Do Peers' Parents Matter? A New Link Between Positive Parenting and Adolescent Substance Use

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ABSTRACT. Objective: Although studies have demonstrated that an adolescent's parents and friends both influence adolescent substance use, it is not known whether the parenting experienced by one's friends also affects one's own use. Drawing on conceptions of shared parenting and the tenets of coercion theory, we investigated the extent to which three domains of parenting behaviors (parental knowledge, inductive reasoning, and consistent discipline) influenced the alcohol, cigarette, and marijuana use of not only their own adolescent children but also of members of their adolescents' friendship groups. **Method:** Analyses of friendship nominations within each of two successive ninth-grade cohorts in 27 Iowa and Pennsylvania schools ($N = 7,439$ students, 53.6% female) were used to identify 897 friendship groups. Hierarchical logistic regression models were used to examine prospective associations between 9th-grade friendship group–level parenting behaviors and adolescent self-reported alcohol, cigarette, and marijuana use in 10th grade. **Results:** Adolescent substance use in 10th grade was significantly related to parenting behaviors of friends' parents, after controlling for adolescents' reports of their own substance use and their own parents' behaviors at the 9th grade level. These associations were particularly strong for parents' knowledge about their children and use of inconsistent discipline strategies. Significant interaction effects indicated that these relationships were strongest when adolescents received positive parenting at home. Some, but not all, of the main effects of friends' parents' parenting became nonsignificant after friends' substance use in ninth grade was included in the model. **Conclusions:** The findings suggest that the parenting style in adolescents' friends' homes plays an important role in determining adolescent substance use. Implications of the joint contribution of parents and peers for prevention and intervention are discussed. (*J. Stud. Alcohol Drugs, 73,* 423–433, 2012)

PARENTS AND PEERS ARE KEY FIGURES in the daily lives of adolescents, and, accordingly, both figure prominently throughout theory and research on adolescence, especially as influences on adolescent substance use (Giordano, 2003). In the present study, we investigated a potential form of joint influence from parents and friends that has not received attention. Specifically, we asked whether adolescents' friendship groups connect them to a broader web of parental influence. Recent studies have found that a range of individual characteristics and behaviors influence others via social networks; these characteristics and behaviors include alcohol and cigarette use, obesity, and infectious disease (Ali and Dwyer, 2010; Christakis and Fowler, 2007; Klovdahl et al., 1994; Pollard et al., 2010). Here we investigated whether parenting quality also is transmitted through friendship networks. Specifically, we assessed whether adolescents' substance use is associated not only with the parenting they receive in their own families but also with the parenting received by others in their groups of friends.

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Parental influence

The idea that other parents play an important role in socializing youth is widespread, as reflected in the popular saying that "it takes a village to raise a child" and in Coleman's (1990) influential conception of intergenerational closure. *Intergenerational closure* refers to the extent to which parents know the parents of their children's friends, bringing parents into regular contact with adults who have information about the child's actions and whereabouts and can act in the parents' stead (e.g., "Tell Johnny to be home by 9:00"). Consistent with the "village" focus, studies in this area often concern aggregate units, such as neighborhoods (Sampson et al., 1999) or schools (Carbonaro, 1998). However, there is a gap between research on this broader scale and the large body of individual-level research: There is a limited understanding of the proximal social context that influences youth. Accordingly, we shift attention in this study to the more immediate social context of the adolescent by studying friendship clusters. Rather than focusing on the role parental interconnections play in enhancing parents' effectiveness with their own children, we examine adolescent friendship

groups as venues that extend the influence of parenting to their offspring's friends.

This influence may take place in many ways. Perhaps most obviously, parents can influence their children's friendship group through their own child's behavior. That is, "good" parents are more likely to raise children who will be a positive influence on other children (Steinberg, 2001). This statement implies that the parental influence on the group is indirect, such that parents' behaviors change the behavior of their own child who, in turn, influences the behavior of the rest of the group. Parents also might influence their children's friendship group more directly, over and above their influence on their own children. We offer below two examples of processes by which this influence might occur.

First, parents may have an independent effect on their children's friendship group by altering the adolescents' interactions with one another. When, where, and how adolescents interact with their peers is dependent on all of their parents. Moreover, these dimensions of time spent with peers appear to be especially pertinent to problem behaviors such as substance use. Not only does a large share of such behavior occur in the company of friends (Erickson and Jensen, 1977), but there also is evidence that unstructured and unsupervised socializing contributes to problem behavior through exposure to opportunities for risky behavior (Osgood et al., 1996).

A second means by which an adolescent may be directly influenced by a friend's parents is through interacting with those parents or observing the friend and parent interact. Parents who are affectionate to their own child are likely to be warm and caring toward the rest of the group of friends. Such positive interactions, especially if repeated frequently and/or with the parents of several friends, may bolster a youth's social bonds, which, in some theories of antisocial behavior, guide behavior toward conventional, prosocial norms (Catalano et al., 1996).

Coercion theory

The processes outlined above are consistent with coercion theory (Dishion and Patterson, 1997), which offers a framework to study how parents could influence their children's friends. Coercion theory specifies that adolescent problem behaviors result from a bidirectional process between the parent and the child that escalates over time. This process can be described as a negative feedback loop that occurs when a parent reinforces a child's aversive behaviors (e.g., crying or whining in young children, defiance or lying in adolescents). During this process, the child responds to the parent's discipline attempts by escalating the aversive behavior, which prompts the parent to escalate in turn. The coercion process culminates in the parent desisting from attempts to discipline the child and eventually ignoring aversive behaviors (Crosswhite and Kerpelman, 2009).

Although it is likely that a level of coercion exists within all families, the theory suggests that a high level of coercion in family interactions is associated with a breakdown of effective parenting management skills. To avoid this breakdown, parents may use several parenting practices. Among these are (a) maintaining adequate knowledge and monitoring of the child's whereabouts, (b) using effective discipline techniques (i.e., consistent and appropriate rather than inconsistent and harsh), (c) providing explanations and reasons for discipline decisions (i.e., use of inductive reasoning), and (d) reinforcing prosocial behaviors (Patterson et al., 1984).

Empirical evidence supports the importance of each of these parenting practices. The association between parental monitoring activities and adolescent behavior is well established (Crouter and Head, 2002). Although *monitoring* is defined as attention to and tracking of children's activities and whereabouts, many studies actually have relied on measures better viewed as reflecting the distinct concept of parental knowledge of child activities (Kerr and Stattin, 2000; Stattin and Kerr, 2000). This distinction is crucial because parental knowledge may come about largely through what adolescents voluntarily disclose to their parents—as a result of a warm and open relationship—rather than parents' active monitoring and solicitation of information. In fact, parents who have low levels of knowledge of youth activities because of low levels of child disclosure may compensate by using more active monitoring strategies. Thus, parental knowledge may be a stronger predictor of adolescent problem behaviors relative to measures of active parenting strategies (Kerr et al., 2010).

Empirical research also demonstrates that parental disciplinary style contributes to adolescent behavior. For example, harsh and inconsistent parenting is associated with a variety of negative outcomes, including serious delinquency, violence, and substance use (Bender et al., 2007; Gershoff, 2002). Likewise, inductive parenting strategies are associated with positive outcomes for children and youth (Carlo et al., 2011). There also is evidence that parents' use of positive reinforcement is negatively related to child and adolescent problem behaviors (Barrera et al., 2001).

However, positive parenting behaviors may not confer the same level of protection across different types of social contexts. Several studies support a protective–reactive interaction (Luthar et al., 2000) by which the beneficial influence of parenting behaviors is less effective at preventing adolescents' problem behaviors in high-risk environments (Cleveland et al., 2010; Knoester and Haynie, 2005; Simons et al., 2005). These findings suggest that processes outside the family context may overwhelm the protection offered by positive parenting behaviors. Peer influence is likely one such factor. However, no studies have examined how parenting behaviors at the proximal friendship-group

level moderate the influence of parenting behaviors within the adolescent's own family.

Current study

The current study represents a novel use of a social-network approach by focusing on how adolescents' friendship groups expose them to influence from the behaviors of other group members' parents. Social-network analysis with peers relies on sociometric data obtained by asking adolescents to identify their friends, who independently are asked to do the same. Friendship nominations are then used to identify friendship clusters or groups. Research using social-network analysis has almost exclusively conceptualized peer influence as the result of the behaviors or attitudes of the friends. We shift the focus here to the parenting behaviors received by members of the peer group. Thus, the present study investigated a hitherto unanswered question: whether adolescents' substance use is associated not only with the parenting they receive in their own families but also with the parenting received by other members of their friendship group.

Guided by coercion theory, we hypothesized that parenting behaviors experienced by the rest of the friendship group would influence adolescents' own substance use. Three domains of parenting were assessed: knowledge and monitoring of children's whereabouts, use of inductive reasoning, and use of inconsistent discipline strategies. Measures of positive reinforcement, the fourth domain of parenting skills emphasized in coercion theory, were not available in the data source (described below). We used a social-network approach to obtain data about friendship ties, and all youth reported on their own parents' behaviors. We then examined whether adolescents' reports of their own parents' behaviors and aggregate levels of friend-reported parenting behaviors would independently or interactively predict substance use.

Method

The data used in this study come from the PROmoting School-community-university Partnerships to Enhance Resilience (PROSPER) study. PROSPER is a community-randomized trial of a dissemination system for evidence-based substance use prevention programs (for more information, see Spoth et al., 2007). PROSPER follows two successive cohorts of sixth-grade students living in 28 rural communities in Iowa and Pennsylvania. Each community had a single public school district with 1,300–5,200 enrolled students. The average population in these communities was 19,000 residents, and the median household income was U.S. $37,000. The officials of one district did not agree to participate in the network portion of the study, resulting in a final sample of 27 districts. Because each district had a single high school and contributed two cohorts, we had 54 unique school social networks for analyses. The current study focused on the fifth and sixth waves of PROSPER data collection with students, when the students were in the spring of 9th and 10th grades (M_{age} = 15.3 years and 16.3 years, respectively).

Students completed pencil-and-paper questionnaires administered in school by trained university-based data collectors. Confidentiality of responses was assured, and students were informed that the information they provided would not be seen by parents or school administrators. The survey included questions that measure multiple dimensions of parenting behaviors (adapted from the Iowa Youth and Families Project; see Conger, 1989; McMahon and Metzler, 1998; Spoth et al., 1998) as well as alcohol, cigarette, and marijuana use. In addition, students nominated up to two best friends and up to five other close friends in the same grade who attended the same school. We focused our analyses on the prospective associations between 9th-grade parenting behaviors and 10th-grade substance use.

Measures

Adolescent perceptions of parental knowledge were assessed with five items, such as "During the day, my parents know where I am," and "My parents know who I am with when I am away from home." All items for this and the other parenting-related scales used response categories ranging from 1 (*almost always false*) to 5 (*almost always true*). The Cronbach's α reliability for the scale was .82. In prior research, this scale was labeled "child monitoring" (Redmond et al., 1999; Spoth et al., 1998). However, given the field's recognition of the separate aspects of parental knowledge and parental monitoring, we have revised the name to more accurately reflect the item content.

Three items were used to create the inductive-reasoning scale. For example, "My parents give me reasons for their decisions," and "My parents ask me what I think before making a decision that affects me." The Cronbach's α for the scale was .84.

Six items measured adolescents' perceptions of inconsistent discipline. Example items included, "When my parents ask me to do something and I don't do it right away, they give up," and "When I do something wrong, my parents lose their temper and yell at me." The α reliability of the scale was .76.

Adolescents' substance use was measured with four items: "During the past month, how many times have you (1) had beer, wine, wine coolers, or other liquor; (2) been drunk from drinking wine, wine coolers, or other liquor; (3) smoked any cigarettes; (4) smoked marijuana (pot, reefer, weed, blunts)." The response scale for these items ranged from 1 (*not at all*) to 5 (*more than once a week*). Each of the

four substance use measures was dichotomized to indicate any use (1) versus no use (0) at 10th grade.

Definition of friendship groups

Because our focus was on friendship groups, our first task was to identify those groups. We did so based on the ninth-grade friendship nominations, using a variant of Moody's CROWDS algorithm (Kreager et al., 2011; Moody, 2001). This structural-network approach defines mutually exclusive groups that maximize friendship ties within groups relative to ties between groups, and it results in discrete boundaries between groups. Alternative methods produced very similar groupings (Newman and Girvan, 2004), and our preferred method, which follows suggestions for best practice in community search tools (Porter et al., 2009), produces groups of a size consistent with regular face-to-face interaction and does not assign poorly fitting cases to groups (see below).

We excluded three groups that had more than 40 members (*n*s = 45, 53, and 66) because the meaning of "group" likely differs with so many members. We also excluded students identified as isolates (n = 426 students who were disconnected from all groups) and liaisons (n = 352 students whose friendships did not place them in any single group). This resulted in a sample of 9,417 ninth-grade students (53.1% female) nested within 897 friendship groups having a mean of 10.5 members. Of these students, 7,439 (79%, 53.6% female) were present at 10th grade and comprised our analysis sample. Comparison of means indicated that the students who remained in the sample reported lower levels of use for all three substances and more positive parenting behaviors (i.e., more parental knowledge and inductive reasoning, less inconsistent discipline).

Analytical strategy

The PROSPER data are hierarchical, with students nested within friendship groups, which are, in turn, nested within school/cohort combinations. Such nesting typically results in dependence among residuals for individuals within the same aggregate unit, violating the assumptions underlying standard regression approaches and resulting in incorrect standard errors (Raudenbush and Bryk, 2002). We accounted for this nesting structure by estimating hierarchical logistic regression models predicting each of the four substance use outcomes using the MLwiN software (Rasbash et al., 2009). Individual students constituted Level 1 (N = 7,439), peer groups Level 2 (n = 897), and school/cohorts Level 3 (n = 54). Note that our analytic approach does not address dependence from friendships that are between friends in different groups. We chose our approach because the vast majority of friendships are within group and because this dependence rather than pair-wise dependence is most consequential for the group-level parenting variables that are our primary focus. Because maximum likelihood estimation is computationally intensive for discrete-response multilevel models, all models were estimated using quasi-likelihood methods.

The explanatory variables of greatest interest were the parenting received by friends, as captured by friendship-group means for each of the three parenting behaviors. In assessing the relationship of such an aggregated variable to an individual-level outcome, it is essential to control for the individual-level version (i.e., the youth's own report of parenting) of the aggregated variable. Doing so isolates a "context effect" in the sense of a relationship that holds above and beyond any individual-level relationship (Raudenbush and Bryk, 2002). At both individual and group levels, the parenting behavior measures were grand-mean centered so that the "main effect" terms are estimates of the overall relationship of that variable with the outcome, averaged across levels of other variables with which they interact in the regression model.

Several covariates were included to reduce spuriousness. At Level 1, these included the students' gender and their own ninth-grade measure of the substance use outcome. We also included an indicator of treatment assignment for the PROSPER intervention as a Level 3 covariate. These coefficients should not be viewed as estimates of treatment effects, however, because the model includes a control for ninth-grade substance use—and ninth grade falls in the posttreatment period. Preliminary models included interaction terms of the parenting measures, at both levels, with gender and treatment assignment. None of the interaction terms were statistically significant. Thus, the final three-level logistic models can be expressed as:

Individual-level:

$$\text{logit (Grade 10 use)}_{ijk} = \eth_{0jk} + \eth_{1}(\text{gender})_{ijk} + \eth_{2jk}\,(\text{Grade 9 own use})_{ijk} + \eth_{3jk}\,(\text{Grade 9 knowledge})_{ijk} + \eth_{4jk}\,(\text{Grade 9 reasoning})_{ijk} + \eth_{5jk}\,(\text{Grade 9 discipline})_{ijk} + e_{ijk}$$

Group-level:

$$\eth_{0jk} = \hat{a}_{00k} + \hat{a}_{01k}\,(\text{Grade 9 knowledge})_{jk} + \hat{a}_{02k}\,(\text{Grade 9 reasoning})_{jk} + \hat{a}_{03k}\,(\text{Grade 9 discipline})_{jk} + r_{0jk}$$

$$\eth_{1jk} = \hat{a}_{10k}$$

$$\eth_{2jk} = \hat{a}_{20k}$$

$$\eth_{3jk} = \hat{a}_{30k} + \hat{a}_{31k}\,(\text{Grade 9 knowledge})_{jk} + r_{3jk}$$

$$\eth_{4jk} = \hat{a}_{40k} + \hat{a}_{41k}\,(\text{Grade 9 reasoning})_{jk} + r_{4jk}$$

$$\eth_{5jk} = \hat{a}_{50k} + \hat{a}_{51k}\,(\text{Grade 9 discipline})_{jk} + r_{5jk}$$

School-level:

$$\beta_{00k} = \tilde{a}_{000} + \tilde{a}_{001}\,(\text{condition})_{k} + u_{00k}$$

$$\beta_{lmk} = \tilde{a}_{lm0}, \text{ for all } \beta_{lmk} \text{ other than } \beta_{00k}$$

To assess the independent effect of the friends' parents' behaviors, over and above the effect of the friends' substance use, we added friends' ninth-grade substance use as an additional covariate in the equation for $\eth_{0jk}$ for each of the four models. Comparing the results of the two models, with and without controlling for friends' use, reveals the extent to which friends' substance use may account for the association

TABLE 1. Variance components and intraclass correlation coefficients (ICCs) for parenting behaviors and child substance use outcomes

	Variance components				ICC value	
Variable	School/ cohort	Group	Student	Total	School/ cohort	Group
Grade 9 parenting behavior						
Parental knowledge	0.004*	0.044***	0.635***	0.683	.006	.068
Inductive reasoning	0.002	0.054***	1.365***	1.422	.002	.041
Inconsistent discipline	0.002	0.025***	0.752***	0.778	.003	.033
Grade 10 substance use						
Alcohol use	0.065*	0.566***	3.29	3.921	.017	.209
Drunkenness	0.113*	0.882***	3.29	4.285	.026	.319
Cigarette use	0.112*	1.143***	3.29	4.545	.025	.363
Marijuana use	0.043	0.993***	3.29	4.326	.001	.273

*$p < .05$; ***$p < .001$.

of subjects' own substance use with measures concerning friends' parents.

Results

Descriptive statistics

We first estimated unconditional models to partition the variance in each study variable across the three levels (individual, friendship group, and school/cohort), using the latent variable model formula of Snijders and Bosker (1999). As Table 1 shows, the variance for each of the variables was primarily at the student level; however, substantial variance also existed at the higher levels, particularly within the friendship groups. Thus, there was considerable variation in substance use across friendship groups that could conceivably be explained by the parenting received by friends.

Table 2 displays the descriptive statistics for our study variables. Correlations of the parenting behaviors with the substance use measures were significant and in the expected directions at both the individual and friendship-group levels. Generally, stronger correlations with substance use were found for parental knowledge, compared with the other parenting behaviors. There was substantially less variation for all study variables at the friendship-group level than at the individual level, consistent with the intraclass correlation coefficient values.

Hierarchical logistic regression models

The results of the first set of hierarchical logistic regression models predicting 10th-grade substance use are presented in Table 3. At the individual level, two of the three parenting behaviors were significantly associated with the likelihood of use for each substance. High levels of parental knowledge were associated with less substance use (coefficients range from -.23 to -.47), whereas high levels of inconsistent discipline were associated with increased likelihood of substance use (coefficients range from .17 to .31). Unexpectedly, higher levels of inductive reasoning were not associated with increased likelihood of use of any substance.

At the friendship-group level, two of the three measures for friends' parents' behaviors were consistently associated with the substance use outcomes. Adolescents belonging to friendship groups with higher levels of parental knowledge were less likely to report alcohol use (odds ratio [OR] = 0.60), drunkenness (OR = 0.41), cigarette use (OR = 0.45), and marijuana use (OR = 0.38). In contrast, adolescents belonging to groups of friends whose parents engaged in more inconsistent discipline were more likely to report alcohol (OR = 1.31), cigarette (OR = 1.83), and marijuana use (OR = 1.86). Significant cross-level interactions between the individual- and friendship group–level parenting terms were found for two of the outcomes. For alcohol use, the interactions involved both parental knowledge (OR = 0.71)

TABLE 2. Pearson correlations, means, and standard deviations for study variables

								Individual		Group	
	1	2	3	4	5	6	7	*M*	*SD*	*M*	*SD*
1. Grade 9 parental knowledge	–	.56	-.15	-.21	-.24	-.23	-.23	4.07	0.81	4.07	0.35
2. Grade 9 inductive reasoning	.57	–	-.12	-.12	-.11	-.13	-.12	3.22	1.18	3.20	0.48
3. Grade 9 inconsistent discipline	-.31	-.26	–	.14	.14	.15	.13	2.46	0.88	2.48	0.36
4. Grade 10 alcohol use	-.34	-.18	.21	–	.69	.41	.40	0.40	0.49	0.40	0.25
5. Grade 10 drunkenness	-.37	-.15	.21	.79	–	.46	.50	0.25	0.43	0.24	0.23
6. Grade 10 cigarette use	-.36	-.21	.29	.56	.60	–	.49	0.19	0.39	0.21	0.22
7. Grade 10 marijuana use	-.38	-.18	.26	.55	.63	.58	–	0.14	0.34	0.15	0.18

Notes: Correlations above the diagonal refer to individual level; correlations below the diagonal refer to friendship-group level.
All correlations are significant at $p < .001$.

TABLE 3. Effect of own and friends' parenting at Grade 9 on change in substance use at Grade 10

	Alcohol use			Drunkenness			Cigarette use			Marijuana use		
Variable	Coeff.	*SE*	OR/*SD*	Coeff.	*SE*	OR/*SD*	Coeff.	*SE*	OR/*SD*	Coeff.	*SE*	OR/*SD*
Intercept	-0.29***	0.07		-1.31***	0.10		-1.62***	0.09		-2.04***	0.09	
Covariates												
Gender (1 = male)	-0.12	0.07		-0.05	0.08		-0.16	0.09		0.02	0.09	
Condition (1 = interv.)	0.03	0.10		0.06	0.12		0.01	0.11		-0.02	0.11	
Grade 9 own use	1.03***	0.04		1.22***	0.05		1.12***	0.04		0.90***	0.05	
Parenting:												
Individual (Level 1)												
Parental knowledge	-0.23***	0.05	0.83	-0.33***	0.06	0.76	-0.32***	0.07	0.77	-0.47***	0.07	0.68
Inductive reasoning	0.03	0.03	1.04	0.01	0.04	1.01	-0.02	0.04	0.98	0.00	0.05	1.00
Inconsistent discipline	0.17***	0.04	1.16	0.27***	0.05	1.27	0.22***	0.05	1.21	0.31***	0.05	1.31
Parenting:												
Group level (Level 2)												
Parental knowledge	-0.51***	0.15	0.84	-0.90***	0.19	0.73	-0.80***	0.21	0.76	-0.96***	0.20	0.71
Inductive reasoning	0.06	0.10	1.03	0.25	0.13	1.13	0.16	0.15	1.08	0.22	0.14	1.11
Inconsistent discipline	0.27*	0.12	1.10	0.28	0.16	1.11	0.60***	0.17	1.24	0.62***	0.17	1.25
Parenting:												
Cross-level interactions												
(Level 1 × Level 2)												
Parental knowledge	-0.34***	0.13		-0.20	0.16		-0.29	0.18		-0.36*	0.16	
Inductive reasoning	0.11	0.06		-0.02	0.08		-0.05	0.09		0.00	0.09	
Inconsistent discipline	-0.27**	0.10		-0.20	0.12		-0.21	0.14		-0.27	0.14	
Variance components												
School/cohort	0.06	0.02		0.09	0.04		0.05	0.03		0.04	0.03	
Friendship group	0.23	0.05		0.49	0.08		0.45	0.09		0.43	0.09	
Parental knowledge	0.08	0.08		0.18	0.08		0.19	0.09		0.00	0.00	
Inductive reasoning	0.03	0.03		–	–		–	–		–	–	
Inconsistent discipline	0.01	0.04		0.11	0.06		0.07	0.07		0.12	0.07	

Notes: Three level hierarchical model used (see text). Coeff. = logit parameter estimate; *SE* = standard error of the logistic estimate; OR/*SD* = odds ratio per standard deviation of measure; interv. = intervention. All results reflect hierarchical logistic regression models using first-order marginal quasi-likelihood procedures as starting values for second-order penalized quasi-likelihood estimation. Models for drunkenness, cigarette use, and marijuana use did not include a random coefficient for inductive reasoning because of nonconvergence.
*$p < .05$; **$p < .01$; ***$p < .001$.

and inconsistent discipline (OR = 0.76). The cross-level interaction term for parental knowledge was also significantly associated with marijuana use (OR = 0.70).

To aid the interpretation of the main effects of parenting behaviors at both the individual and the friendship-group level, we multiplied the logistic coefficients by the standard deviation of each parenting measure and exponentiated the product to obtain the OR per standard deviation. For example, as seen in Table 3, each standard deviation increase in parental knowledge at the individual level resulted in a 17% decrease in alcohol use, a 24% decrease in drunkenness, a 23% decrease in cigarette use, and a 32% decrease in marijuana use. Increases in the friendship groups' average levels of parental knowledge resulted in similar decreases in alcohol use (16%), drunkenness (27%), cigarette use (24%), and marijuana use (29%).

Figure 1 displays the log-odds of alcohol use at different levels of the adolescent-reported inconsistent discipline for three levels of inconsistent discipline reported by friends (overall mean, and ±1 *SD* from the mean among friendship groups). Consistent with the main effects, the predicted probability of alcohol use was lowest when both the target adolescents' own parents and parents of other youth in the friendship group maintained consistent discipline in their parenting practices (i.e., low levels of inconsistent parenting). However, alcohol use was more likely if either individual adolescents or the members of their friendship groups reported that their parents were inconsistent, regardless of the level of the other variable. The cross-level interaction for parental knowledge (Figure 2) suggested a similar pattern. Alcohol use was most likely at low levels of both adolescents' parents' knowledge and friendship-group members' parents' knowledge. Moreover, the effect of individual-level parental knowledge was strongest at high levels of friends' reports of parental knowledge.

To determine the extent to which substance use by others in the friendship group accounted for some of the associations between friends' parents' behaviors and adolescent substance use, the second series of models added an additional control for the friendship-group mean of ninth-grade substance use. Notably, the effects of parenting at the individual level and the cross-level interaction terms were nearly identical in the two sets of models. Thus, Table 4 presents only the coefficients for friendship-group substance use and friendship-group parents' behavior for each of the two models. As seen in the table, friendship groups' use accounted

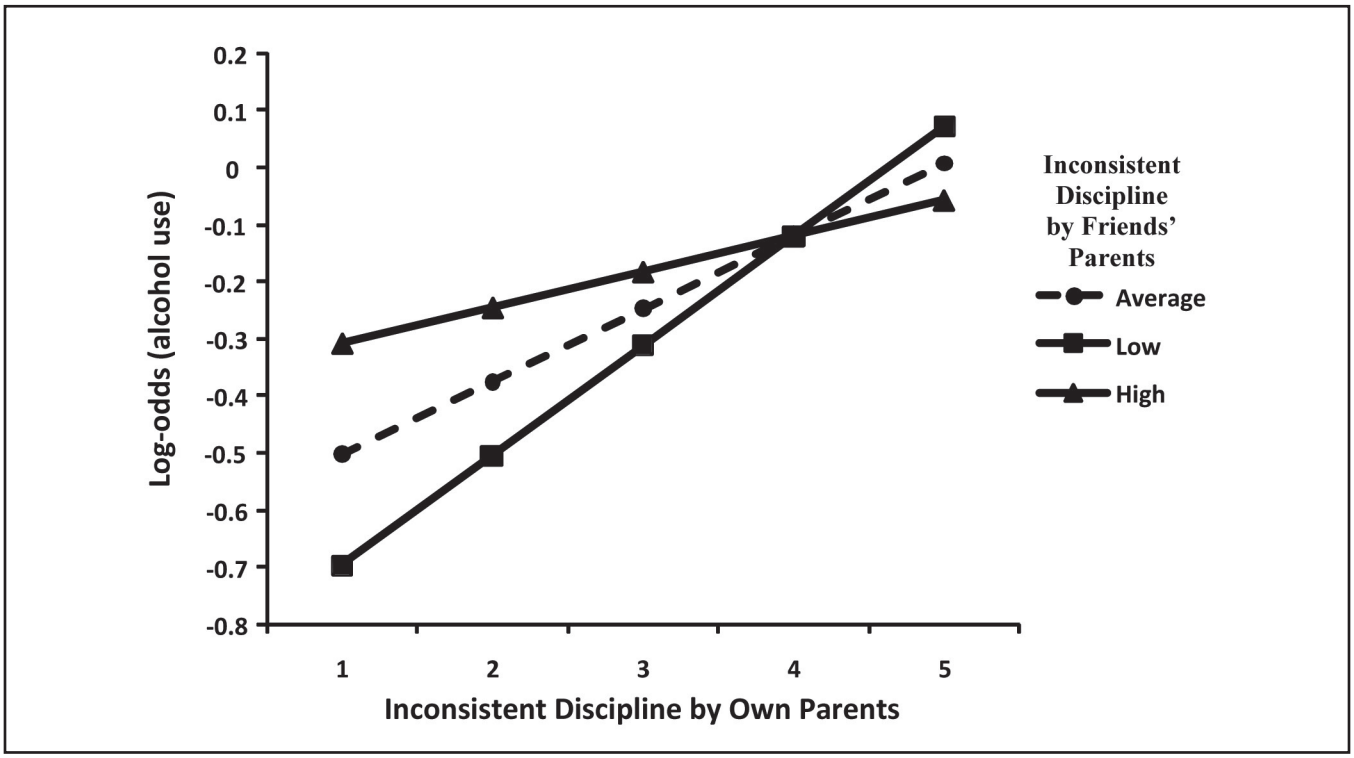

FIGURE 1. Association between inconsistent discipline and alcohol use. Higher values on the x axis indicate higher levels of inconsistent discipline.

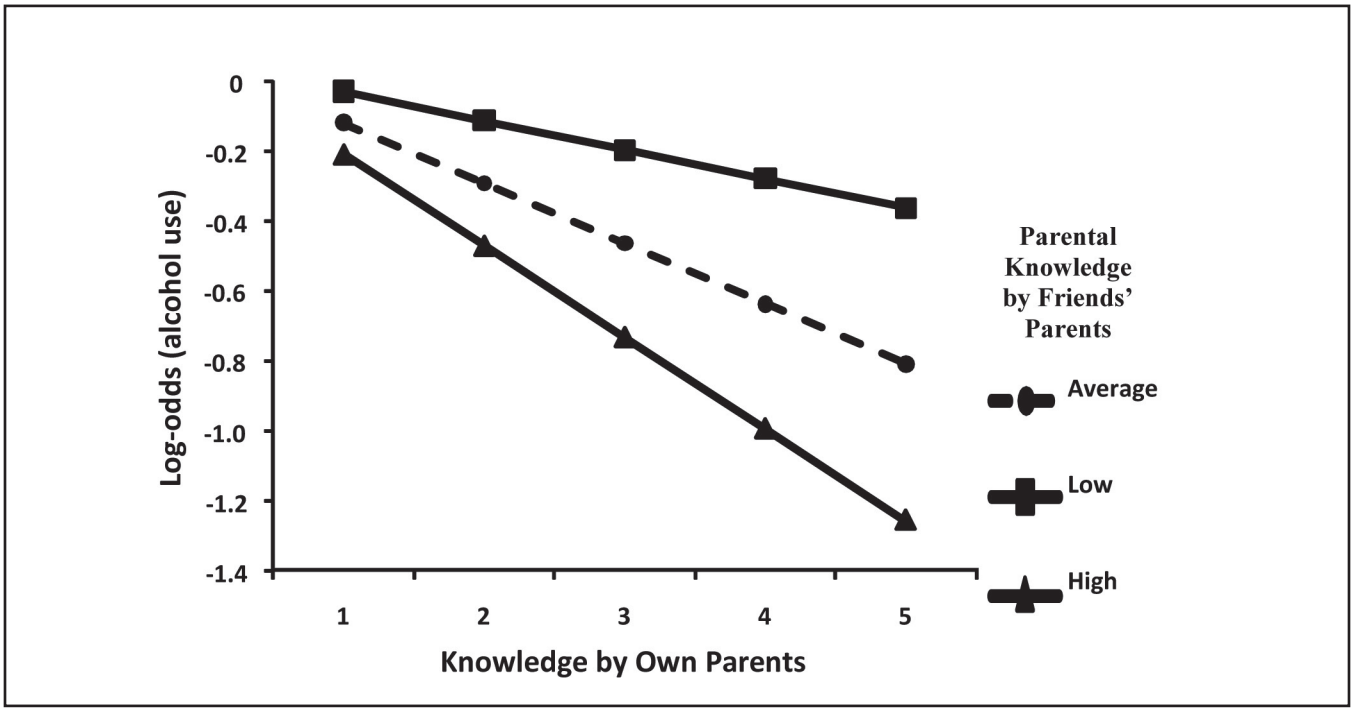

FIGURE 2. Association between parental knowledge and alcohol use. Higher values on the the x axis indicate higher levels of parental knowledge.

TABLE 4. Reduction in coefficients for friends' parenting on Grade 10 substance use as a result of controlling for level of Grade 9 friendship-group substance use

	10th-grade substance use outcome											
	Alcohol use			Drunkenness			Cigarette use			Marijuana use		
Variable	M1	M2	%	M1	M2	%	M1	M2	%	M1	M2	%
Grade 9 friend use	–	0.67***		–	1.00***		–	0.54***		–	0.66***	
Parent: Group level												
Knowledge	-0.51***	-0.11	78%	-0.90***	-0.37§	58%	-0.80***	-0.48*	40%	-0.96***	-0.66***	31%
Inductive	0.06	0.03	50%	0.25§	0.20	20%	0.16	0.21	-31%	0.22	0.24	-9%
Inconsistent	0.27*	0.12	55%	0.28§	0.09	67%	0.60***	0.40*	33%	0.62***	0.53***	14%

Notes: Values refer to logistic regression coefficients predicting 10th-grade substance use. M1 = series of models that include effects of group-level parenting (with covariates, not shown); M2 = series of models that include additional control for aggregate levels of ninth-grade friendship group's substance use; % = percentage reduction in the logistic regression coefficient of the group-level parenting behavior between M1 and M2. Knowledge, inductive, and inconsistent refer to group-level effect of parental knowledge, inductive reasoning, and inconsistent discipline, respectively.
§$p < .10$; *$p < .05$; ***$p < .001$.

for a substantial proportion of the total effect of friendship groups' reports about parenting. Controlling for friendship groups' use particularly reduced the effects of parental knowledge and inconsistent discipline on alcohol use and drunkenness (by 55%–78% of their original magnitude). For both of these outcomes, neither parental knowledge nor inconsistent discipline by friends' parents was significantly associated with use, once peer use had been accounted for. However, the friendship groups' reports about their parents remained significant predictors of cigarette and marijuana use, where controlling for friendship groups' use reduced the logistic coefficient by 14%–40%.

Discussion

This study examined the possibility that adolescents' substance use is associated with the parenting behaviors received by others in their friendship group, in addition to the behaviors of their own parents. By connecting adolescents to a broader set of parental influences, this previously unexplored relationship represents an additional avenue in which parents and peers jointly influence adolescent substance use. Using hierarchical logistic regression modeling and measures about peers' parents derived from social-network analysis, we assessed the relationship of change in substance use with parental knowledge, inductive reasoning, and inconsistent discipline reported by adolescents' friends. Importantly, our models included several covariates that helped isolate the effects of peer parenting practices on adolescent substance use. These covariates included measures of the individual adolescents' previous substance use as well as a friendship group–level aggregate measure of previous substance use.

The results supported the central hypothesis of this study, that friends' reports about their parents are significantly associated with changes in adolescent substance use from 9th to 10th grade. In particular, higher levels of parental knowledge and lower levels of inconsistent discipline, as reported by adolescents' friendship groups, were associated with decreased likelihood of respondents' alcohol, cigarette, and marijuana use. The results also suggested that drinking behaviors of the friendship group may account for the major share of the impact of group members' parents' behaviors on adolescent alcohol use. For the use of cigarettes and marijuana, the effects of other group members' parents remained significant even after controlling for the average level of use by the group, suggesting that parental knowledge and discipline behaviors of friends' parents may have unique effects on certain adolescent behaviors that are independent of their influence on their own children. In contrast, there was less consistent evidence for the importance of group members' parents' use of inductive reasoning. However, the relatively high correlation between parental knowledge and inductive reasoning (at both individual and group levels) suggests that parents' use of inductive reasoning may be indirectly related to adolescent substance use. It may be that parents' use of inductive reasoning fosters positive communication between parents and their children, thereby leading to better parental knowledge (Kerr and Stattin, 2000; Stattin and Kerr, 2000).

We found modest support for the hypothesis that the contributions of one's own parents and other group members' parents would moderate one another. Significant cross-level interactions were found in 3 of 12 models, suggesting that the associations between adolescents' own parents' behaviors and substance use differed according to the average level of parenting received by the rest of the group. In each case, the best outcomes were seen among adolescents with "good" parenting (i.e., high levels of parental knowledge or low levels of inconsistent discipline) from both their own parents and the other parents of their group of friends. In families where parental knowledge was low or inconsistent discipline was high (i.e., "poor" parenting), the other parents' behavior was less important. And in friendship groups where parenting was poor (i.e., low levels of parental knowledge or high levels of inconsistent discipline), the individual's own parents' behaviors mattered less than for friendship groups where parenting was good.

Thus, the results suggest that poor parenting either in one's own family or in the rest of the friendship group's families places an adolescent at risk for substance use while also limiting the potential for parenting at the other level to compensate for that risk. This type of interaction is consistent with a protective–reactive effect (Luthar et al., 2000) whereby one's own family functioning matters the most when reinforced by contextual-level influences. Our study is the first to confirm that more proximal social contexts, such as an adolescents' circle of friends, may also act to synergistically protect against the risk of alcohol and marijuana use when an adolescents' own parents use effective parenting strategies.

The sphere of parental influence

Together, the results of this study imply that the sphere of parental influence includes the members of children's friendship groups. Friendship groups, therefore, serve as opportunities for adolescents to be connected to a larger set of adults beyond their own parents. We found that two domains of parenting were especially relevant to this process, thereby influencing the behavior of both the target adolescent and his or her friends: knowledge of adolescents' activities and use of inconsistent discipline strategies.

Because adolescent risk behavior, such as substance use, is often a group phenomenon (Erickson and Jensen, 1977), it seems plausible that parents' knowledge of youth activities can have an influence beyond their own children to also include the friendship group. For example, consider an adolescent whose own parents were actively involved and highly aware of his or her whereabouts. If this teenager happens to have friends whose parents allow them to roam at will and do not actively monitor their activities, those parents' lax approach might have negative influence on the teenager's behavior, countering the positive influence of his or her own parents. Conversely, if the friends' parents are similarly aware of their whereabouts, the two spheres can act synergistically to offer enhanced protection.

The use of inconsistent discipline strategies represents an additional avenue by which adolescents may be influenced by the parents of their friends. According to coercion theory (Dishion and Patterson, 1997), children are negatively reinforced when their parents do not follow through on discipline attempts. Our results suggest that adolescents may learn vicariously from their friends that such defiance can be useful in their own family situation and ultimately lead to their parents relinquishing control of their behavior.

Through both of these avenues, it is apparent that parenting is a collective process. Traditionally, this notion of shared parenting has focused on the connections to other adults that parents can rely on as a form of social capital for help in socializing and supervising their children. We suggest that a different process occurs in which parenting affects both one's own children and their friends. Thus, our results extend past research, which has conceptualized peer influence primarily along the lines of direct influence of friends on one another. Our study suggests that friends also can influence behavior by connecting adolescents to a wider sphere of adult behaviors, which may or may not be beneficial.

Implications for prevention

These findings have several implications for the prevention of adolescent substance use. First, they show that parenting behaviors experienced by members of an adolescent's peer group are consistently associated with change in adolescent substance use, even after controlling for individuals' reports about their own parents' behaviors and an aggregate measure of their friendship groups' substance use. This finding opens up a potential target for intervention and prevention programs that are designed to deter adolescent risk behaviors. Such programs are often based on improving parenting skills; however, because participation is almost always voluntary, typically only a modest percentage of families receive these interventions. The current findings show an avenue by which the impact of such interventions may diffuse to other adolescents through their friendship networks. Although beyond the scope of this study, it seems likely that certain peers (and their parents) in a network may play a more important role in this diffusion process. Future interventions may consider strategies to enhance parenting skills in parents of influential group members.

Conclusion

When drawing conclusions, several limitations of the current study should be noted. First, we relied on adolescent reports of parenting behaviors at both the individual and friendship-group level. Past studies have confirmed that associations between adolescent and parental reports of such behaviors are not consistent (Kerr and Stattin, 2000). However, we know of no studies that have combined parent-reported behaviors and social-network analysis. The current results also must be considered in terms of the relatively homogenous sample, which was primarily White and drawn from semirural and rural areas in two states. Thus, it is not clear how these results would generalize to other ethnic groups or to youth from urban areas or other geographic locations. Our analyses also were limited to a narrow age span. These processes may vary with age because of developmental differences in the relations among parenting behaviors, peer processes, and adolescent substance use. For example, the effects of parenting may diminish at later ages when substance use, in particular use of alcohol, is more normative. We also note that measures of parents' use of positive reinforcement of prosocial activities were not available in the PROSPER study. Thus, we were unable to fully examine the family processes described in coercion theory.

Finally, although our results showed that a significant proportion of the effect of friends' parenting on adolescent substance use was accounted for by friends' substance use, we were unable to determine whether this process occurred through the friends' use or through the change in the adolescents' own use between Grades 9 and 10. That is, it is likely that parenting affects changes in adolescent substance use, which, in turn, affects changes in the adolescent's friends' substance use. Moreover, adolescents' substance use is likely to elicit changes in parenting behaviors (Kerr et al, 2010). We used prospective models that controlled for both adolescents' and their friends' earlier use, but future studies that account for these reciprocal relationships are necessary to help elucidate these processes.

Despite these limitations, the current study points to a broader vision of the role of the community of parents in adolescents' lives. Our findings suggest that an overlooked aspect of parental influence in shaping children's behaviors can be found within the friendship ties that bind children not only to one another but to the parents of their friends as well. We found that these connections between children and their friends' parents have an important association with whether an adolescent engages in substance use during the vulnerable years of mid-adolescence. Thus, it appears likely that the joint contribution of parent and peer influence includes not only the behaviors of one's own parents and the attitudes and behaviors of one's friends but also the quality of the parenting received by these friends. Our findings are a first step in elucidating this new realm of the proximal social context.

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