

Parents and Peers as Social Influences to Deter Antisocial Behavior

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Abstract:

Growth curve analyses were used to investigate parents' and peers' influence on adolescents' choice to abstain from antisocial behavior in a community-based sample of 416 early adolescents living in the Southeastern United States. Participants were primarily European American (91%) and 51% were girls. Both parents and peers were important influences on the choice to abstain from antisocial behavior. Over the four-year period adolescents relied increasingly on parents as influences and relied less on peers as influences to deter antisocial behavior. Significant gender differences emerged and suggested that female adolescents relied more on social influences than did male adolescents but that as time progressed male adolescents increased the rate at which they relied on peers. Higher family income was associated with choosing peers as a social influence at wave 1, but no other significant income associations were found. Understanding influences on adolescents' abstinence choices is important for preventing antisocial behavior.

Keywords: Parental influence | Peer influence | Adolescence | Antisocial behavior | Abstinence

Article:

Adolescence marks a time when youth are developing autonomy and making important choices about key issues in their lives that shape their developmental trajectories (Allen et al. 1997). Adolescence also is a time when some antisocial behavior such as substance use becomes more normative (Pardini et al. 2005). Thus, one key issue adolescents make choices about is whether to abstain from or engage in antisocial behavior. Although antisocial behavior may become increasingly normative during adolescence, there are several risks associated with engaging in antisocial acts (French and Conrad 2005; Simons et al. 2004), including school disengagement and decreased educational and occupational opportunities in early adulthood (Luthar and Ansary 2005; Sanford et al. 1994). Thus, to assure a successful transition into early adulthood it is paramount to understand the development of antisocial behavior during the period of early

adolescence and identify social influences that minimize adolescents engagement in antisocial behavior.

During early and middle adolescence, parents and peers are two particularly important social influences (Dodge et al. 2006). In this study, the term *social influences* describes adolescents' reliance on parents and peers when making choices about whether or not to abstain from antisocial behavior. Specifically, 416 adolescents from the Southeastern region of the United States were asked their perception of who influences their choice to abstain from a given antisocial behavior. To date, few studies have focused on who influences adolescents' *choice to abstain from antisocial behavior*. Rather, existing studies have focused on influences on the choice to *engage* in antisocial behavior (e.g., deviant peers and negative parenting practices). This distinction between influences on adolescents' choices to engage versus influences on adolescents' choices to abstain from antisocial behavior is critical for programs aimed at prevention because there is little empirical evidence suggesting that influences on adolescents' engagement choices are the same as influences on adolescents' abstinence choices.

Despite the fact that age, gender, and socioeconomic status (SES) are three important factors associated with engagement in antisocial behavior (Gorman-Smith and Loeber 2005; National Center for Educational Statistics 2003), there is little empirical evidence that adolescents' reliance on social influences to deter antisocial behavior vary as a function of age, gender, and SES. It is important to examine the effect of age, gender, and SES on adolescents' reliance on social influences because it will inform research and practice on the prevention of risk behavior by helping to address which youth at what age are more or less open to influence when deciding about antisocial behavior. Based on the gaps in the literature the purpose of the current study was to examine adolescents' reliance on social influences to deter seven antisocial behaviors, as well as examine the effects of youth gender and SES on these influence patterns across the first half of adolescence. In the current study, we define antisocial behavior as characterized by socially inappropriate, selfish, hostile, and disruptive actions to self or others (Simons et al. 2004). Specific indicators of antisocial behavior for adolescents in this study include delinquent behaviors (i.e., destruction of property, alcohol use, marijuana use, and harder drug use), externalizing behaviors (i.e., fighting), and socially inappropriate risk behaviors (i.e., early sexual activity and smoking).

Social Influences

Both parents and peers affect adolescents' choices and actions (Laible et al. 2000; Wood et al. 2004). Parents are important socialization agents who encourage prosocial behaviors and discourage antisocial behaviors (Maccoby 1992). Few studies have focused directly on adolescents' perceptions of parents as a social influence on deterring antisocial behavior and have instead focused on the influence of specific parenting practices such as harsh discipline and monitoring. However, Wyatt and Carlo (2002) investigated the role of adolescents' perceptions of parental reactions toward antisocial behavior in a sample of 80 adolescents (Mean age = 14.2).

Parental disapproval of antisocial behavior was associated with fewer adolescent antisocial acts. Brody et al. (2006) found similar results in a study that examined the effects of a prevention program on at-risk African American families. Open communication was associated with an increase in early adolescents' choice to abstain from risk behavior. However, neither study considered the concurrent role of peers as a deterring influence.

During adolescence, peers are a powerful influence on youths' choices; yet, researchers have neglected the role of peers as a positive social influence (Collins and Roisman 2006). The scant research investigating this relationship, however, has suggested that peer disapproval is associated with abstinence from illegal substance use and sexual intercourse (Beal et al. 2001; Maguen and Armistead 2006). Given the importance of peers as a socialization influence, additional research is needed that determines the extent to which peers act as a positive influence on adolescents' choices to refrain from antisocial behavior. This information is critical to inform programs aimed at minimizing antisocial behavior during early adolescence. Thus, the current study addresses this need by examining the extent to which adolescents perceive their peers as informing their abstinence choices.

The comparative influence of parents and peers, in general, during adolescence has been debated (Beal et al. 2001; Maguen and Armistead 2006). Given mixed empirical findings, the relative influence of parents versus peers may depend on the adolescent adjustment outcome. Evidence has suggested that parents have more influence on academic achievement (Chen 2005), whereas peers have more influence on substance use (Pilgrim et al. 1999). Furthermore, peer influence on abstinence choices may not be as strong as peer influence to engage in risky behavior (Berndt 1979) because peers are more accepting than parents of controversial attitudes and behaviors, such as beliefs about sexual activity (Epstein and Ward 2008) and youths' experimental behavior (Call and Mortimer 2001). On the other hand, parental influence may be more salient on abstinence choices (Maguen and Armistead 2006) because parents are still very concerned with influencing choices regarding adolescents' safety (McElhaney et al. 2008). Based on this scant empirical base, we hypothesized that adolescents are less likely to choose peers as a social influence on deterring antisocial behavior when compared with parents. This line of inquiry marks a contribution to the literature by examining the conjoint influences of *both* parents and peers on adolescents' abstinence choices over a four-year period. Furthermore, the few studies that have examined the influence of parents and peers conjointly on adolescents' abstinence choices have been limited because data were collected on only one occasion, preventing conclusions regarding developmental changes in social influence patterns.

Developmental Shifts

Research traditionally has suggested that as adolescents gain autonomy during early adolescence and begin to focus their attention on relationships outside of the family (Ardelt and Day 2002), youth begin to rely more on peers as social influences who inform important choices (Allen et al. 1997). On average, adolescents spend roughly 50% of their time with peers and 20% with

parents, suggesting that peers may take on increased social influence because of increased opportunity (Larson 1983). Adolescents may spend more time with peers during middle adolescence than early adolescence and peers appear to be most influential on adolescents' choices during middle adolescence (Helsen et al. 2000; Steinberg and Silverberg 1986). Given increased opportunity and salience, one might hypothesize that during the first half of adolescence youth will increase their reliance on peers as social influences and decrease their reliance on parents. However, past research examining developmental changes in the influence of peers and parents on adolescents' behavior has focused predominately on peers having a stronger influence on *engagement* in antisocial behavior. In the current study, we examined peers and parents as social influences that *deterred* antisocial behavior. Shifting the focus to influences on adolescents' abstinence choices may alter the predominant finding in research that during early and middle adolescence peers gain influence and parents loose influence on youths' behavioral choices (Steinberg and Monahan 2007).

Two areas of research undergird our hypothesis that as youth transition through early adolescence their reliance on parents as a social influence will take on increased importance and their reliance on peers as a social influence will take on decreased importance. First, prior theory on autonomy development has suggested that during early and middle adolescence parents reduce the amount of control they have over their children's lives equally in all domains. However, adolescents' perception of parental influence may vary as a function of the domain in which youth are making choices (Padilla-Walker 2008; Padilla-Walker and Carlo 2007). More recent research and theorizing has suggested that parents are not as willing to grant autonomy and relinquish influence over issues that involve adolescents making choices about personal safety/well-being (e.g., smoking) and moral issues (e.g., stealing; Smetana et al. 2003). Thus, based on this line of more recent research, we hypothesized that as youth transition through early adolescence and are confronted with increasing opportunities to engage in antisocial behavior, they rely more on parents to inform their abstinence choices.

Second, the salience of peers as social influences who deter antisocial behavior may be complicated because peers on average are more accepting of risk behavior than are parents (Chassin et al. 1984; Moore and Rosenthal 1991). As antisocial behavior becomes more normative during middle adolescence, peers might be less influential in deterring deviant behavior because adolescents may perceive that most of their peers are engaging in antisocial acts. Therefore, we hypothesized that youth will rely on both parents and peers as social influences, and that the reliance on parents as a social influence on abstinence choices will take on increased importance over time.

Youth Gender

Male and female adolescents differ in the extent to which social influences affect their abstinence choices. Females may be less at risk for antisocial behavior because they rely more on parents and peers to influence their risk behavior (Huebner and Betts 2002; Van Lier et al. 2005).

Females also may place less of a focus on autonomy than do males (Zimmer-Gembeck and Collins 2003) and place a stronger emphasis on interpersonal relationships (Finkelstein 1997). This might increase females' amenability to parental influence (Huebner and Betts 2002).

The role gender exerts on reliance on peers is less clear but there is some suggestion that females rely more on peers to influence their choices than do males. Again, relational theory (Finkelstein 1997) suggests interpersonal relationships are more influential in females' choices. Furthermore, Gilligan (1982) argues females make choices based on weighing the influence of all individuals involved in their lives. Some research has indicated that the association between peer attachment and the decision to abstain from delinquent behavior is stronger for females than for males (Anderson et al. 1999). Brown et al. (1986) found that female adolescents reported being influenced more by peers to conform to prosocial behaviors with no gender differences found in regards to misconduct. These results suggest female adolescents may be more open to peers influencing positive behaviors than are male adolescents. Therefore, we hypothesized that female adolescents cite parents and peers as informing their abstinence choices more often than do male adolescents.

Developmental shifts during adolescence may affect the role gender assumes in reliance on social influence. Specifically, because male adolescents place more salience on autonomy development and are afforded more autonomy in all domain areas when compared to female adolescents (Levpusek 2006; Fiese and Skillman 2000), we expected parents to act as less of a social influence on male adolescents' choice to abstain from antisocial behavior over the four-year period than on female adolescents' choice. Seydlitz (1991) found support for this proposition such that as female adolescents transitioned into middle adolescence the need to obey parents' rules had a significantly greater impact on deterring antisocial behavior than it did for male adolescents. As there is not a particularly clear picture of how gender affects reliance on peers as an influence over time, no a priori hypothesis regarding the direction of a time by gender interaction was made.

Socioeconomic Status

Socioeconomic background may influence the choices adolescents make surrounding risky behavior. Families with lower incomes in our society often live in neighborhoods where crime rates and poverty are higher and community resources are minimal (Leventhal and Brooks-Gunn 2003). High prevalence rates may influence adolescents' perception that antisocial behavior is normative (Anderson 1999). These perceptions (or misperceptions) regarding the prevalence of antisocial behaviors are critical because adolescents who overestimate the amount of substance use and cigarette smoking are more likely to engage in such behaviors (Jacobs and Johnston 2005; Nucci et al. 1991). Although we were unable to test adolescents' perceptions of the extent to which they believed peers were engaging in antisocial behaviors, we hypothesized that adolescents from lower SES homes choose peers less frequently as a social influence

because past research suggests that antisocial behavior may be more normative among the peer culture for youth from lower SES homes (Anderson 1999).

Despite the fact that most antisocial behaviors are more prevalent in adolescents with low SES (Duncan et al. 1994), no studies, to our knowledge, have investigated the associations among SES, parental influence, and abstinence from antisocial behavior. However, past research suggests that lower family income adversely affects parenting behaviors (Bradley and Corwyn 2002; Dodge et al. 1994), which in turn may affect adolescents' reliance on parents as a social influence to deter antisocial behavior. Thus, we hypothesized that adolescents from lower income families are less likely to choose parents as a social influence on abstinence choices than are adolescents from higher income families.

Hypotheses

Drawing on the above research and theory, the current study investigated the role of social influences in adolescents' choice to abstain from antisocial behavior during the first half of adolescence. The following hypotheses were addressed: (a) both parents and peers will be chosen as social influences on the choice to abstain from antisocial behavior, and parents will be chosen more frequently than peers; (b) the rate at which adolescents choose parents will increase during the four-year period, whereas the rate at which peers are chosen as a social influence will decrease; (c) female adolescents will be more likely to choose parents as a social influence than will male adolescents and this difference will increase over time; (d) female adolescents will be more likely to choose peers as a social influence on abstinence behavior than male adolescents and this difference will remain constant over time; and (e) adolescents from lower SES families will rely less on parents and peers as sources of social influence when compared with adolescents from higher SES families and this difference will remain constant over time.

Methods

Participants

This study was part of a larger longitudinal project that examined the effect of family processes on the transition from childhood into adolescence. In the first wave of data collection, 6th grade students from 13 middle schools from a southeastern county were invited to participate in a study on family life. Sixth graders were sampled because they are beginning the transition from childhood into adolescence. Eighty-percent of the families who returned the consent forms gave permission for their adolescents to complete a questionnaire during school ($N = 2,297$). The sample was representative of families in the county in regards to race, family income, and family structure (contact corresponding author for census details).

Given that a primary goal of the longitudinal study was to examine the effects of marital functioning on youths' development, a subsample of 1,131 two-parent married families was identified, and 416 families agreed to participate in the 4-year study (37% response rate).

Stepfamilies were not included in the subsample because stepfamilies may differ systematically from families without stepparents in the home. Primary reasons for families not participating included time constraints and/or an unwillingness to be videotaped (observations were not used for the current study). Participants were similar to eligible non-participants on all study variables reported by youth on the questionnaire on family life that was completed during school. At the onset of the study (W1) adolescents ranged in age from 11–14 ($M = 11.86$, $SD = .42$). Participants were primarily European American (91%) and 51% were girls. The median level of education for parents was an associate's degree. This level of education was similar to European-American adults in the county (county mean category was some college, no degree; U.S. Census 2000, Table P148A of SF4). The median level of household income for participating families was about \$70,000, which is higher than the median 1999 income for married European Americans in the county (\$59,548, U.S. Census 2000, Table PCT40 of SF3; \$64,689 inflation-adjusted dollars through 2001).

Procedures

Youth completed a questionnaire during fall of the 2001–2002 school year. Questionnaires also were mailed home to youth, mothers, and fathers at which time family members were asked to complete questionnaires independently and seal each in a separate envelope. Another brief questionnaire containing particularly sensitive information was completed during a home visit (e.g., adolescent antisocial behavior). Assessments were conducted again a year later (W2), two years later (W3), and three years later (W4). Most adolescents were in 7th grade at W2 ($M = 12.84$), in 8th grade at W3 ($M = 13.83$), and in 9th grade at W4 ($M = 14.84$). There were 366 participating families at W2, 340 families at W3, and 330 families at W4 (80% retention of W1 families). Attrition analyses using MANOVA revealed no differences between the retained and attrited families on any of the study variables (contact corresponding author for statistical details). Families were compensated \$100 for their participation for W1, \$120 for W2, \$135 for W3, and \$150 for W4.

Measures

Social Influences

Barber's Social Control Scale (1994) was used to assess specific social influences (i.e., parents, peers, religion, health, self) that had prevented adolescents' engagement in seven antisocial behaviors: smoking, drinking, marijuana use, harder drugs, fighting, destruction of property, and sexual activity. For example, adolescents are asked "If you do not destroy property, why?" Participants then decided if the choice to abstain from a behavior is based on peers' disapproval, parents' disapproval, religion's disapproval, health's disapproval, or self-disapproval. Adolescents could choose as many as five social influences for a given abstinence choice. Instead of reporting on abstinence influences, adolescents could indicate that they engage in a specific behavior. For purposes of the current study, only adolescent reports of parents or peers

acting as a social influence on deterring antisocial behavior were examined because parental influence and peer influence have been shown to be particularly salient in the choices youth make during early and middle adolescence (Dodge et al. 2006). Count variables ranging from 0 (*no influence*) to 7 (*influenced all behaviors*) were created for *peer influence* and *parental influence*. A count variable was created as opposed to examining parental and peer influence on the seven antisocial behaviors separately because we were interested in examining the extent to which parents and peers influenced adolescents' choices regarding antisocial behavior in general, as opposed to specific choices. Furthermore, preliminary analysis for the current paper, as well as previous research, has suggested that antisocial behaviors are highly correlated (Table 1; Duncan et al. 1998). Creating count variables also allowed all 416 participants to be included in the final analyses because each participant chose either parents or peers as an influence on at least one antisocial behavior during the four years of the study. Cronbach's alphas for the *peer influence* scale at all four waves were high: W1 $\alpha = .97$, W2 $\alpha = .96$, W3 $\alpha = .94$, and W4 $\alpha = .92$. Cronbach's alphas for the *parental influence* scale at all four waves also were high: W1 $\alpha = .98$, W2 $\alpha = .97$, W3 $\alpha = .96$, and W4 $\alpha = .95$.

Table 1 Correlations among antisocial behaviors for peer influence and parental influence: Wave 1

Variables	1	2	3	4	5	6	7
<i>Perceived peer disapproval</i>							
1. Sexual activity	–						
2. Destroying property	.76*	–					
3. Fighting	.75*	.74*	–				
4. Smoking	.89*	.78*	.71*	–			
5. Alcohol	.87*	.79*	.68*	.93*	–		
6. Marijuana	.88*	.78*	.70*	.96*	.92*	–	
7. Harder drugs	.88*	.78*	.69*	.95*	.94*	.96*	–
<i>Perceived parental disapproval</i>							
1. Sexual activity	–						
2. Destroying property	.83*	–					
3. Fighting	.75*	.81*	–				

4. Smoking	.89*	.85*	.77*	–			
5. Alcohol	.86*	.84*	.75*	.92*	–		
6. Marijuana	.88*	.85*	.77*	.95*	.95*	–	
7. Harder drugs	.88*	.84*	.76*	.95*	.93*	.96*	–

Note: * $p < .001$, $N = 416$

Gender

Gender was a dichotomous variable that was dummy coded (0 = female, 1 = male).

Socioeconomic Status

To increase content validity and demonstrate stability in SES over time, SES was measured by a composite variable (average across waves) of mothers' and fathers' reports on family income ($M = \$73,749, SD = \$20,000$). Income was used to measure SES because when compared with measures of education and occupation it is a stronger indicator of the neighborhood environment and adolescents' friends (Hoffman 2003).

Analytic Strategy

A three-level hierarchical generalized linear model (HGLM) was used to examine the relationships among gender, family income, and two outcome variables: peer influence and parental influence. Specifically, a hierarchical *generalized* linear model with a binomial link was used, as opposed to a hierarchical linear model, because the dependent variables consisted of count data from a finite set of events, which violated assumptions of normality (Raudenbush and Bryk 2002). The two dependent variables represented the number of seven antisocial behaviors that parents were influential in deterring and the number of seven antisocial behaviors that peers were influential in deterring. As a result of using the binomial link function, all results initially are interpreted as the log-odds of the probability of selecting either parents or peers as a social influence.

HGLM also was used to address potential dependencies within these data. It was plausible that peer and parental influences were related ($\phi = .73$). For example, an individual relying highly on parents as a source of influence may also rely highly on peers as a source of influence when compared to an individual who does not rely on either parents or peers to influence their choices. Furthermore, participants provided responses on four separate occasions (once a year), and it was expected that individuals' responses at one point in time would be associated with their responses at another point in time. To address these dependencies, a three-level HGLM was used. Parent and peer influence at level-1 of the HGLM were nested within time point (level-2), and therefore level-1 was used only to model the association between the counts of parent and

peer influence. This approach is comparable to multivariate hierarchical modeling approaches described by Raudenbush and Bryk (2002) where dummy-coded covariates are used at level-1 as a method to model the association between multiple dependent variables. In addition, time points (level-2) were nested within individuals (level-3), which accounted for the association between the repeated observations (both parental and peer influence) across four time periods (i.e., waves). In terms of hypotheses testing, levels 2 and 3 were of particular interest in this study.

Results

Preliminary Analysis

Descriptive Statistics

Using cross-tabs, we explored whether the proportion at which adolescents chose a social influence to deter a specific risk behavior (e.g., alcohol use) differed for boys and girls. Specifically, cross-tab tables were estimated for all waves of the study that separately examined the effect of gender on adolescents' reliance on parents as an influence for each of the seven antisocial behaviors and peers as an influence for each of the seven antisocial behaviors. Results indicated that during all 4 waves across early adolescence female adolescents were more likely than were male adolescents to choose parents and peers as social influences who deterred harder drug use, destroying property, fighting, early sexual intercourse, and smoking (contact author for specific descriptive results). Cross-tab analyses also were used to examine if the proportion at which adolescents chose a social influence to deter a specific risk behavior (e.g., alcohol use) differed for adolescents from higher and lower SES homes. To examine group differences based on family income two groups were created using a median split. Cross-tabs for SES were conducted only for W1 because estimation of initial growth curve models indicated that the relationship between SES and social influence did not change significantly over time. Cross-tab analyses suggested that adolescents from families who made above the median income (\$70,000) chose both parents and peers as social influences for each of the seven antisocial behaviors more often than did adolescents who scored below the median. Based on these preliminary analyses we felt confident about our decision to aggregate the seven antisocial behaviors to test the central study hypotheses.

Pearson correlations and phi correlations were computed by gender to investigate significant relationships between all predictors and outcomes (Table 2). Means and standard deviations based on the total sample also are represented in Table 2.

Table 2 Correlations, means, and standard deviations for Level 1 and Level 2 variables by youth gender

Variables	1	2	3	4	5	6	7	8	9
1. Average SES	–	.01	.08	.02	.13	.07	–.01	.19**	.10

2. Parental influence— W1	.02	–	.25**	.19*	.02	.69**	.28**	.09	.04
3. Parental influence— W2	.18*	.27**	–	.46**	.21**	.12	.66**	.35**	.17*
4. Parental influence— W3	.16*	.19*	.39**	–	.25**	.07	.43**	.54**	.29**
5. Parental influence— W4	–.04	.26**	.29**	.36**	–	–.03	.08	.29**	.27**
6. Peer influence—W1	.09	.65**	.27**	.13	.14	–	.31**	.24**	.26**
7. Peer influence—W2	.22**	.19*	.74**	.29**	.31**	.30**	–	.42**	.30**
8. Peer influence—W3	.20**	.21**	.39**	.63**	.44**	.23**	.47**	–	.49**
9. Peer influence—W4	.16*	.19*	.31**	.32**	.51**	.24**	.37**	.55**	–
<i>M</i>	30.3	5.1	5.4	5.4	6.0	4.3	4.6	4.6	4.3
<i>SD</i>	9.1	2.9	2.7	2.6	2.2	3.1	2.9	2.9	2.7
Total sample <i>N</i>	300	416	362	337	320	416	362	337	320

Note: W1 means wave 1. W2 means wave 2. W3 means wave 3. W4 means Wave 4.

Correlations for girls are below the diagonal and correlations for boys above the diagonal. Means and standard deviations are presented for the entire sample

* $p < .05$, ** $p < .01$

Full Model Estimation

A preliminary HGLM model was estimated that examined the effects of time, both quadratic and linear parameters, gender, and SES on adolescents' reliance on parents and peers as social influences. Preliminary models were more exploratory in nature and we wanted to be sure to detect significant effects that might be missed due to the large number of parameters estimated and the subsequent reduction of power. Therefore, all parameters that reached a trend level (i.e., $p < .10$) were retained for the final reduced model (Henkel 1976).

An unconditional quadratic growth model was estimated for both dependent variables to assess the trajectories of peer and parental influence over the four-year period. Quadratic parameters were included because researchers have suggested that parental and peer influence during adolescence may not follow a linear trend (Berndt 1979; Collins and Roisman 2006) and preliminary analyses suggested a nonlinear pattern across time. Thus, results are discussed in

regards to both the linear change at the beginning of the study (i.e., the initial rate of change) and the acceleration rate (i.e., the quadratic rate). The acceleration rate describes how the growth rate changes for peer and parental influence in respect to time for all four waves of the study (i.e., the nonlinear rate). The linear parameter was significant for peer influence but not for parental influence and thus for parental influence only the quadratic term was included in the reduced model.

Next, a preliminary model was examined to identify significant and nonsignificant parameters with regards to the effects of youth gender and SES (family income) on parental influence and peer influence. SES as a time-varying covariate was not included in the final analysis because estimates of fixed effects indicated that the log-odds of choosing parents and peers as a social influence did not vary as a function of SES by time. In addition, SES was not a significant predictor of initial levels of parental influence (intercept) and therefore was not retained in the final model. Finally, contrary to expectations gender was not significantly associated with change over time in reliance on parents as an influence. Equations for the final reduced model used to test the study hypotheses are provided below.

Level-1 Model:

$$\eta_{jti} = \beta_{1ti}X_{1ti} + \beta_{2ti}X_{2ti}$$

At level-1 the counts, in the form of log-odds, of parental and peer influence were modeled as a function of two dummy variables (X_{1ti} and X_{2ti}). X_{1ti} was coded as a one if the response referred to peer influence at time t for individual i and 0 otherwise. X_{2ti} was coded as a one if the response referred to parental influence at time t for individual i and 0 otherwise. Therefore, the weights β_{1ti} and β_{2ti} were the multivariate response of the i th individual at time t .

Level-2 Model:

$$\beta_{1ti} = \Pi_{10i} + \Pi_{11i}a_{ti} + \Pi_{12i}a_{ti}^2 + r_{1ti} \quad \beta_{2ti} = \Pi_{20i} + \Pi_{22i}a_{ti}^2 + r_{2ti}$$

At level-2 the log-odds that adolescents relied on peers (β_{1ti}) and the log-odds that adolescents relied on parents (β_{2ti}) were modeled separately as a function of time (a_{ti}). Both linear (Π_{11i} , for peers only) and quadratic effects (Π_{12i} , Π_{22i}) were estimated. The error terms at level-2 (r_{1ti} and r_{2ti}) allowed for a multivariate response by adolescents and represented the residual association between the two social influences (peers and parents).

Level-3 Model:

$$\begin{aligned} \Pi_{10i} &= \gamma_{100} + \gamma_{101}(SES_i) + \gamma_{102}(Gender_i) + u_{10i} & \Pi_{11i} &= \gamma_{110} + \gamma_{112}(Gender_i) & \Pi_{12i} &= \gamma_{120} + \gamma_{122}(Gender_i) \\ \Pi_{20i} &= \gamma_{200} + \gamma_{202}(Gender_i) + u_{20i} & \Pi_{22i} &= \gamma_{220} \end{aligned}$$

At level-3, HGLM models were estimated to describe how the growth models (level-2) for both peers and parents changed as a function of SES and gender. Specifically, at the initial time point,

models were estimated that described the probability that a specific adolescent would rely on peers to deter antisocial behavior as a function of SES (γ_{101}) and gender (γ_{102}). Models also were estimated that examined the linear trend at the beginning of the study and the acceleration rate for the probability that adolescents relied on peers as a function of gender (γ_{112} , γ_{122}) but not SES. The log-odds probability that an adolescent initially relied on parents as a social influence was modeled as a function of gender (γ_{122}).

Multivariate Reduced Growth Models: The Effects of Time on Social Influence

Reliance on peers as a social influence that deterred antisocial behavior changed across time (Table 3). The linear rate at the beginning of the study was significant, $t = 2.83$, $p < .01$, indicating that the probability that youth relied on peers as a social influence increased from W1 to W2 of the study. The acceleration rate for peer influence also was significant, $t = -3.21$, $p < .01$, signifying that by the end of W4 the effect of time on adolescents reliance on peers as social influences was smaller than the initial effect at W1. Furthermore, an examination of the log odds¹ indicated that the probability that adolescents (both males and females) relied on peers was .77 (1.21 logits) at W1 and .62 (.49 logits) at W4. As hypothesized, the linear rate at which adolescents chose peers as a social influence decreased by W4 suggesting that peers may not be as influential in deterring antisocial behavior as youth transition into middle adolescence.

Table 3 Gender and SES as predictors of peer and parental influence on abstinence choices

Effect	Peer influence			Parental influence		
	Coefficient	SE	Log-odds	Coefficient	SE	Log-odds
Level 2 fixed effects						
Intercept	1.23**	.26	3.42	2.54**	.23	12.72
Linear slope	.97**	.34	2.64			
Quadratic slope	-.34**	.71	.71	.13**	.03	1.13
Level 2 predictors						
SES						
Intercept	.03*	.01	1.03			
Gender						
Intercept	-.97**	.33	.34	-.67*	.28	.51

Linear slope	-.71	.43	.49			
Quadratic slope	.32	.14	1.37			

Note: * $p < .05$, ** $p < .01$

The opposite acceleration pattern was found in regards to adolescents' reliance on parents. Time was associated significantly with parents as a social influence but only in regards to the acceleration rate. The positive acceleration rate indicated that parental influence regarding abstinence choices became stronger at the end of the four-year period. Furthermore, an examination of the log odds indicated that the probability that adolescents relied on parents was .91 (2.34 logits) at W1 and .99 (4.29 logits) at W4. These results are consistent with the hypothesis that adolescents reliance on parents as social influences increased as youth entered middle adolescence.

We also hypothesized that on average adolescents would rely more on parents than peers as social influences to deter antisocial behavior. Estimation of log-odds for both parental and peer influence (See footnote 1) indicated that at W1 the probability that youth relied on parents was .91 as compared to the probability of relying on peers, which was .77. At W4, when adolescents were about 15 years old, the probability that they relied on parents increased to .99. The probability of relying on peers had decreased to .62. This finding supports the hypothesis that adolescents would rely on parents more often as social influences that deter antisocial behavior and that parents would begin to take on more salience during middle adolescence than during early adolescence.

Multivariate Reduced Growth Models: The Effects of Gender on Social Influence

The effect of gender on the intercept, which describes the initial reliance on peers at W1, was significant, $t = -2.95$, $p < .01$, indicating that controlling for average family income, female adolescents were more likely to rely on peers as a social influence on abstinence choices than were male adolescents. Gender also was associated with reliance on parents as a social influence at W1, $t = -2.42$, $p = .02$, with female adolescents relying more on parents as a social influence that deterred antisocial behavior. The odds ratios for both peer and parental influence indicated that at the onset of the study male adolescents were 1/3 less likely than female adolescents to rely on peers as a social influence that deterred antisocial behavior, and 1/5 less likely than female adolescents to rely on parents to deter antisocial behavior. These findings are consistent with the hypotheses that both parents and peers would be chosen as social influences more often by female adolescents than male adolescents.

Time by Gender Interaction

The effect of time on reliance on peers as a social influence also differed for male and female adolescents. The linear rate of change at the beginning of the study indicated that female

adolescents increased in the probability of choosing peers as a social influence; but, this effect was not statistically significant. However, the acceleration rate was significant, $t = 2.31, p = .02$, indicating that by the end of the four years male youth increasingly chose peers as social influences to deter antisocial behavior. Gender differences for the linear rate of change at the beginning of the study and the acceleration rate in choosing parents as a social influence were not significant and thus not retained in the reduced model. This finding was not consistent with our expectations, as we hypothesized that female adolescents would increase in the rate at which they chose parents as a social influence when compared with male adolescents.

Multivariate Reduced Growth Models: The Effects of Socioeconomic Status on Social Influence

The effect of family income on the intercept of peer influence was significant, $t = 2.57, p = .01$, indicating that adolescents with higher family income were more likely to rely on peers to deter antisocial behavior during W1. The odds ratio indicated that with every unit increase of income (where a unit was defined as an increase of \$5000) adolescents were 1.02 times more likely to rely on peers to deter antisocial behavior. Furthermore, preliminary analyses indicated that SES did not have a significant effect on reliance on parents as an influence on abstinence behavior and the effect of average SES on reliance on peers or parents as social influences did not change over time.

Variance components for each level of the HGLM model are presented in Table 4. All variance components were significant indicating that there were significant individual differences among adolescents in their reliance on both peers and parents as influences that deter antisocial behavior after accounting for time, gender and SES.

Table 4 Variance components

Random effect	Peer influence		Parental influence	
	Variance component	χ^2	Variance component	χ^2
Level-2 error	4.92	3426.71	6.65	2836.53
Level-3 error	3.65	983.52	3.5	747.96

Note: All variance components are significant at $p < .01$

Discussion

The importance of parents and peers as social influences on adolescent adjustment remains one of the most heavily investigated areas of research. Theorists have suggested that adolescents' needs to develop autonomy outside the family decrease the social influence of parents (Blos 1962; Erikson 1968). However, research has suggested that parents and peers *both* contribute significantly to the socialization of adolescents (Dodge et al. 2006). The

current study used growth-modeling techniques to examine adolescents' reliance on both peers and parents to deter youths' engagement in antisocial behavior during early adolescence. We also considered the effects of gender and SES on social influence selections during the transition from early to middle adolescence. This study marks a departure from the traditional focus of social influences on *engagement* in antisocial behavior by focusing on adolescents' reliance on peers and parents as *deterrents of* antisocial behavior. We believe that this shift in focus from influences on engagement to influences on deterrents of antisocial behavior is critical in order to understand more fully the influence of parents and peers on all domains in which adolescents make choices.

Peers and Parents as Social Influences

Consistent with expectations, both parents and peers were chosen frequently as social influences on abstinence behavior. Observation of the means and the average log-odds indicated that the probability that adolescents would choose peers to deter antisocial behavior was less than the probability that adolescents would choose parents to influence their abstinence choices. At W4 the probability of choosing parents as a social influence, compared with choosing peers, was particularly pronounced. Although results are in opposition to historical views of autonomy development, recent work has suggested that adolescents continue to rely on parents to influence certain choices, specifically those that involve youth's personal safety and well-being (Daddis 2008). Furthermore, our finding supports research suggesting that parents remain important sources of influence over certain domains in adolescents' lives even during middle adolescence when peers become more influential (Maguen and Armistead 2006).

Interestingly, quadratic growth curves indicated that once adolescents had entered high school there was a significant decrease in the rate at which peers were chosen as social influences. Although past research has suggested that peers may take on increased influence as youth transition from early to middle adolescence, it is important to consider the types of choices that peers may be influencing. For instance, rates of antisocial behavior increase when adolescents transition into high school (Johnston et al. 2007), and as risk behavior becomes more normative, peers may have less of an influence on deterring that behavior because in essence "everyone is doing it" (Hussong 2000). This explanation is consistent with the quadratic pattern found in the current study such that peers became decreasingly important during middle adolescence in deterring antisocial behavior.

The extent to which adolescents relied on parents as a social influence to deter antisocial behavior, on the other hand, increased across the four waves. These results are in direct opposition to theorists who suggest that parents are no longer influential in adolescents' development (Harris 1998). In this sample, parents were chosen more frequently as a social influence on abstinence behavior, and as adolescents transitioned into middle adolescence parents were cited as increasingly important deterrents of antisocial behavior. Few studies have considered the effect of parents and peers as social influences on deterring antisocial behavior

even though this information is critical for informing prevention programs. More research is needed that examines adolescents' reliance on parents and peers as social influences that deter risk behavior. Specifically, examining the choices in which adolescents' rely on parents to influence is an important area of research that will help scholars to understand the choices that parents continue to effect throughout the course of adolescence.

Youth Gender and Reliance on Social Influences

Female adolescents chose both peers and parents as deterrents of antisocial behavior more often than did male adolescents across all four waves of the study. When youth were in sixth grade, there were significant gender differences with female adolescents relying more on both peers and parents to deter antisocial behavior. This finding is consistent with our predictions and with past research and theory that suggested female adolescents rely more on relationships to influence their choices (Anderson et al. 1999; Gilligan 1982).

Contrary to expectations, when compared to female adolescents, male adolescents experienced a more dramatic increase in the probability of choosing peers as social influences who deterred antisocial behavior when transitioning into middle adolescence. Very little research has investigated gender differences in choosing peers as a social influence during the transition from early to middle adolescence. Consistent with the current results there is some research that indicated male adolescents experience a steeper improvement in same-sex friendships than female adolescents (Way and Greene 2006), and during early adolescence girls experience a greater level of intimacy with peers than do males but by late adolescence gender differences no longer exist (Azmitia et al. 1998). It is possible that due to this increase in relationship quality, male adolescents come to feel that they can depend on their peers as social influences to deter risk behaviors. To our knowledge, no studies have explored changes in gender differences for reliance on peers as a social influence on deterring antisocial behavior. More research is needed to substantiate gender differences uncovered in the current study, and to explore how relationship quality with peers might affect reliance on peers as a social influence differently for male and female adolescents.

Socioeconomic Status and Reliance on Social Influences

Results indicated that SES, as measured by family income, only was associated significantly with reliance on peers as a social influence on abstinence behavior in 6th grade. This finding is consistent with our expectations and previous research suggesting that adolescents with lower family incomes may view the peer culture as accepting of antisocial behavior and thus rely on peer influences less to deter that behavior (Anderson 1999). The effect of SES on reliance on peers as a social influence did not change across time.

SES was not associated with parents as a social influence on abstinence choices. We expected that adolescents from lower-income families would rely less on parents as a social influence than adolescents from higher-income families. However, despite the fact that several studies have

found a relationship between lower family income and higher rates of antisocial behavior, results are far from conclusive and several studies have found an inverse relationship or no relationship at all (Bjerk 2007). Inconsistent results may be more of a reflection of the choice of measure used for SES or the sample for a given study. In the current study, although there was variability in family-level income for the sample, only about 12% of the families reported incomes below the poverty line. It is plausible that the stresses and strains associated with more extreme levels of poverty have a stronger impact on parenting than moderate levels of financial instability, and thus would be more likely to affect adolescents' reliance on parents as an influence on antisocial behavior. Furthermore, a lack of significant findings also may have been influenced by the choice to use income as an indicator of SES. Although income was appropriate in this study, and has been found to be associated with engagement in antisocial behavior (Farrington 2005), it is plausible that education or a measure of the neighborhood environment might have been more strongly associated with reliance on parents as a social influence.

Limitations and Future Directions

This study makes an important contribution to the literature on the effect of social influences on the choices adolescents make regarding antisocial behavior. However, there are important limitations. Most notably, the study relied solely on adolescent self-report on questionnaires. From a conceptual standpoint, this decision was appropriate because of the focus on adolescents' reliance on social influences to deter antisocial behavior. However, the validity of self-reports are subject to social desirability, as well as the characteristics of the adolescent (Brown and Zimmerman 2004). To reduce error introduced by self-report, future studies might want to consider using vignettes or structured laboratory tasks to assess social influences on adolescents' choices, as both these methods are less subject to impression management (Cohen and Prinstein 2006).

The generalizability of the findings may be influenced by the characteristics of the sample. Participants represented married families of largely European American descent. Thus, these results may not be applicable to adolescents from different ethnic groups and family structures. Adolescents from single-parent homes and adolescents who experience extreme levels of poverty are more at-risk for becoming involved in antisocial behavior (Farrington 2005). This risk context might alter influence patterns. Finally, the sample is limited because the role of social influences was only considered during early adolescence and the transition to middle adolescence. Some research has suggested that peer influence and parental influence might change during late adolescence (Collins and Roisman 2006). Future studies should examine whether parental and peer influence decreases as adolescents begin to take more responsibility for choices in their lives.

In regards to the analyses, the decision was made to compute count variables that combined antisocial behaviors together instead of examining the behaviors separately. Although preliminary analyses showed high correlations among antisocial behaviors it is plausible that

findings may have been different had we considered the effect of gender, SES, and time on the different antisocial behaviors in separate analyses. Furthermore, it is important to note that the residuals from the HLM analysis indicated biased estimates, which may cause over or under estimation of the amount of variability in reliance on social influence. The current study relied on robust standard errors for hypotheses testing which allows us to be less cautious in interpreting significance tests (Raudenbush and Bryk 2002). Interestingly, observation of the distribution of the residuals from the HGLM analysis suggested the possibility of a bimodal distribution, which may imply there are types of people or groups. Future research should investigate the extent to which individual or group characteristics might predict reliance on peer or parental influence on abstinence behaviors.

Finally, the measure of social influence used in this study is a new measure developed by Barber that has not been used previously. Thus, there is not a body of evidence supporting the psychometric properties of this measure. However, reliability estimates in the current study were excellent and significant findings provide evidence of construct validity. Future studies would benefit from testing this measure with more diverse samples to provide additional evidence of reliability and validity.

Despite limitations, this study contributes to the growing body of research that documents influence by both parents and peers on adolescents' choice to abstain from antisocial behavior. Future research should build on the current study and focus on predictors of adolescents' reliance on social influences to deter antisocial behavior because this focus on abstinence choices is critical for the development of effective prevention programs that promote competent behaviors and reduce antisocial behaviors (Cowen 1980).

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Footnotes

1 Using the following equation log odds were computed to examine the probability that adolescents would rely on parents and peers for each of the four years of the study. Contact corresponding author for more details.

$$\text{Reliance on Peers} = \beta_{10} + \beta_{11} (\text{Time}) + \beta_{12} (\text{Time}^2)$$

$$\text{Reliance on Parents} = \beta_{20} + \beta_{21} (\text{Time}^2)$$