions were considered. None of the first order effects and interactions with gender were statistically significant for either the cigarette or the alcohol models, and accordingly, gender was not considered further.

Results

Table 3 presents the descriptive statistics for the study variables. As expected, adolescents were more likely to endorse intentions to use alcohol compared to intentions to use cigarettes ($F [1, 378] = 15.74$, $p < .001$), and high levels of perceived approval/use were associated with strong intentions to use both alcohol and cigarettes.

Regression Model for Cigarette Intentions

The model accounted for about 9% of the variance in cigarette intentions. Adolescents reporting perceived peer approval/use of cigarettes were more likely to intend to use cigarettes (see Table 4). Though the first-order effect of agentic goals was statistically significant for cigarette intentions, the first-order effect of communal goals was not. The two-way interaction, perceived peer approval/use of cigarettes by agentic goals, was statistically significant. Although the sr^2 for this interaction was small, it is important to note that this represents the unique association after accounting for the first-order effects. The simple slope of perceived peer approval/use of cigarettes was statistically significant at both high ($t [1] = 3.55$, $p < .001$, $sr^2 = 0.031$), and low levels of agency ($t [1] = 3.37$, $p < .001$, $sr^2 = 0.028$), though this association was stronger at high levels of agency (see Figure 1). The communal interaction term was not statistically significant.

Multiple Regression Model for Alcohol Intentions

The model accounted for approximately 10% of the variance in intentions to use alcohol. Social goals and perceived peer approval/use of alcohol were not significant predictors of alcohol intentions as first-order effects (see Table 4). The two-way perceived peer approval/use of alcohol and communal goals interaction term approached statistical significance ($p = .10$). Like the perceived peer approval/use of cigarettes and agentic goals interaction term, the sr^2 for this interaction term was small because it represents the unique association after accounting for first-order effects. No other interaction terms approached statistical significance. The simple slope of perceived peer approval/use of alcohol was statistically significant at high ($t [1] = 2.93$, $p < .01$, $sr^2 = 0.021$), but not at low levels of communal goals ($t [1] = .94$, *ns*, $sr^2 = 0.002$; see Figure 2).

[1]Three-way interactions were also analyzed (peer approval/use × agency × communal; peer approval/use × agency × gender; peer approval/use × communal × gender), and none were marginally or statistically significant.

Discussion

The purpose of this study was to examine the relationship between social goals, perceived peer approval/use of alcohol and cigarettes, and intentions to initiate alcohol and cigarette use in early adolescence. Strong agentic and strong communal goals were both hypothesized to increase vulnerability to peer influence on intentions to use alcohol and cigarettes. Adolescents who value gaining respect from their peers may believe that substance use will make them "look cool" and garner more respect from their peers; accordingly, these adolescents were expected to conform to the peer group's substance use attitudes and intend to use substances in the future. On the other hand, adolescents who value building communion with their peers may believe that endorsing the social group's attitudes will increase connectedness and minimize the possibility of rejection, and thus, these adolescents were also expected to conform to a peer group's substance use attitudes and intend to use substances in the future. Support was found for these hypotheses but there were important differences across intentions to use alcohol and cigarettes.

Interpersonal Goals and Cigarette Smoking

Consistent with study hypotheses, perceived peer cigarette approval/use was associated with strong intentions to smoke for adolescents characterized by high levels of agency compared to adolescents characterized by low levels of agency. Research on smoker prototypes suggests that adolescents associate smokers with an image of rebelliousness, maturity, leadership, and coolness (Dinh, Sarason, Peterson, & Onstad, 1995; Gerrard et al., 2002) and that such prototypical images are related to willingness to smoke even among children as young as nine years old (Wills et al., 2007). This prototype may be particularly salient to agentic adolescents given that they value dominance in their social relationships. That is, agentic adolescents may view smoking as an effective means of projecting an image of being dominant, in control, and appearing cool, and thus, eliciting respect and achieving social status in a peer group that is approving of cigarette use.

Interpersonal Goals and Alcohol Use

We found some support for our hypothesis that communal adolescents would be more susceptible to perceived peer approval/use on intentions to use alcohol. Adolescents who endorse strong communal social goals place a high value on solidarity and social connectedness, and thus may be more susceptible to peer influence compared to those reporting low communal goals. Research on prototypes suggests that adolescents associate drinking alcohol with an image of someone who is social and fits in (Andrews & Peterson, 2006; Norman, Armitage, & Quigley, 2007). Accordingly, communal adolescents may view drinking as a means of connecting with others, thus increasing belongingness to a peer group that approves of alcohol use. Although this moderating effect of communal goals was in the predicted direction, it did not reach conventional criteria for statistical significance; however, the effect sizes were comparable to statistically significant moderational effects found for intentions to smoke.

Drug-Specific Differences across Social Goals

As noted above, agentic goals moderated perceived peer approval/use of cigarettes, and communal goals moderated perceived peer approval/use of alcohol. Thus, our findings support differences in how social goals may operate with respect to the early stages of cigarette and alcohol use. Cigarette smoking in early adolescence may be considered less normative and more taboo than alcohol (Unger & Rohrbach, 2002), and this is consistent with our findings suggesting stronger intentions to drink alcohol than to smoke cigarettes and with the prototypical images adolescents have of smokers (rebellious, mature, cool) and drinkers (social, fits in). Projecting an image of rebelliousness and maturity by smoking may

be viewed as a viable means of achieving high agentic social goals. In contrast, alcohol, being more acceptable among the broader peer culture, may be viewed as less likely to achieve the desired social goals of agentic adolescents. On the other hand, communal adolescents place a high value on solidarity and belongingness, and consequently, may view cigarette use as being too divergent with the broader peer culture and unlikely to aid them in achieving their communal social goals. Alcohol use may be more desirable for communal adolescents who are motivated to fit in and belong.

Future Directions and Limitations

We examined perceived peer approval/use of substances and social goals in an early adolescent sample, and it will be important for future research to examine these variables across time and spanning different periods of adolescence. Longitudinal research will aid in understanding the nature and direction of the effects of peer attitudes and social goals; it may reveal changes in social goals across time, and whether social goals are more pertinent at some ages than others. Furthermore, longitudinal research will help distinguish processes related to initiation of alcohol and cigarette use compared to predictors of transitions across stages of heavier use. We focused on negative peer influences as this has been most widely studied and discussed in the adolescent substance use literature. However, peers also have positive influences on behavior (Barry & Wentzel, 2006), and it may be fruitful to examine how social goals moderate positive peer influence on intentions to abstain from substance use. Examining potential three-way interactions involving agentic and communal goals and gender is also of interest. We could not test such effects because of limited power; however, girls characterized by high communal goals may be particularly susceptible to perceived peer approval/use of alcohol. In contrast, boys high on agency may be particularly susceptible to perceived peer approval/use of cigarettes. Finally, we focused on a moderational model, but given the likely complexity of the relationship between social goals and peer influence, other models (i.e., mediational models) are also plausible.

A potential limitation of this study is that peer influence may operate differently across racial/ethnic groups (Griesler & Kandel, 1998; Siddiqui, Mott, Anderson, & Flay, 1999), and although our sample was representative of the county from which it was drawn, we did not have adequate group sizes to test for such differences. Our sample is limited to early adolescence, a time when peer influence may be particularly strong (Brown et al., 1997); therefore, our findings may not generalize to older adolescents. Finally, we focused on perceived peer attitudes and not peer reports of attitudes which has the potential of overestimating the influence of peers (Kandel, 1996; Prinstein & Wang, 2005). Still, research suggests that the perception of peers' approval and substance use may be especially influential during early adolescence when actual substance use or offers are rare (Bauman & Ennett, 1996) and may be critical for understanding initiation of substance use in early adolescence. It will be important to see if these relationships still exist when including peer reports of attitudes and use. Finally, our data are cross-sectional, thus limiting strong conclusions regarding the direction of effects.

Despite these limitations, the current study extends the literature on peer influence and adolescent substance use in several important ways. First, although there is a large literature examining the influence of peers on adolescent cigarette and alcohol use, peer influence is likely to vary across individuals, and few studies have examined this issue other than considering gender. Second, our findings suggest that social goals impact vulnerability to peer influences on substance use, and this has important implications for theory refinement and prevention. Current socialization theories of adolescent substance use should incorporate moderators, and one such moderating variable is social goals. Finally, our findings suggest that socialization processes may be different in the early stages of alcohol and cigarette use. If this pattern is replicated, then etiological models and prevention efforts

that focus on peer socialization may need to have some drug specific components. Overall, our findings provide support for continued research on interpersonal processes, especially social goals, and their relationship to substance use initiation.

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References

Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Newbury Park: Sage; 1991.

Alden LE, Wiggins JS, Pincus AL. Construction of Circumplex Scales for the Inventory of Interpersonal Problems. Journal of Personality Assessment. 1990; 55:521–536. [PubMed: 2280321]

Andrews JA, Hampson SE, Barckley M, Gerrard M, Gibbons FX. The effect of early cognitions on cigarette and alcohol use during adolescence. Psychology of Addictive Behaviors. 2008; 22:96–106. [PubMed: 18298235]

Andrews JA, Peterson M. The development of social images of substance users in children: A Guttman unidimensional scaling approach. Journal of Substance Use. 2006; 11(5):305–321. [PubMed: 18604283]

Arsenio WF, Lemerise EA. Aggression and moral development: Integrating social information-processing and moral domain models. Child Development. 2004; 74(4):987–1002. [PubMed: 15260859]

Barry CM, Wentzel KR. Friend influence on prosocial behavior: The role of motivational factors and friendship characteristics. Developmental Psychology. 2006; 42(1):153–163. [PubMed: 16420125]

Bauman KE, Ennett ST. On the importance of peer influence for adolescent drug use: Commonly neglected considerations. Addiction. 1996; 91(2):185–198. [PubMed: 8835276]

Bauman A, Phongsavan P. Epidemiology of substance use in adolescence: Prevalence, trends and policy implications. Drug and Alcohol Dependence. 1999; 55:187–207. [PubMed: 10428361]

Baumrind, D.; Moselle, KA. A developmental perspective on adolescent drug abuse. In: Brook, DW.; Lettieri, DJ., editors. Alcohol and substance abuse in adolescence. Binghamton: Haworth Press; 1985. p. 41-68.

Brown, BB.; Bakken, JP.; Ameringer, SW.; Mahon, SD. Comprehensive conceptualization of the peer influence process in adolescence. In: Prinstein, MJ.; Dodge, KA., editors. Understanding peer influence in children and adolescents. New York: The Guilford Press; 2008. p. 17-44.

Brown, BB.; Dolcini, MM.; Leventhal, A. Transformations in peer relationships at adolscence: Implications for health-related behavior. In: Maggs, JL.; Schulenberg, J.; Hurrelmann, K., editors. Health risks and developmental transitions during adolescence. New York: Cambridge University Press; 1997. p. 161-189.

Chassin L, Presson CC, Sherman SJ, Edwards DA. Four pathways to young-adult smoking status: Adolescent social-psychological antecedents in a midwestern community sample. Health Psychology. 1991; 10(6):409–418. [PubMed: 1765036]

Cillessen, AHN.; Mayeux, L. Sociometric status and peer group behavior: Previous findings and current directions. In: Kupersmidt, JB.; Dodge, KA., editors. Children's peer relations: From development to intervention. Washington, D.C.: American Psychological Association; 2004. p. 3-20.

Cohen, J.; Cohen, P. Applied multiple regression/correlation analysis for the behavioral sciences. 2nd ed. Hillsdale: Erlbaum; 1983.

Collins, WA.; Steinberg, L. Adolescent development in interpersonal context. In: Eisenberg, N., editor. Handbook of child psychology (6th edition): Social, emotional, and personality development. New York: Wiley; 2006. p. 619-700.

Crick NR, Dodge KA. A review and reformulation of social information-processing mechanisms in children's social adjustment. Psychological Bulletin. 1994; 115:74–101.

Denscombe M. Peer group pressure, young people and smoking: New developments and policy implications. Drugs: Education, Prevention and Policy. 2001; 8:7–32.

Dinh KT, Sarason IG, Peterson AV, Onstad LE. Children's perceptions of smokers and nonsmokers: A longitudinal study. Health Psychology. 1995; 14(1):32–40. [PubMed: 7737070]

Galea S, Tracy M. Participation rates in epidemiological studies. Annals of Epidemiology. 2007; 17(9):643–653. [PubMed: 17553702]

Gerrard M, Gibbons FX, Reis-Bergan M, Trudeau L, Vande Lune LS, Buunk B. Inhibitory effects of drinker and nondrinker prototypes on adolescent alcohol consumption. Health Psychology. 2002; 21(6):601–609. [PubMed: 12433013]

Griesler PC, Kandel DB. Ethnic differences in correlates of adolescent cigarette smoking. Journal of Adolescent Health. 1998; 23:167–180. [PubMed: 9730360]

Johnston, LD.; O'Malley, PM.; Bachman, JG. Monitoring the Future national survey results on drug use, 1975–2002. Volume I: Secondary school students (NIH Publication No. 03-5375). Bethesda: National Institute on Drug Abuse; 2003.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Monitoring the Future national survey results on drug use, 1975–2004. Volume I: Secondary school students (NIH Publication No. 05-5727). Bethesda: National Institute on Drug Abuse; 2005.

Kandel D. Stages in adolescent involvement in drug use. Science. 1975; 190(4217):912–914. [PubMed: 1188374]

Kandel D. The parental and peer contexts of adolescent deviance: An algebra of interpersonal influences. Journal of Drug Issues. 1996; 26(2):289–315.

Kandel, D.; Yamaguchi, K. Stages of drug use in the U.S. population. In: Kandel, D., editor. Stages and pathways of drug involvement: Examining the gateway hypothesis. New York: Cambridge University Press; 2002. p. 65-89.

Kiesner J, Cadinu M, Poulin F, Bucci M. Group identification in early adolescence: Its relation with peer adjustment and its moderator effect on peer influence. Child Development. 2002; 73:196–208. [PubMed: 14717252]

Kobus K. Peers and adolescent smoking. Addiction. 2003; 98S:37–55. [PubMed: 12752361]

Leventhal H, Cleary PD. The smoking problem: A review of the research and theory in behavioral risk modification. Psychological Bulletin. 1980; 88(2):370–405. [PubMed: 7422752]

Locke KD. Circumplex scales of interpersonal values: Reliability, validity, and applicability to interpersonal problems and personality disorders. Journal of Personality Assessment. 2000; 75(2): 249–267. [PubMed: 11020143]

Locke KD. Status and solidarity in social comparison: Agentic and communal values and vertical and horizontal directions. Journal of Personality and Social Psychology. 2003; 84(3):619–631. [PubMed: 12635921]

Luthar SS, D'Avanzo K. Contextual factors in substance use: A study of suburban and inner-city adolescents. Development and Psychopathology. 1999; 11(4):845–867. [PubMed: 10624729]

Markey PM, Markey CN, Tinsley B. Applying the interpersonal circumplex to children's behavior: Parent-child interactions and behaviors. Personality and Social Psychology Bulletin. 2005; 31:549–559. [PubMed: 15743988]

Mayeux L, Sandstrom MJ, Cillessen AHN. Is being popular a risky proposition? Journal of Research on Adolescence. 2008; 18(1) 49.74.

McClelland GH, Judd CM. Statistical difficulties of detecting interactions and moderator effects. Psychological Bulletin. 1993; 114(2):376–390. [PubMed: 8416037]

Nelson D, Crick N. Rose-colored glasses. Journal of Early Adolescence. 1999; 19:17–38.

Norman P, Armitage CJ, Quigley C. The theory of planned behavior and binge drinking: Assessing the impact of binge drinker prototypes. Addictive Behaviors. 2007; 32:1753–1768. [PubMed: 17270356]

Ojanen T, Gronroos M, Salmivalli C. An interpersonal circumplex model of children's social goals: Links with peer-reported behavior and sociometric status. Developmental Psychology. 2005; 41(5):699–710. [PubMed: 16173868]

Prinstein MJ, Wang SS. False consensus and adolescent peer contagion: Examining discrepancies between perceptions and actual reported levels of friends' deviant and health risk behaviors. Journal of Abnormal Child Psychology. 2005; 33:293–306. [PubMed: 15957558]

Rubin, KH.; Bukowski, WM.; Parker, JG. Peer interactions, relationships, and groups. In: Eisenberg, N., editor. Handbook of child psychology (6th edition): Social, emotional, and personality development. New York: Wiley; 2006. p. 619-700.

Rubin, K.; Krasnor, L. Social-cognitive and social behavioral perspectives on problem solving. In: Perlmutter, M., editor. The Minnesota Symposium on Child Psychology. Vol. Vol. 18. Hillsdale: Erlbaum; 1986. p. 1-68.

Salmivalli C, Ojanen T, Haanpaa J, Peets K. "I'm OK but you're not" and other peer-relational schemas: Explaining individual differences in children's social goals. Developmental Psychology. 2005; 41(2):363–375. [PubMed: 15769192]

Salmivalli C, Peets K. Pre-adolescents' peer relational schemas and social goals across relational contexts. 2009; 18:817–832.

SAS Institute Inc. SAS (Version 9.1.3). [Computer software]. Cary: SAS Institute Inc; 2004.

Siddiqui O, Mott J, Anderson T, Flay B. The application of Poisson random-effects regression models to the analyses of adolescents' current level of smoking. Preventive Medicine. 1999; 29:92–101. [PubMed: 10446034]

Taylor, JR. An introduction to error analysis. 2nd ed. Sausalito: University Science Books; 1997.

Trucco, EM.; Bowker, JC.; Colder, CR. Psychometric properties of the Revised Interpersonal Goals Inventory for Children; Poster presented at the American Psychological Association; Boston, MA. 2008 August.

Unger JB, Rohrback LA. Why do adolescents overestimate their peers' smoking prevalence? Correlates of prevalence estimates among california 8th-grade students. Journal of Youth and Adolescence. 2002; 31:147–153.

Wentzel K. Relations of social goal pursuit to social acceptance, classroom behavior, and perceived social support. Journal of Educational Psychology. 1994; 86:173–182.

Wiggins JS, Phillips N, Trapnell P. Circular reasoning about interpersonal behavior: Evidence concerning some untested assumptions underlying diagnostic classification. Journal of Personality and Social Psychology. 1989; 56(2):296–305.

Wills TA, Ainette MG, Mendoz D, Walker C, Gibbons FX, Gerrard M, et al. Self-control, symptomatology, and substance use precursors: Test of a theoretical model in a community sample of 9-year old children. Psychology of Addictive Behaviors. 2007; 21:205–215. [PubMed: 17563140]

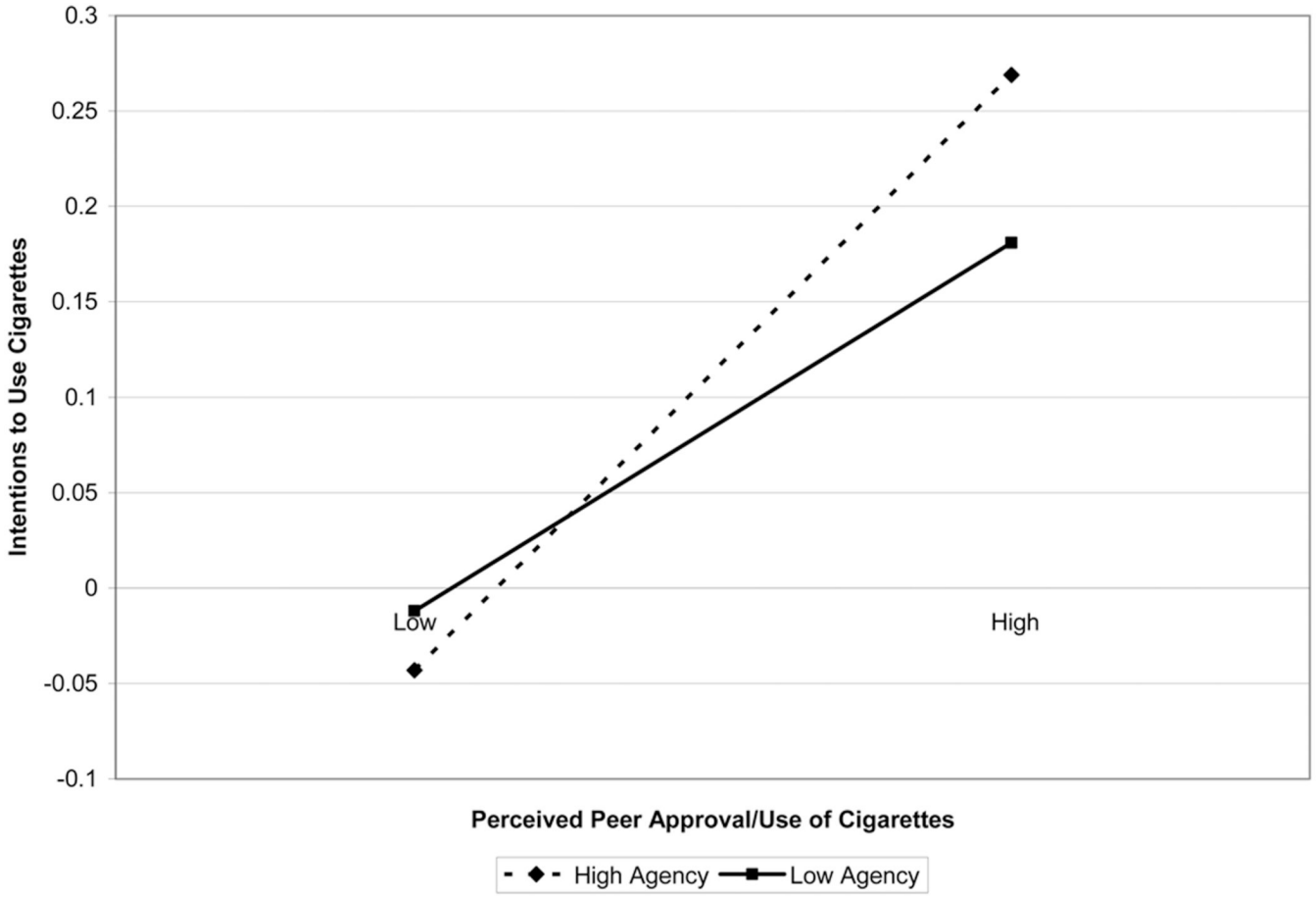

Figure 1.
Perceived Peer Approval and Use on Intentions to Use Cigarettes by Agentic Goals

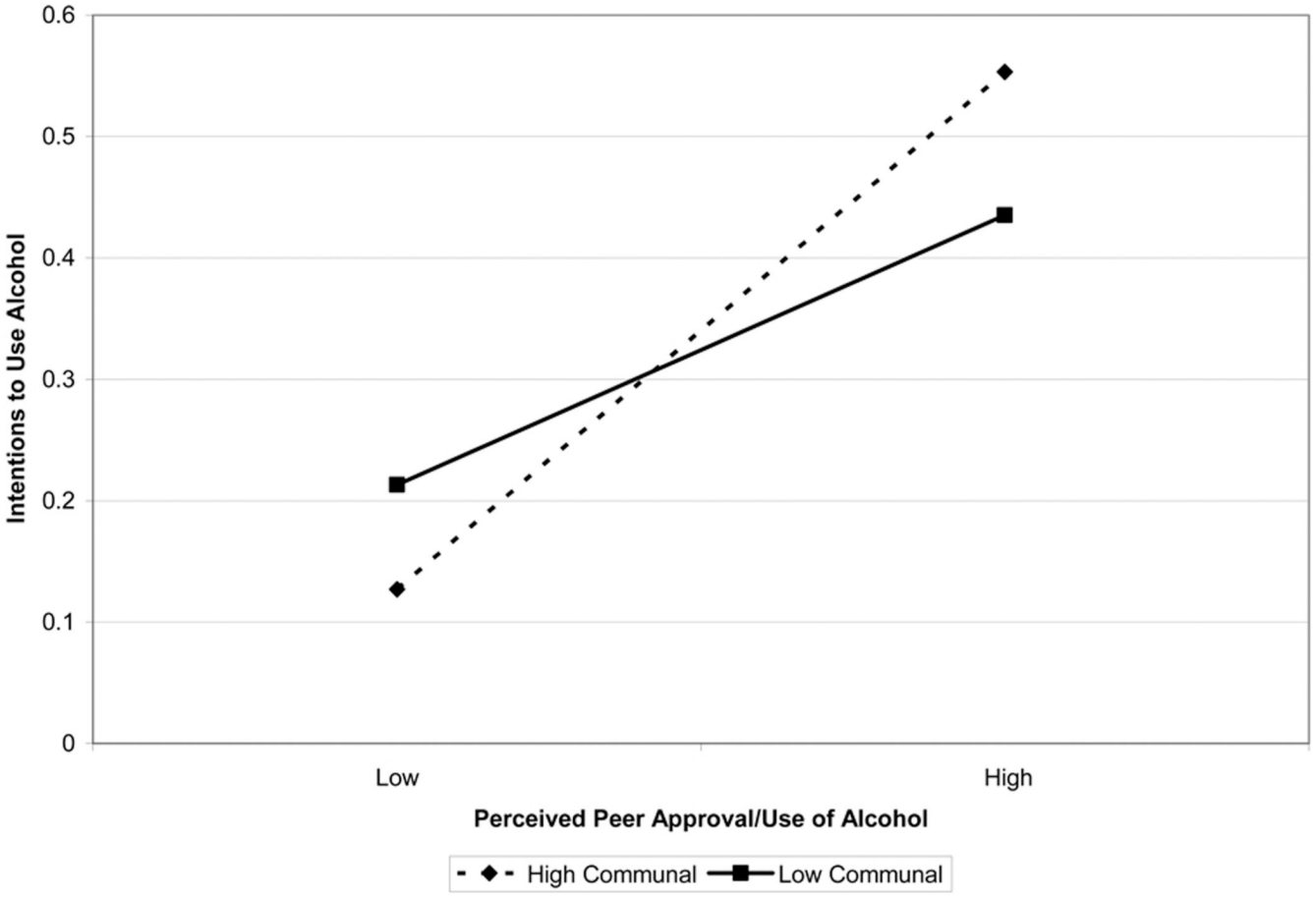

Figure 2.
Perceived Peer Approval and Use on Intentions to Use Alcohol by Communal Goals

Table 1

Descriptive Statistics for Selected Sample Characteristics

Adolescents	
Gender	
% Female	55.0
Age	
Mean (SD)	11.60 (.55)
Range	11–13
Race	
% Caucasian	83.1
% African American	9.1
% Other Race	7.8
Caregivers	
Education	
% Some High School	2.9
% High School Graduate	14.2
% Technical School	2.9
% Some College	21.8
% College Graduate	38.2
% Graduate or Professional School	20.0
Family Characteristics	
Mean Annual Family Income	$81,325 (*SD* = $58,430.42)
Median Annual Family Income	$70,000.00
Family Composition	
% Two-Parent	76.0
% Divorced/Separated	12.1
% Single-Parent/Never Married	9.8
% Other	2.1

Table 2

Intercorrelations Among the Ipsatized Interpersonal Goal Scales

	1	2	3	4	5	6	7	8
1. (+A)	--	−.11 .16	−.27*** .02	−.31*** −.17	**−.31***** **−.37*****	.17** −.28**	−.12* −.09	.17** −.02
2. (+A+C)	−.04 .16	--	.26*** .47***	.01 .15	.08 −.06	**−.40***** **−.42*****	−.41*** −.49***	−.21*** −.33**
3. (+C)	−.17** .02	.23*** .47***	--	.37*** .44***	.34*** .30**	−.35*** −.41***	**−.51***** **−.62*****	−.48*** −.53***
4. (−A+C)	−.33*** −.17	.06 .15	.35*** .44***	--	.17* .32**	−.31*** −.33**	−.24*** −.40***	**−.26***** **−.37*****
5. (−A)	**−.31***** **−.37*****	−.24*** −.06	.10 .30**	.10 .32**	--	−.10 .26*	−.40*** −.57***	−.50*** −.53***
6. (−A−C)	−.26*** −.28**	**−.45***** **−.42*****	−.45*** −.41***	−.30*** −.33**	.07 .26*	--	.24*** −.02	−.17** .11
7. (−C)	−.20** −.09	−.38*** −.49***	**−.51***** **−.62*****	−.30*** −.40***	−.14* −.57***	.31*** −.02	--	.17 .47***
8. (+A−C)	.21** −.02	−.03 −.33**	−.32*** −.53***	**−.21**** **−.37*****	−.50*** −.53***	−.21** −.17	−.01 .47***	--

Notes. Correlations from Ojanen's (2005) primary sample (n = 276) are reported on the top line below the diagonal and correlations for the cross-validation sample (n = 310) are reported above the diagonal for comparison. Bolded correlations represent opposite subscales.

* p <.05.

** p <.01.

*** p <.001.

Table 3

Descriptive Statistics for All Study Variables

	Mean	*SD*	*Correlations*					
			1	**2**	**3**	**4**	**5**	**6**
1. Intentions to Use Cigarettes	1.17[a]	0.46[a]	1.00					
2. Intentions to Use Alcohol	1.59[a]	0.93[a]	0.39***	1.00				
3. Agency	−1.55	1.35	0.15**	0.10*	1.00			
4. Communal	2.63	1.59	−0.06	−0.01	−0.08	1.00		
5. Peer Approval/Use (Cigarettes)	0.00	0.70	0.37***	0.24***	0.18***	−0.05	1.00	
6. Peer Approval/Use (Alcohol)	0.00	0.73	0.37***	0.44***	0.17***	−0.06	0.74***	1.00

Notes:

* $p < .05$,

** $p < .01$,

*** $p < .001$,

[a] based on untransformed variables

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Table 4

Regression Model for Intentions to Use Cigarettes and Alcohol

Model Predicting Intentions to Smoke Cigarettes				
	Coefficient	***SE***	***t* value**	***sr*^{2}**
Intercept	0.099***	0.018	5.41	
Agentic Goals	0.014*	0.006	2.23	0.012
Communal Goals	−0.004	0.005	−0.77	0.001
Peer Approval/Use of Cigarettes	0.126***	0.035	3.65	0.033
Agentic goals × Peer Approval/Use of Cigarettes	0.030*	0.013	2.23	0.012
Communal goals × Peer Approval/Use of Cigarettes	−0.012	0.010	−1.21	0.004
Model Predicting Intentions to Drink Alcohol				
	Coefficient	*SE*	*t* value	*sr*^{2}
Intercept	0.332***	0.049	6.72	
Agentic Goals	0.016	0.017	0.95	0.002
Communal Goals	0.008	0.014	0.54	0.001
Peer Approval/Use of Alcohol	0.162	0.093	1.74	0.007
Agentic Goals × Peer Approval/Use of Alcohol	0.019	0.032	0.58	0.001
Communal Goals × Peer Approval/Use of Alcohol †	0.051	0.031	1.61	0.006

Notes:

* p <.05,

** p <.01,

*** p <.001,

† p = .10,

sr^2= squared semi-partial correlation.