

Gender Peer Effects on Adolescent Behavior

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Abstract

This paper analyzes gender peer effects among junior and high school students. The sample is drawn from a large, nationally representative, longitudinal study of adolescents, with detailed individual and school information. Variation in the proportion of girls across grade levels within a school provides the identification, while school selection is controlled with fixed effects. The availability of short and long term academic indicators, as well as extensive data on attitudes towards school and school involvement, delinquency, friendships, and sexual activity provides a unique look at the ways in which adolescent girls and boys affect each other. My results suggest that high school girls who have more female classmates are significantly and substantially more likely to graduate. However, there is no significant correlation between sex ratios and high school completion among boys; or grades, enrollment in advanced courses, or college attendance of boys or girls. On the other hand, I do find significant behavioral effects, whose direction is consistent with literature on (a) marriage markets and (b) pubertal development. Namely, the proportion of girls in a school-grade is positively correlated with being sexually active among girls and with being sexually aware among younger boys. Having more female classmates is also correlated with more positive attitudes towards school but, at the same time, greater likelihood of delinquent, and potentially dangerous, behaviors among boys.

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1. Introduction

This paper analyzes the effects of classroom gender composition on junior and high school students. I build upon existing literature on gender peer effects by investigating an extensive list of behaviors and attitudes, such as friendship network formation, attitude towards school and school participation, delinquency, and sexual activity, in addition to short and long term academic outcomes. The existence of intra-school grade-level variation in gender composition provides the identification and allows me to address school selection concerns. School selection poses a serious obstacle in any education analysis – school quality varies widely and can be correlated with income, parental education or, since girls perform better on average, gender. By including school fixed effects, I am able to capture between-school differences in academic and behavioral outcomes. Within-school differences in the proportion of girls in a given grade, on the other hand, are plausibly random. Since all the schools in my sample are mixed-gender and half of the variation in gender composition is within-school, I am able to capture gender peer effects of reasonable magnitude. Furthermore, in the case of gender peer effects, it is reasonable and appropriate to define peers as classmates. While some peer influences might operate through social interactions, which may not be limited to students in the same school-grade, boys and girls can influence each other without having explicit social ties.

I find only limited evidence of gender peer effects on academic achievement. High school girls who have more female classmates are significantly and substantially more likely to graduate. However, I find no significant correlation between sex ratios and high school completion among boys; or grades, enrollment in advanced courses, or college attendance of boys or girls. On the other hand, I do find behavioral effects that are consistent with literature on marriage markets and on effects of puberty. Specifically, I find that an abundance of girls in a school-grade is correlated with greater levels of sexual activity among girls, particularly in high school. There is no correlation with the total number of sexual partners or with “non-romantic” sexual activity. This is consistent with bargaining

power models of marriage,¹ or, in this case, romantic relationships between two adolescents, assuming that teenage boys derive greater utility from sex. Similar findings have been produced using data on college students (Jemmott et al., 1989), immigrants (Angrist, 2002), and African-American communities (Cornwell and Cunningham, 2008). Boys in grades with more female classmates are not more sexually active, but more boys in grades 7 and 8 do report being attracted to girls. The proportion of girls in the school-grade is also significantly correlated with positive attitudes towards school and, at the same time, more fighting and delinquent behavior, such as vandalism and stealing, among junior high school boys. Similar findings have been reported in literature on pubertal development (e.g., Felson and Haynie, 2002).

The rest of the paper is structured as follows. I summarize relevant literature in Section 2. Sections 3 and 4 describe the data and my empirical strategy, respectively. Section 5 presents the results and Section 6 concludes.

2. Literature Review

There is a growing body of literature addressing student peer effects through quasi-experimental methods, including intra-school grade-level variations. The number of such papers dealing specifically with gender peer effects in a mixed-gender environment, however, is much smaller. Furthermore, only one paper estimates gender peer effects for post-pubertal teens: Lavy and Schlosser (2007), which examines the effects of classroom gender composition on 5th through 10th graders using Israeli data. The authors find that greater proportion of girls in a school-grade is positively correlated with test scores of both boys and girls at all grades levels. They also find positive effects on students' and teachers' perceptions of school environment and relationships. On the other hand, they find no significant correlation with students' own behaviors, leading them to conclude that the gender effects are operating primarily through classroom composition. The study benefits greatly from availability of teacher surveys, as well as the large sample of schools (close to 400 middle schools and 300 high schools). However, their data lack

¹ As in Becker (1973).

information about the sexual and delinquency-related behaviors that turn out to be important in my analysis.

Other work on gender peer effects includes Hoxby (2000), which uses a similar methodology but focuses on younger schoolchildren (grades 3 through 6). Hoxby finds positive gender effects on reading and math among both girls and boys. Whitmore (2005) uses random assignments in the Tennessee's Project STAR and finds mixed results in grades K through 3. At the other end of the age spectrum, Hansen et al. (2006) reports positive gender effects using variation in college course group assignments. These studies do not examine behavioral outcomes.

While there has been relatively little analysis of effects of gender composition on sexual activity and related behaviors of schoolchildren, the effects of physical development on adolescents' self-esteem, delinquency, sexual debut, and sexual activity have been studied more extensively. For example, Simmons and Blyth (1987) finds that early pubertal development is associated with lower self-esteem among girls but greater self-esteem among boys. Felson and Haynie (2002) uses the same data as this paper to show that early pubertal development is correlated with better psychological health and adjustment but also greater delinquency among boys. Further evidence of positive and negative effects of puberty for boys in particular can be found in Haynie and Piquero (2006), Magnusson (1998), Moffitt et al. (2001), and Susman et al. (2002).

The effects of gender composition or sex ratios have also been examined in marriage or sexual and romantic relationship markets. The general hypothesis being tested in this literature is that the relative supplies of men and women affect their bargaining power and result in changes in equilibrium behavior, such as marriage and sexual activity. For example, Angrist (2002) finds that, within immigrant communities, a lower proportion of women is correlated with higher marriage rates and lower labor force participation among women. Conversely, Cornwell and Cunningham (2008) finds that a shortage of black men, due to higher incarceration rates, is correlated with a greater number of sex partners among black women. Jemmott et al. (1989) shows that perceptions about the availability

of potential partners (on a college campus) can also affect attitudes about and commitment to an existing relationship.

3. Data

Add Health is a survey initially administered at 144 schools to a nationally representative sample of 90,118 students in grades 7-12 during the 1994-95 school year (Wave 1). According to the study's website (www.cpc.unc.edu/projects/addhealth), Add Health is "the largest, most comprehensive longitudinal survey of adolescents ever undertaken." The survey was designed to ensure that the schools were representative with respect to region of country, urbanicity, school size, school type, and ethnicity. A sub-sample of 20,745 students was given an additional in-home interview, and the parents of 17,670 of these students were also interviewed. Students in the in-home sample were re-interviewed in 1996 (14,738 observations; Wave 2), 2001-2 (15,197 observations; Wave 3), and 2007-9 (data not yet available).

The dataset contains both short and long term academic performance measures. It includes student-reported grades for the 1994-5 school year in English, math, and more broadly defined social studies and science. It also includes participants' academic education level reported in 2001-2 – whether the participant completed high school and is attending (or has completed) a 2- or a 4-year college. In addition, the survey asked an extensive list of questions about school activities, attitudes towards school, engagement in risky or delinquent behaviors (such as smoking, drinking, fighting, vandalism, stealing, lying to parents, etc.), sexual activity, and about friends and sexual partners. I use this information to obtain a broader picture of gender peer effects.

4. Empirical Strategy

A typical concern in the peer effects literature is the possibility of selection correlated with the characteristic of interest, in this case the proportion of girls in the peer group. For example, because girls perform better on average, schools with more girls may be viewed more positively by parents and may draw a disproportionate number of students

with parental pressure to succeed. In the absence of random assignment, a number of studies have used within-school grade level variations to combat this selection problem, and I adopt this methodology here. In essence, I assume that grade-to-grade variations in the sex ratios are driven by exogenous factors and that families cannot anticipate or react to these variations.

This strategy depends crucially on the existence of sufficient variance in gender ratios inside the schools. The proportion of girls in the school-grades in my sample ranges between 29% and 74%, with a mean of 49.4% and a standard deviation of 5.3% (see Table 1 for a breakdown by grade). Exactly half of the variation occurs within the schools (see Table 2).² This variance decomposition is similar to that reported by Lavy and Schlosser and by Hoxby and should be sufficient to identify peer effects of reasonable magnitude.³

To identify the influence of girls on their school peers, I estimate the following reduced form equation separately for girls and for boys:

$$Y_{igst} = \alpha_g + \alpha_s + X'_{igst} \lambda_1 + X'_{(-i)gst} \lambda_2 + \pi P_{gst} + \varepsilon_{igs}, \quad (1)$$

where Y_{igst} is the outcome of student i in grade g and school s ; α_g and α_s are grade and school fixed effects, respectively; X_{igst} is a vector of student i 's and her family's characteristics; $X_{(-i)gst}$ is a vector of characteristics averaged across all members of grade g in school s excluding student i ; and P_{gst} is the proportion of girls in student i 's school-grade. X_{igst} includes an indicator of any learning disability,⁴ parents' education, and dummy variables indicating whether both parents are present, whether at least one parent

² When splitting the sample into students below grade 9 and those in grades 9 or higher, the within-school variation accounts for a slightly smaller proportion of the total – 44% and 43%, respectively.

³ See Gibbons and Telhaj (2008) for a discussion of what constitutes a peer effect of reasonable magnitude.

⁴ Certain regressions also control for physical disability, religious affiliation, and religiosity. Specifically, regressions of physical activity, such as participation in school sports, control for physical disability; regressions of sexual activity control for physical disability and religion.

works, and whether the family receives welfare assistance.⁵ Although parents who participated in the survey were asked about their income, the large number of missing observations and their possible non-random nature prohibits the use of this variable. Instead, I use the proportion of the population within the student's census block group who are over 25 and do not have a high school education, as well as the median household income and its standard deviation in the census tract. These variables, taken from the 1990 Census, are included in the Add Health data set and are available for most respondents. X_{igst} also includes measures of parents' involvement and their expectations of academic achievement, as reported by the adolescents. Students were asked whether they have (i) talked about their school work or grades, (ii) worked on a project for school, or (iii) talked about other things they are doing in school with their mother and/or father figure in the four weeks prior to the interview. I use the total number of affirmative responses as an index of parental involvement. Students were also asked the following question: "On a scale of 1 to 5, where 1 is low and 5 is high, how disappointed would [your mother/father figure] be if you did not graduate from college?" I use the response to this question as the measure of parents' expectations.⁶ $X_{(-i)gst}$ (the average peer group characteristics) is limited to questions asked during the in-school portion of the survey and includes parents' education and the dummies for the presence of both parents and their work status only. School-grade size and its square are also included among the covariates.

An important concern is whether classmates represent the appropriate peer group. They certainly do for effects that occur inside the classroom. For example, Lavy and Schlosser show that a greater proportion of girls in the school-grade is correlated with lower teacher fatigue and improved student-teacher relationships. Furthermore, outside the classroom (a) boys and girls can affect each other without having explicit social connections, i.e., without being friends; and (b) cross-gender friendships can be viewed as the *outcome* of a matching process. Accordingly, I consider school-grade composition to be the single

⁵ Due to large number of missing responses, the welfare variable takes on 3 values: no, yes, and missing. It is treated as a categorical variable.

⁶ To be precise, I use the responses referring to the mother figure whenever they are available, and responses for the father figure when they are not, for both involvement and expectations. Variables for the mother figure typically have fewer missing observations.

explanatory variable of interest, while investigating its effect on friendship network composition, among other outcomes.

5. Results

Table 3 shows statistics for a number of outcome variables by gender.⁷ Consistent with the broader trends in education, girls have higher average grades and high school completion and college attendance rates, although the differences are not statistically significant. Girls also participate in more school activities (i.e., clubs) but fewer sports. There is little difference in the size of either the reach 1 (all students named as friends by the respondent) or the reach 2 (all students named by the respondent and all students named by those students) friendship network between the genders, though, not surprisingly, these networks tend to be majority same-gender. The attitudes of girls and boys towards school, based on agreement with statements like “I feel happy to be at this school,” are quite similar, on average. On the other hand, girls report having less trouble getting along with teachers and students and less fighting, exposure to violence, and so-called delinquent behavior, such as vandalism and stealing. Interestingly, boys and girls have similar prevalence for smoking and drinking, but girls report using marijuana less frequently than boys. Finally, girls report slightly higher levels of attraction to the opposite sex but lower levels of sexual activity. Girls tend to have fewer sexual partners than boys as well. This discrepancy may be explained by differences in propensity to date outside the school. On the other hand, girls and boys might differ in their willingness to report sexual activity. All survey sections dealing with sexual matters were conducted using audio-CASI (audio-computer assisted self interview) technology during the in-home portion of the interview. This presumably mitigated privacy and non-report issues, but it may not have eliminated them. The existence of a gender difference in willingness to report sexual activity is problematic only if it is correlated with the gender composition of a student’s peer group, i.e., if girls who have more female classmates are more likely to underreport their sexual activity, for example.

⁷ See the Appendix for more detailed descriptions of the variables.

I begin my analysis by estimating Equation 1 separately for girls and for boys across all grade levels (7 through 12). The results are shown in Table 4 and Table 5, with each cell showing the coefficient on the proportion of girls in the school-grade, P_{gst} , from a separate regression. All regressions are limited to school-grades with at least 20 students and schools with at least two such grades. In addition, I require that a school-grade contain at least five observations with non-missing values relevant to each regression. Column 1 shows the coefficients for the proportion of girls in the school-grade when one controls only for grade fixed effects. Columns 2-4 add school fixed effects and school-grade size; individual characteristics; and average peer characteristics, respectively. All non-binary outcome variables and the main explanatory variable are standardized, so coefficients indicate the effect, in standard deviations, of a single standard deviation change in the proportion of girls in the school-grade (about 5 percentage points). All regressions are estimated using OLS, probability weights (using weights supplied with the data), and the Moulton correction procedure⁸ with clustering at the school level.

In the specification with the least controls (column 1), the proportion of girls in the school-grade is positively, though weakly, correlated with girls' college attendance and science grades and negatively correlated with girls' extended friendship network size, engagement in physical activity, delinquency, and levels of discord with teachers and classmates ("Having trouble at school"). However, these correlations disappear once school fixed effects are added (column 2), suggesting that they are driven largely by selection. On the other hand, the correlation between school-grade composition and girls' sexual activity becomes significant. That is, when girls have more female classmates they are more likely to report having had sex, though there is no significant correlation with the number of partners. One might worry that deviations of the school-grade composition from the school average are correlated with student characteristics. To check this, I add individual characteristics described earlier (column 3), as well as a more limited set of characteristics averaged across each school-grade (column 4). The former captures the qualities of the girls, while the latter is based on all classmates, including the boys. Adding these controls makes the correlation with sexual activity slightly stronger,

⁸ See Moulton (1986). For more on implementing the procedure in Stata, see Angrist and Pischke (2009).

indicating that it is not driven by characteristics such as parental education, race, religious affiliation, etc. The effect is fairly substantial – a one standard deviation increase in the proportion of girls is associated with a 2 percentage point increase in the probability of being sexually active. By comparison, having a parent with a college education reduces the probability of being sexually active by about 6.5 percentage points. Having both parents present has a similar effect.

Among boys, sex ratios are not significantly correlated with academic performance or sexual activity in any specification. However, boys who have more female classmates appear to participate in more school activities, like school more, and have less trouble getting along with teachers and students. These results are very stable and robust to inclusion of school fixed effects and individual/peer characteristics. Boys with more female classmates also appear to engage in more delinquent behaviors. This correlation becomes significant (weakly) only after individual characteristics are added. Additionally, boys with more female classmates are more likely to have female friends, but this correlation appears to be driven by selection, since the coefficients are drastically reduced and become not significant once school fixed effects are added. In other words, male adolescents who choose (or whose parents choose) schools with a higher proportion of girls are more predisposed to befriend girls in their grade.

One concern when evaluating these results is that trends in gender composition might be correlated with trends in outcomes, at the school level. For example, an introduction of a gender-specific academic, athletic or other extracurricular program at a school (or perhaps something as simple as a growing record of wins for a girls' sports team) might attract students of a particular gender. This would be reflected in school's average performance, due to the gender performance gap. The resulting selection bias would then grow in tandem with the proportion of girls or boys in the school-grade. In order to minimize the possibility of such spurious correlations, one can include school-specific linear grade trends.⁹ School-specific deviations in gender composition from the sample-

⁹ Because Add Health surveyed, in a single year, adolescents at different grade levels, these trends would be capturing both cohort differences and grade or age differences. The latter might be less likely to be

wide trend are statistically significant. Within-school variation in gender composition accounts for 45.8% of the total, when including both school and grade fixed effects. School-specific trends, when added to this ANOVA model, account for 25.5% of total variation (F-statistic is 1.68, with a p-value of 0.0013).¹⁰

Adding school trends to regressions performed on all participants is complicated by the fact that the sample includes a large proportion of schools with only two usable grades. Both middle¹¹ and high schools were surveyed, and of the 117 schools that satisfy all selection criteria, 47 are middle schools, 53 are high schools, and 17 span both pre-high school and high school grades. Since the youngest students interviewed were in 7th grade, all middle schools have only two usable grades (with the exception of two schools that include the 9th grade and, therefore, have three grades). For a school with only two grades, regressing any dependent variable on the school dummy and the sex ratio in each grade is equivalent to regressing on the dummy and the difference in sex ratios between the two grades. Adding a school trend would completely absorb this difference, and doing so for the entire sample of 117 schools is equivalent to ignoring the 45 middle schools with two usable grades. In the context of gender peer effects, however, age differences are of great interest and are, in fact, important, as I will demonstrate. Therefore, I subdivide the sample into 7th and 8th-graders and students in grades 9 and above. The results are shown in Table 6. Most of these students are already separated physically, although some do attend the same schools, as described above. For the younger group, I control for grade and school fixed effects, school-grade size, individual characteristics, and average peer characteristics (same as column 4 in the previous tables). For the older group, I add school trends, although this has no substantive impact on the results (see Table 7).

These results confirm that higher proportions of girls in the school grade are correlated with greater sexual activity among girls, but the coefficient is larger and more significant

linear in nature. For instance, the average proportion of female friends in girls' reach 2 friendship networks peaks in 7th grade at 63.5%, declines to 60.9% in 8th grade, and then remains at essentially 60% in grades 9 through 12.

¹⁰ For schools with more than two usable grades, school trends account for 17.3% of total variation, with an F-statistic of 1.39 and a p-value of 0.0497.

¹¹ Or any other type of school, such as junior high school, that does not include high school grades.

among older adolescents. On the other hand, the correlation between school-grade composition and friendship network size and composition is completely different in lower and higher grades. Girls who have more female classmates in grades 7-8 appear to have larger networks that are more gender-balanced, while in grades 9-12 girls with more female classmates have smaller networks (this effect is not significant at standard thresholds) with a greater proportion of female friends. There is also a significant positive correlation with high school completion that appears only among older girls (the coefficient for younger girls is negative but not significant).

There are important differences between younger and older boys as well. In grades 7-8, boys with more female classmates are more likely to report feeling attracted to girls, to report liking school, and to participate in school activities (the latter is only marginally significant). At the same time, there is a positive correlation with a number of negative behaviors, such as certain types of delinquency (vandalism and stealing), fighting, passive exposure to violence (witnessing someone being shot or being shot yourself, as opposed to shooting someone else), and smoking. Having more female classmates is also marginally correlated with lower math grades among younger boys. By contrast, older boys appear to be less sensitive to the sex ratio in their school-grade. In grades 9-12, higher proportion of girls is correlated with lower reported levels of trouble getting along with teachers and students and with more fighting.¹² The correlation with sexual activity is positive, with a magnitude very similar to that for girls, but not statistically significant. There are also no significant effects on academic outcomes.

It is necessary to note that none of these results remain significant if one corrects for the number of tests performed (38 are shown, even more were performed). Applying the Bonferroni adjustment, for example, which can be done by dividing the desired alpha by the number of tests, would lower the significance threshold from 0.05 to about 0.001. The Bonferroni method has been criticized for being overly conservative – it tests for joint significance of all tests, increases the probability of type II error, and relies on a

¹² It should be noted that there are several questions, in the in-home and in-school portions of the survey, that asked about fighting. Only the in-school response shows a significant correlation with the proportion of girls in the school-grade.

somewhat arbitrary definition of what constitutes a single test.¹³ What is more important, however, is that the results tell a consistent story about the behavioral effects of female peers, for girls and boys, and the significant coefficients do not appear to be random. Consider, for example, younger boys' attitudes towards school. The correlations between gender composition and responses to the statements "I feel close to people at this school," "I feel like I am part of this school," and "I am happy to be at this school" are all large, positive and significant, while the correlations with the responses to statements "The students at this school are prejudiced" and "The teachers at this school treat students fairly" are small, negative, and not significant. The former set of statements evaluates students' feelings and is likely to be influenced by adolescents' self-perception. The later statements, on the other hand, call for an objective judgment of teachers' and schoolmates' prejudices. That gender composition would be positively correlated with the former but uncorrelated with the latter is completely expected in light of the literature on the effects of pubertal development on boys, some of which uses these very data and some of which relies on different data sources.

6. Conclusion

Taken together, the results presented in this paper suggest a story based on sexual activity and/or awareness, but only limited effect on academic performance. Greater proportions of girls in a school-grade tends to affect girls' friendship networks and to increase their propensity to be sexually active. While there is no statistically significant effect on boys' sexual activity, younger boys with more female classmates are more likely to be sexually aware. Having more female classmates is also correlated with more positive attitudes towards school but, at the same time, greater likelihood of delinquent, and potentially dangerous, behaviors among boys.¹⁴

Thus, my analysis expands on the existing literature by considering a much wider array of behaviors than has been previously possible. In contrast to Lavy and Schlosser, I show

¹³ See Perneger (1998), for example, for a more detailed discussion.

¹⁴ Interestingly, for boys, being attracted to girls in grades 7-8 or being sexually active in grades 9-12 is positively and statistically significantly correlated with delinquency, but not with attitudes towards school.

that, in my sample, girls do have a direct impact on the behavior of their peers, i.e., that gender peer effects do not operate through compositional changes alone.¹⁵

The impact of female peers on boys, especially younger ones, seems contradictory at first glance. However, both the positive and negative effects have been reported in the literature on pubertal development of boys. In fact, my findings are so consistent that the question becomes whether exposure to girls can determine the onset of puberty or whether it simply complements its effects. The positive correlation between the “supply” of girls and their sexual activity is also consistent with previous results on markets for partners. Although I do not find any significant correlation with pregnancy rates or the number of sex partners, increased sexual activity, especially among younger adolescents, is certainly a concern and an area for possible policy intervention.

The relative paucity of significant scholastic effects found in this analysis is not entirely surprising, given the lack of agreement regarding the existence of such effects in the literature. However, my results do run counter to those of Lavy and Schlosser, the only authors who analyze students in the same age group. On the other hand, the positive correlation between the proportion of girls and older girls’ high school completion rates is strongly significant and substantial.

¹⁵ Lavy and Schlosser (2007) does show that the proportion of girls in the school grade is positively correlated with fighting, among both girls and boys, in grades 5 and 6, though not in grades 7 through 9.

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Table 1. Proportion of girls in school-grades

Grade	Mean	SD	Min	Max	Obs.
7	49.3%	6.3%	31.9%	73.8%	2,240
8	47.7%	5.0%	29.8%	66.8%	2,144
9	48.8%	4.4%	29.5%	59.4%	2,946
10	52.2%	5.2%	29.5%	65.7%	3,323
11	49.0%	4.4%	33.8%	59.4%	3,225
12	49.3%	5.0%	31.9%	59.5%	2,802
Total	49.4%	5.3%	29.5%	73.8%	16,680

Means and standard deviations are weighted.

Table 2. Decomposition of variance in the proportion of girls

Sample		Sum of squares	Share of total	Degrees of Freedom
Grades 7-8	Between schools	0.24	56%	62
	Within schools	0.19	44%	61
	Total	0.43		123
Grades 9-12	Between schools	0.43	57%	71
	Within schools	0.33	43%	197
	Total	0.75		268
All grades/schools	Between schools	0.59	50%	116
	Within schools	0.60	50%	276
	Total	1.19		392

Table 3. Descriptive statistics

	Girls		Boys		Range
Completed HS	92%		89%		0/1
Attended college	63%		54%		0/1
Attended 4-year college	37%		31%		0/1
English GPA	3.00	(0.92)	2.64	(0.97)	1-4
Math GPA	2.75	(1.03)	2.63	(1.05)	1-4
History GPA	2.97	(0.98)	2.75	(1.03)	1-4
Science GPA	2.92	(0.99)	2.72	(1.02)	1-4
Reach-1 network size	5.49	(2.49)	5.30	(2.66)	1-10
Reach-2 network size	24.38	(13.19)	24.28	(14.29)	1-74
% girls in reach-1 network	66%	(0.24)	38%	(0.27)	0-1
% girls in reach-2 network	61%	(0.18)	43%	(0.20)	0-1
Number of school activities	1.55	(1.66)	0.80	(1.47)	0-21
Number of school sports	0.87	(1.22)	1.28	(1.57)	0-12
Physical activity	2.77	(1.66)	3.30	(1.80)	0-6
Dislike school	15.82	(4.27)	15.63	(4.17)	4-31
I feel close to people at this school	3.69	(1.04)	3.69	(0.98)	1-5
I feel like I am part of this school	3.84	(1.02)	3.81	(1.03)	1-5
I am happy to be at this school	3.66	(1.13)	3.69	(1.12)	1-5
The students at this school are prejudiced	2.80	(1.19)	2.84	(1.21)	1-5
The teachers at this school treat students fairly	3.43	(1.08)	3.53	(1.08)	1-5
Have trouble at school	3.87	(2.80)	4.63	(3.12)	0-16
getting along with your teachers?	0.78	(0.92)	1.02	(1.03)	0-4
paying attention in school?	1.16	(0.99)	1.35	(1.10)	0-4
getting your homework done?	1.07	(1.02)	1.33	(1.13)	0-4
getting along with other students?	0.85	(0.95)	0.93	(1.02)	0-4
Delinquent behaviors	3.47	(4.32)	4.88	(5.75)	0-39
paint graffiti?	0.10	(0.39)	0.17	(0.54)	0-3
deliberately damage property that didn't belong to you?	0.14	(0.43)	0.34	(0.69)	0-3
take something from a store without paying for it?	0.31	(0.71)	0.43	(0.83)	0-3
go into a house or building to steal something?	0.05	(0.29)	0.10	(0.40)	0-3
Fighting	0.57	(0.98)	1.01	(1.20)	0-4
Exposure to violence	0.61	(1.27)	1.47	(2.22)	0-15
You saw someone shoot or stab another person	0.10	(0.36)	0.18	(0.47)	0-2
Someone shot you	0.00	(0.07)	0.03	(0.18)	0-2
Smoke	28%		27%		0-1
Drink	1.05	(1.38)	1.17	(1.58)	0-6
Marijuana	1.14	(5.95)	2.90	(25.17)	0-100
Ever had sex	36%		39%		0/1
Number of sex partners	0.76	(1.29)	0.96	(1.47)	0-4
Ever pregnant	6%				0/1
Feel attracted to opposite sex	87%		84%		0/1

Standard deviations are in parentheses. Means and standard deviations are weighted. Variables with "0/1" range are binary; all other variables take on values within the indicated range.

Table 4. Results – Girls, all grades; Explanatory variable = proportion of girls in school-grade

Dependent Variable	(1)		(2)		(3)		(4)		Students	Grades	Schools
Completed HS	0.01	(0.01)	0.01	(0.01)	0.01	(0.01)	0.01	(0.01)	6,474	388	115
Attended college	0.03*	(0.02)	0.00	(0.01)	0.01	(0.01)	0.01	(0.01)	6,474	388	115
Attended 4-year college	0.03	(0.02)	0.00	(0.01)	0.01	(0.01)	0.01	(0.01)	6,474	388	115
English GPA	0.00	(0.02)	0.00	(0.02)	0.01	(0.02)	0.02	(0.02)	8,161	393	117
Math GPA	0.04	(0.02)	0.03	(0.02)	0.03	(0.02)	0.03	(0.02)	7,729	392	117
History GPA	0.01	(0.02)	-0.00	(0.02)	0.00	(0.02)	0.01	(0.02)	7,283	386	117
Science GPA	0.06*	(0.03)	0.02	(0.03)	0.03	(0.03)	0.03	(0.03)	7,304	389	117
Reach-1 network size	-0.03	(0.03)	-0.00	(0.03)	-0.00	(0.03)	-0.00	(0.03)	5,917	374	113
Reach-2 network size	-0.09**	(0.04)	-0.03	(0.02)	-0.03	(0.02)	-0.02	(0.02)	5,917	374	113
% girls in reach-1 network	0.03	(0.02)	0.02	(0.03)	0.02	(0.03)	0.02	(0.03)	5,917	374	113
% girls in reach-2 network	0.05*	(0.03)	0.02	(0.03)	0.02	(0.03)	0.02	(0.03)	5,721	367	111
Number of school activities	0.05	(0.04)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)	6,843	386	115
Number of school sports	-0.01	(0.03)	-0.01	(0.03)	-0.01	(0.03)	-0.00	(0.03)	6,843	386	115
Physical activity	-0.05**	(0.02)	-0.04	(0.02)	-0.04*	(0.02)	-0.04*	(0.02)	8,306	393	117
Like school	0.01	(0.02)	-0.02	(0.02)	-0.02	(0.02)	-0.02	(0.02)	8,305	393	117
Have trouble at school	-0.04*	(0.03)	-0.01	(0.02)	-0.02	(0.02)	-0.02	(0.02)	8,305	393	117
Delinquent behaviors	-0.03**	(0.02)	-0.02	(0.02)	-0.02	(0.02)	-0.02	(0.02)	8,306	393	117
Ever had sex	-0.01	(0.01)	0.02*	(0.01)	0.02**	(0.01)	0.02**	(0.01)	8,306	393	117
Number of sex partners	-0.03	(0.02)	0.01	(0.02)	0.01	(0.02)	0.01	(0.02)	8,270	393	117
Ever pregnant	-0.01	(0.00)	0.00	(0.01)	0.01	(0.01)	0.01	(0.01)	8,306	393	117
Feel attracted to opposite sex	0.00	(0.01)	-0.00	(0.01)	0.00	(0.01)	-0.00	(0.01)	8,306	393	117
Controls	Grade FEs		Grade FEs, School FEs		Grade FEs, School FEs, Xi		Grade FEs, School FEs, Xi, X(-i)				

* indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. Each cell shows a coefficient and standard error, in parentheses, from a separate regression. All regressions are estimated using OLS with probability weights and Moulton correction procedure with clustering at the school level. The explanatory variable and all non-binary dependent variables are standardized. X_i stands for individual characteristics, $X_{(-i)}$ for average peer group characteristics, and School trends for school-specific linear grade trends (see Appendix for details). All regressions that include school fixed effects also control for school-grade size and its square.

Table 5. Results – Boys, all grades; Explanatory variable = proportion of girls in school-grade

Dependent Variable	(1)		(2)		(3)		(4)		Students	Grades	Schools
Completed HS	-0.00	(0.01)	-0.02	(0.01)	-0.01	(0.01)	-0.01	(0.01)	5,795	385	115
Attended college	0.04	(0.02)	0.01	(0.02)	0.00	(0.02)	0.00	(0.02)	5,795	385	115
Attended 4-year college	0.01	(0.02)	-0.01	(0.02)	-0.01	(0.02)	-0.01	(0.02)	5,795	385	115
English GPA	0.04	(0.03)	0.05	(0.03)	0.04	(0.03)	0.05	(0.03)	7,790	392	117
Math GPA	0.00	(0.04)	-0.01	(0.03)	-0.02	(0.03)	-0.02	(0.03)	7,462	390	117
History GPA	0.02	(0.03)	-0.00	(0.03)	-0.01	(0.03)	-0.01	(0.03)	6,993	385	117
Science GPA	0.03	(0.03)	0.02	(0.03)	0.02	(0.03)	0.03	(0.03)	7,007	387	116
Reach-1 network size	-0.01	(0.05)	-0.05	(0.04)	-0.05	(0.04)	-0.06	(0.04)	4,728	356	105
Reach-2 network size	-0.02	(0.06)	-0.05	(0.04)	-0.06	(0.04)	-0.06	(0.04)	4,733	357	105
% girls in reach-1 network	0.08**	(0.04)	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.04)	4,728	356	105
% girls in reach-2 network	0.10***	(0.04)	0.03	(0.04)	0.02	(0.04)	0.02	(0.04)	4,568	349	105
Number of school activities	0.07*	(0.04)	0.07**	(0.03)	0.06*	(0.03)	0.06*	(0.03)	6,277	378	114
Number of school sports	0.05	(0.04)	0.04	(0.05)	0.04	(0.05)	0.03	(0.05)	6,277	378	114
Physical activity	0.02	(0.03)	-0.02	(0.03)	-0.03	(0.03)	-0.03	(0.03)	7,997	393	117
Like school	0.05*	(0.03)	0.07**	(0.03)	0.06*	(0.03)	0.07**	(0.03)	7,997	393	117
Have trouble at school	-0.05**	(0.02)	-0.07**	(0.03)	-0.06*	(0.03)	-0.07**	(0.03)	7,997	393	117
Delinquent behaviors	0.01	(0.03)	0.04	(0.03)	0.06*	(0.03)	0.05*	(0.03)	7,997	393	117
Ever had sex	-0.01	(0.01)	0.00	(0.01)	0.01	(0.01)	0.01	(0.01)	7,997	393	117
Number of sex partners	-0.04	(0.03)	-0.02	(0.03)	-0.02	(0.03)	-0.02	(0.03)	7,917	393	117
Feel attracted to opposite sex	0.02*	(0.01)	0.02	(0.01)	0.02	(0.01)	0.02	(0.01)	7,997	393	117
Controls	Grade FEs		Grade FEs, School FEs		Grade FEs, School FEs, X_i		Grade FEs, School FEs, X_i , $X_{(-i)}$				

* indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. Each cell shows a coefficient and standard error, in parentheses, from a separate regression. Means and standard deviations are weighted. All regressions are estimated using OLS with probability weights and Moulton correction procedure with clustering at the school level. The explanatory variable and all non-binary dependent variables are standardized. X_i stands for individual characteristics, $X_{(-i)}$ for average peer group characteristics, and School trends for school-specific linear grade trends (see Appendix for details). All regressions that include school fixed effects also control for school-grade size and its square.

Table 6. Results – Girls and boys, by grade
 Explanatory variable = proportion of girls in school-grade

	Girls				Boys			
	Gr. 7-8		Gr. 9-12		Gr. 7-8		Gr. 9-12	
Completed HS	-0.02	(0.02)	0.02***	(0.01)	-0.03	(0.02)	0.00	(0.01)
Attended college	0.03	(0.03)	-0.00	(0.02)	-0.01	(0.03)	0.02	(0.02)
Attended 4-year college	0.02	(0.03)	0.01	(0.02)	-0.00	(0.03)	-0.02	(0.02)
English GPA	0.05	(0.04)	-0.02	(0.04)	0.08	(0.05)	0.04	(0.05)
Math GPA	0.02	(0.03)	0.04	(0.04)	-0.09*	(0.05)	0.03	(0.06)
History GPA	-0.02	(0.03)	-0.05	(0.04)	-0.07	(0.05)	0.06	(0.06)
Science GPA	0.08*	(0.04)	-0.01	(0.04)	-0.00	(0.05)	-0.03	(0.06)
Reach-1 network size	0.10**	(0.05)	-0.06	(0.04)	-0.05	(0.07)	-0.02	(0.07)
% girls in reach-1 network	-0.04	(0.05)	0.08*	(0.05)	-0.09	(0.07)	0.03	(0.07)
Number of school activities	0.07	(0.05)	-0.00	(0.04)	0.17*	(0.09)	-0.05	(0.04)
Number of school sports	0.03	(0.06)	-0.01	(0.03)	0.09	(0.10)	-0.01	(0.05)
Physical activity	-0.05	(0.04)	-0.01	(0.04)	-0.05	(0.05)	-0.02	(0.05)
Like school	-0.03	(0.04)	-0.02	(0.04)	0.09	(0.06)	-0.03	(0.05)
I feel close to people at this school	-0.03	(0.04)	-0.05	(0.04)	0.11**	(0.05)	0.05	(0.05)
I feel like I am part of this school	-0.02	(0.04)	-0.01	(0.04)	0.11**	(0.05)	-0.07	(0.05)
I am happy to be at this school	-0.03	(0.04)	0.01	(0.04)	0.17***	(0.06)	-0.05	(0.06)
The students at this school are [not] prejudiced	0.02	(0.04)	0.01	(0.04)	-0.01	(0.06)	0.05	(0.05)
The teachers at this school treat students fairly	0.01	(0.04)	-0.02	(0.04)	-0.01	(0.06)	-0.00	(0.06)
Have trouble at school	-0.02	(0.04)	0.01	(0.04)	0.04	(0.06)	-0.09*	(0.05)
getting along with your teachers?	-0.06	(0.05)	-0.00	(0.04)	0.02	(0.06)	-0.06	(0.05)
paying attention in school?	-0.05	(0.03)	0.01	(0.04)	0.04	(0.06)	-0.06	(0.05)
getting your homework done?	0.01	(0.04)	0.05	(0.04)	-0.01	(0.05)	-0.04	(0.05)
getting along with other students?	0.04	(0.04)	-0.04	(0.04)	0.06	(0.05)	-0.10*	(0.05)
Delinquent behaviors	-0.00	(0.04)	-0.05*	(0.03)	0.13**	(0.06)	0.04	(0.05)
paint graffiti?	-0.07	(0.05)	-0.01	(0.03)	0.12*	(0.06)	-0.01	(0.05)
deliberately damage property that didn't belong to you?	-0.02	(0.04)	0.01	(0.03)	0.14**	(0.06)	0.01	(0.05)
take something from a store without paying for it?	-0.03	(0.03)	-0.07*	(0.03)	0.12**	(0.06)	0.07	(0.05)
go into a house or building to steal something?	-0.00	(0.05)	-0.00	(0.03)	0.16***	(0.06)	0.07	(0.05)
Exposure to violence	0.02	(0.04)	-0.00	(0.04)	0.06	(0.06)	-0.02	(0.05)
You saw someone shoot or stab another person	0.02	(0.03)	0.00	(0.04)	0.08*	(0.04)	-0.07	(0.05)
Someone shot you	0.02	(0.03)	0.03	(0.03)	0.13*	(0.08)	0.08	(0.05)
Fighting	0.00	(0.06)	0.01	(0.04)	0.14*	(0.07)	0.11**	(0.06)
Smoke	-0.01	(0.02)	0.01	(0.02)	0.04*	(0.02)	-0.00	(0.03)
Drink	-0.04	(0.03)	0.00	(0.04)	0.07	(0.04)	-0.02	(0.06)
Marijuana	0.00	(0.02)	-0.01	(0.06)	-0.02	(0.03)	0.04	(0.04)
Ever had sex	0.02*	(0.01)	0.04**	(0.02)	-0.02	(0.02)	0.03	(0.02)
Number of sex partners	0.02	(0.02)	0.03	(0.04)	-0.02	(0.03)	0.03	(0.06)
Ever pregnant	0.00	(0.00)	0.00	(0.01)				
Feel attracted to opposite sex	-0.02	(0.02)	0.00	(0.01)	0.05**	(0.02)	-0.00	(0.02)

* indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. Each cell shows a coefficient and standard error, in parentheses, from a separate regression. Means and standard deviations are weighted. All regressions are estimated using OLS with probability weights and Moulton correction procedure with clustering at the school level. The explanatory variable and all non-binary dependent variables are standardized. Controls include grade and school fixed effects, individual characteristics (X_i), average peer group characteristics ($X_{(-i)}$), and school-grade size and its square.

Table 7. Additional results – Girls and boys, by grade
 Explanatory variable = proportion of girls in school-grade

	Girls				Boys			
	(1)		(2)		(1)		(2)	
Completed HS	0.02 ***	(0.01)	0.02 ***	(0.01)	0.00	(0.01)	0.00	(0.01)
Attended college	-0.00	(0.02)	-0.00	(0.02)	0.02	(0.02)	0.02	(0.02)
Attended 4-year college	0.01	(0.02)	0.01	(0.02)	-0.02	(0.02)	-0.02	(0.02)
English GPA	-0.02	(0.03)	-0.02	(0.04)	0.03	(0.04)	0.04	(0.05)
Math GPA	0.03	(0.04)	0.04	(0.04)	0.01	(0.05)	0.03	(0.06)
History GPA	0.02	(0.03)	-0.05	(0.04)	0.02	(0.05)	0.06	(0.06)
Science GPA	-0.03	(0.03)	-0.01	(0.04)	0.03	(0.05)	-0.03	(0.06)
Reach-1 network size	-0.08 **	(0.04)	-0.06	(0.04)	-0.13 **	(0.06)	-0.02	(0.07)
% girls in reach-1 network	0.07 *	(0.04)	0.08 *	(0.05)	0.00	(0.06)	0.03	(0.07)
Number of school activities	-0.02	(0.03)	-0.00	(0.04)	-0.03	(0.03)	-0.05	(0.04)
Number of school sports	0.01	(0.03)	-0.01	(0.03)	0.01	(0.04)	-0.01	(0.05)
Physical activity	0.00	(0.03)	-0.01	(0.04)	0.00	(0.04)	-0.02	(0.05)
Like school	-0.02	(0.03)	-0.02	(0.04)	-0.02	(0.05)	-0.03	(0.05)
Have trouble at school	0.03	(0.03)	0.01	(0.04)	-0.09 **	(0.04)	-0.09 *	(0.05)
Delinquent behaviors	-0.01	(0.03)	-0.05 *	(0.03)	0.02	(0.04)	0.04	(0.05)
Exposure to violence	0.01	(0.03)	-0.00	(0.04)	-0.01	(0.04)	-0.02	(0.05)
Fighting	0.02	(0.03)	0.01	(0.04)	0.15 ***	(0.05)	0.11 **	(0.06)
Smoke	-0.01	(0.01)	0.01	(0.02)	-0.00	(0.02)	-0.00	(0.03)
Drink	-0.02	(0.03)	0.00	(0.04)	-0.02	(0.05)	-0.02	(0.06)
Marijuana	-0.03	(0.04)	-0.01	(0.06)	0.03	(0.05)	0.04	(0.04)
Ever had sex	0.03 **	(0.02)	0.04 **	(0.02)	0.03	(0.02)	0.03	(0.02)
Number of sex partners	0.00	(0.04)	0.03	(0.04)	0.01	(0.05)	0.03	(0.06)
Ever pregnant	0.01	(0.01)	0.00	(0.01)				
Feel attracted to opposite sex	0.01	(0.01)	0.00	(0.01)	-0.00	(0.01)	-0.00	(0.02)
School trends	No		Yes		No		Yes	

* indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. Each cell shows a coefficient and standard error, in parentheses, from a separate regression. Means and standard deviations are weighted. All regressions are estimated using OLS with probability weights and Moulton correction procedure with clustering at the school level. The explanatory variable and all non-binary dependent variables are standardized. Controls include grade and school fixed effects, individual characteristics (X_i), average peer group characteristics ($X_{(-i)}$), and school-grade size and its square.

Appendix – Variable Definitions and Notes

Acculturation: acculturation level (immigrant generation and language used at home), number of parents born outside US.

Friendship networks: All students who took the in-school Add Health survey were asked to name up to ten of their closest friends (five girls and five boys). The students either identified their friends from a roster of students in the school or stated that the particular friend did not go to the school. Because an attempt was made to interview all students in each school, detailed information is available about most within-school friends of each respondent, as well as about their friends, etc. Reach-1 network is defined as all students named as friends by the respondent; Reach-2 network is all students named by the respondent and all students named by those students.

Friends' or classmates' characteristics ($X_{(-i)gst}$): parents' education and dummies for presence of both parents and their work status.

Individual characteristics (X_{igst}): race, acculturation, learning disability, parents' education, dummies for "both parents present," "a parent works" and "on welfare," median and standard deviation of household income in census tract, proportion of adults without high school education in block group, proportion of Hispanics in tract, parents' involvement in child's school activities, parents expectations about child's college attendance. Physical disability and religious affiliation are also included when dependent variable is sexual activity.

Likelihood of college: students' response to the following question: "On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?"

Behavioral variables

"Delinquency" is composed of answers to the following questions: "In the past 12 months, how often did you

- paint graffiti or signs on someone else's property or in a public place?
- deliberately damage property that didn't belong to you?
- lie to your parents or guardians about where you had been or whom you were with?
- take something from a store without paying for it?
- get into a serious physical fight?
- hurt someone badly enough to need bandages or care from a doctor or nurse?
- run away from home?
- drive a car without its owner's permission?
- steal something worth more than \$50?
- go into a house or building to steal something?
- use or threaten to use a weapon to get something from someone?
- sell marijuana or other drugs?
- steal something worth less than \$50?

- take part in a fight where a group of your friends was against another group?
- act loud, rowdy, or unruly in a public place?”

“Dislike school” is composed of answers to the following questions: “How much do you agree or disagree with the following statements:

- You feel close to people at your school
- You feel like you are part of your school
- Students at your school are prejudiced
- You are happy to be at your school
- The teachers at your school treat students fairly
- You feel safe in your school”

“Exposure to violence” is composed of answers to the following questions: “During the past 12 months, how often did each of the following things happen?

- You saw someone shoot or stab another person
- Someone pulled a knife or gun on you
- Someone shot you
- Someone cut or stabbed you
- You got into a physical fight
- You were jumped
- You pulled a knife or gun on someone
- You shot or stabbed someone”

“Number of school activities” is based on the answer to the following question: “Here is a list of clubs, organizations, and teams found at many schools. Darken the oval next to any of them that you are participating in this year, or that you plan to participate in later in the school year.” There are a total of 21 possible activities. Examples include French club, band, yearbook, etc.

“Number of school sports” is based on the answer to the same question as school activities. There are a total of 12 possible sports.

“Risky behavior” is composed of answers to the following questions: “During the past twelve months, how often did you

- smoke cigarettes?
- drink beer, wine, or liquor?
- get drunk?
- race on a bike, on a skateboard or roller blades, or in a boat or car?
- do something dangerous because you were dared to?
- lie to your parents or guardians?
- skip school without an excuse?”

“Trouble at school” is composed of answers to the following questions: “Since school started this year, how often have you had trouble

- getting along with your teachers?
- paying attention in school?

- getting your homework done?
- getting along with other students?”