ONLINE APPENDIX: The Girl Next Door: The Effect of Opposite Gender Friends on High School Achievement

By Andrew J. Hill

The online appendix describes results from a variety of robustness checks. Appendix Table B1 describes the composition of the sample, which is discussed in the main body of the paper. The remaining appendix discussion is split into four sections. Section A1 discusses the robustness of the instrument specification, Section A2 provides more details on the friendship nomination process and its implications for the definition of friendship, Section A3 provides support for the instrument exclusion restriction, and Section A4 outlines the potential for non-classical measurement error and explains how the empirical strategy overcomes it.

1. Robustness of Results to Instrument Specification

The instrument is constructed using the weighted gender composition of the nearest twenty schoolmates. Appendix Figure A4 provides an example of the spatial distribution of individuals in a small school in the Add Health data. Individuals are clustered in the center of the map, presumably near the location of the school. The gray lines connecting nodes reveal the friendship networks within the school. Females are denoted by red circles and males by blue triangles.

Results in Appendix Table B4 show that an unweighted version of this instrument, as well as weighted and unweighted instruments based on the gender composition of schoolmates within 2km, generate similar findings. The estimates using the distance-based measure are less precise but of similar magnitude to those reported in Table **??**. These results show that the instrument functional form appears to play a limited role in reaching the findings provided in this paper.

Choosing the instrument based on the strength of the first stage potentially biases the standard errors. The extent of this bias is investigated by bootstrapping the combined instrument selection procedure and IV estimation. Considering the four candidate instrument functional forms reported in Appendix Table B4, the instrument that best fits the first stage is chosen for each sample draw (of which there are 50), and the distribution of the estimated parameters from the IV regressions using the chosen instruments provides the bootstrapped standard errors. The bootstrapped standard errors are reported in Appendix Table B5. As is evident, they are very similar to the original analytical standard errors, showing that the bias introduced by the instrument selection procedure is not a concern in this case.

The urbanicity of the community in which the school is located may also have implications for the instrumentation strategy. This is because the relationship between distance and friendship may have a different structure across urban, suburban and rural schools. Results in Table B6 show that the first stage is weak in urban schools (the first column), so the instrument cannot inform our understanding of the effect of opposite gender friends in these communities. Restricting the sample to suburban and rural schools (the fourth column) shows the negative effect of opposite gender friends on achievement, as well as confirming a strong first stage relationship for these schools. These results provide further motivation

for the instrument as the relationship between distance and friendship should be more evident in communities where distance matters; it is not expected in urban settings with high population densities and generally small distances between all schoolmates.

A remaining concern is that distance to the community origin may generate the first stage relationship between the gender composition of close neighbors and the gender composition of friends. Consider a world in which gender is spatially uniformly distributed throughout the school community and individuals are only friends with their neighbors. Individuals close to the community origin will have an equal share of own and opposite gender neighbors, and therefore an equal share of own and opposite gender friends. Individuals at the community boundary, though, may only have only neighbor, and therefore only one friend.

This type of community organization and friendship formation would generate the observed first stage, but variation would be driven completely by individuals at the community boundary. These individuals are likely to differ systematically from individuals at the community origin, and therefore may reduce the generalizability of the estimated local effect.

Appendix Table B7 shows that this is not a concern in the data. This table splits the sample into three groups according to the distance between individuals and the community origin (defined as the mean X- and Y-coordinates in a school community). The instrument has predictive power for those both in the middle and furthest thirds (in terms of distance to the community origin), showing that the effect is not driven only by individuals at the boundary. Interestingly, the effect is weak for individuals closest to the community origin. This is consistent with the idea that the increased density of schoolmates in the neighborhood close to the community origin may result in increased opportunities for friendship formation. This reduces the relationship between distance and friendship as individuals are able to choose among their close neighbors for matches that make better friends.

2. Robustness of Results to the Friendship Nomination Process and Friendship Definition

The friendship nomination and sampling processes are graphically illustrated in Appendix Figure A1. The first and second panels show a hypothetical school with nine students of which five are randomly sampled to complete the detailed survey. The third and fourth panels show the friendship nomination process, including D nominating an individual who could not be matched to an individual in the school. The fifth panel drops the individuals who were not sampled to show the observed school friendship network. Note that this network distinguishes the direction of nominations from which alternative types of friendships can be defined. The sixth panel shows the weak friendship network used in the analysis. I is dropped as peer gender composition is not well-defined for an individual with no matched friends. The direction of nominations is no longer distinguished as

any nomination defines a weak friendship.

Appendix Figure A2 plots the distribution of the share of matched friendship nominations (ratio of matched nominations to total nominations) by gender, showing that nominations are fully matched for about forty percent of individuals in the sample. The share of matched friendship nominations is orthogonal to the gender composition of schoolmates in the close neighborhood; the correlation coefficient between the instrument and the share of matched nominations is -0.02. This ensures that the empirical strategy deals with potential bias introduced by the matching process (in addition to other biases), such as nominations from weak students being less likely to be matched.

Appendix Table B8 considers the sensitivity of results both to the density of friendship networks from which the gender composition measures are derived and the chosen definition of friendship. The first set of results splits the sample according to the number of friend nominations asked of surveyed individuals and restricts the sample to individuals with at least two friends. The second set of results repeats the primary analysis using different definitions of friendship. These results address concerns related to differences between true and observed friendship networks, and the friendship definition on which these networks are based.

Individuals were asked to nominate either one friend or five friends. The study was designed so that all individuals in the same school nominated the same number of friends. The gender composition measures derived from friendship networks based on five friend nominations are likely to be measured with less error than those based on single nominations. This table shows that potential biases introduced by this aspect of the design do not affect the initial findings. Results are consistent with those originally reported, although they are measured imprecisely due to the smaller sample sizes.

The friendship network gender composition of individuals matched to only one friend are extreme; observed opposite gender friend shares are either zero or one. To show that these individuals do not drive the result, the analysis is performed on a sample restricted to individuals with at least two friends. The point estimate of interest is very similar in this specification. The results are also similar when the analysis is performed on the restricted sample of individuals for whom at least seventy-five percent of friendship nominations were matched. The gender composition of friendship networks for these individuals is likely measured with less error, explaining the maintained precision of the estimates despite the smaller sample.

The nominating process discussed in the data section allows for different definitions of friendships. The preferred definition of friendship for this paper considers any friendship nomination to form a friendship. This is because the identification strategy relies on neighbors affecting outcomes only through the friendship network, and the weakest definition of the friendship network is most likely to satisfy this exclusion restriction. Two alternative friendship networks definitions based

on the nomination process are directional: nominated and nominating friendship networks. These definitions only consider either sent or received nominations to form friendships, respectively. A fourth definition of the friendship network is the strong friendship network discussed in the body of the paper in which only reciprocated nominations form friendships.

Estimates in Appendix Table B8 are similar to those reported in the paper for weak friendship networks, although they are less precisely measured due to the smaller sample sizes. (The sample sizes are smaller because the stronger definitions result in greater exclusion from the sample. Recall that individuals are excluded from the sample if they are not matched to any friends as the gender composition of friendship networks is not well-defined for these individuals.)

3. Instrument Exclusion Restriction

The identification strategy relies on the gender composition of same-school close neighbors being orthogonal to all factors affecting academic achievement other than the gender composition of weak friendship networks.

The first claim supporting this argument is that parents do not choose the location of schools based on the gender composition of the close neighborhood. Appendix Figure A3 reports the distribution of parent motivations for housing locations in the data. The gender of children in the neighborhood was not an available option, but the age of children in the neighborhood was, and was infrequently cited (around five percent). This suggests that locational choice is rarely influenced by the composition of neighborhood children, and, in particular, there is no evidence of neighborhood gender composition playing a role.

The validity of the IV strategy is tested in two ways in Appendix Table B9. First, it considers an experiment similar to randomly reassigning the gender of schoolmates and showing that the reassigned gender composition of close neighbors does not affect the original gender composition of friendship networks. And, second, it confirms the first stage relationship for a composition measure for which randomness is even less contestable than gender.

These tests are performed by introducing another composition measure: share even birth month. Consider an individual with a set of neighbors in the data. Now consider an experiment in which the gender of neighbors is reassigned so that neighbors with an even birth month are of the opposite gender. The share of reassigned opposite gender close neighbors (equivalent to the share of even birth month close neighbors) should not be correlated with the share of (true) opposite gender friends. The first column of Appendix Table B9 reports results from regressing the share of opposite gender friends on the share of even birth month close neighbors and shows that they are uncorrelated.

The share of even birth months friends should have no effect on academic achievement, but, given that individuals are more likely to be friends with schoolmates living in the close neighborhood, the share of even birth month close neighbors should affect an individual's share of even birth month friends. The second

column of Appendix Table B9 confirms the presence of this relationship. Using this as the first stage of an (unnecessary) instrumental variables strategy, the share of even birth month friends is shown to have no effect on school performance (as expected). This table supports the validity of the first stage by performing a placebo test on the first stage and due to the absence of plausible alternative explanations for the relationship between the share of even birth month neighbors and friends.

Two further falsification tests are provided in Appendix Table B10. First, I show how the instrument affects a variable correlated with GPA, but with no reasonable association with the share of opposite gender friends. The Add Health survey includes a question in which students report their general health on a scale of excellent (1) to poor (5). The first column confirms that general health is correlated with GPA, while results in the third column indicate that the share of opposite gender friends has no causal effect on general health as expected. The fourth to sixth columns report reduced form results for subsamples in which the strength of the first stage varies. In particular, using the finding from Appendix Table B6 that there is no first stage in urban settings, it is shown that there is similarly no reduced form relationship in urban schools.

4. Non-classical Measurement Error Arising from Self-reporting Bias

The gender composition of an individual's friendship network is derived from self-nominated friends, and the measure of academic achievement is self-reported GPA. These data may suffer from self-reporting bias. This section outlines the potential for such biases, as well as showing that an instrumental variables strategy deals with these concerns under the assumption that the instrument is orthogonal to self-reporting bias in the outcome and explanatory variable. This result is somewhat obvious, but is useful for understanding the direction of the potential bias under various assumptions about the self-reporting bias and its correlation with other variables in the model.

Consider a simple model in which the true value of an outcome y^* is a linear function of the true value of an explanatory variable x^*.

$$y^* = x^*\beta + e \tag{1}$$

Allow for some form of endogeneity, so $\text{cov}(x^*, e) \neq 0$.

We can write the measured values of the outcome and explanatory variables y and x as the sum of the true values and a measurement error term. These error terms are not random, allowing for some form of systematic self-reporting bias.

$$y = y^* + u_y \tag{2}$$

$$x = x^* + u_x \tag{3}$$

We can substitute Equations 2 and 3 into the true model in Equation 1.

$$y = x\beta + (e + u_y + u_x\beta) \tag{4}$$

The error term in Equation 4 is clearly correlated with the explanatory variable. The correlation between x and e follows from the endogeneity, and there is a mechanical correlation between x and u_x from Equation 3.

We can investigate the consistency of an OLS estimate $\hat{\beta}$ more formally.

$$\begin{aligned}
\operatorname{plim} \hat{\beta} &= \tfrac{\operatorname{cov}(y,x)}{\operatorname{var}(x)} \\
&= \tfrac{\operatorname{cov}(y^*+u_y,x^*+u_x)}{\operatorname{var}(x^*+u_x)} \\
&= \tfrac{\operatorname{cov}(x^*\beta+e+u_y,x^*+u_x)}{\operatorname{var}(x^*+u_x)} \\
&= \tfrac{1}{\operatorname{var}(x^*)+\operatorname{var}(u_x)} \{\beta \operatorname{var}(x^*) + \beta \operatorname{cov}(x^*, u_x) + \operatorname{cov}(x^*, e) \\
&\qquad + \operatorname{cov}(u_x, e) + \operatorname{cov}(x^*, u_y) + \operatorname{cov}(u_x, u_y)\}
\end{aligned} \tag{5}$$

This equation breaks down the potential biases into six components (the terms of the sum inside the braces). The first and third components are the familiar attenuation and endogeneity biases. The remaining components are best understood in terms of the example of this paper. Consider the outcome to be GPA and the explanatory variable to be peer gender composition.

The second component $\operatorname{cov}(x^*, u_x)$ is the bias introduced by correlation between true peer gender composition and self-reporting bias in peer gender composition. For example, individuals with few opposite gender friends may over-report opposite gender friendships, such that $\operatorname{cov}(x^*, u_x) < 0$. This would either bias the estimate towards zero or change the sign of the estimate depending on the relative magnitude of the attenuation bias.

The fourth component $\operatorname{cov}(u_x, e)$ relates to correlation between unobserved determinants of GPA and self-reporting bias in peer gender composition. This may involve some personality trait such as overconfidence. Overconfident individuals may both perform poorly academically and over-report opposite gender friendships, for example. This would also bias the point estimate downwards as $\operatorname{cov}(u_x, e) < 0$.

The fifth component $\operatorname{cov}(x^*, u_y)$ is bias introduced by the correlation between

true peer gender composition and self-reporting bias in GPA. For example, males with a larger share of female friends may systematically over-report GPA if female friends are of higher ability (on average), and individuals have a propensity toward reporting the mean GPA of their friendship networks.

Finally, the sixth component $\text{cov}(u_x, u_y)$ relates to correlation between self-reporting bias in peer gender composition and self-reporting bias in GPA. This correlation would be generated by a world in which some people consistently tell the truth and others consistently distort the truth. For example, some individuals may systematically exaggerate all self-reported data in the direction that is perceived to be more socially-favorable.

The above analysis highlights the potential concerns of using self-reported data. The subsequent analysis shows that using an instrumental variables strategy deals with these concerns under some assumptions about the instrument. (Of course it is already well-known that instruments deal with the attenuation and endogeneity biases.)

Consider an instrument for the explanatory variable z^*, such that $\text{cov}(z^*, e) = 0$. It is assumed to be of the same scale for ease of exposition.

$$z^* = x^* + \epsilon \tag{6}$$

Now consider the covariance between the measured outcome variable y and the instrument z^*.

$$\begin{aligned} \text{cov}(y, z^*) &= \text{cov}(y^* + u_y, z^*) \\ &= \text{cov}(x^*\beta + e + u_y, z^*) \\ &= \text{cov}(x\beta + e + u_y - u_x\beta, z^*) \\ &= \beta\,\text{cov}(x, z^*) + \text{cov}(z^*, e) + \text{cov}(z^*, u_y) - \beta\,\text{cov}(z^*, u_x) \\ &= \beta\,\text{cov}(x, z^*) + \text{cov}(z^*, u_y) - \beta\,\text{cov}(z^*, u_x) \end{aligned} \tag{7}$$

In order for $\beta = \frac{cov(y,z^*)}{\text{cov}(x,z^*)}$, the familiar exactly-identified univariate IV result, it is required that $\text{cov}(z^*, u_y) = 0$ and $\text{cov}(z^*, u_x) = 0$. In other words, the self-reporting biases in the outcome and explanatory variables need to be uncorrelated with the instrument.

In terms of this paper, self-reporting biases in GPA and peer gender composition need to be uncorrelated with neighborhood gender composition. The only real concern is that neighborhood gender composition may affect self-reporting bias in peer gender composition. For example, an individual with a large share of opposite gender close neighbors may over-report opposite gender friends.

Appendix Table B11 reports results from regressing constructed proxies for measurement error in peer gender composition and GPA on the instrument, a female indicator, and self-reported GPA. Proxies for measurement error are con-

structed by differencing the observed measure from another measure that does not suffer from potential self-reporting biases. The gender composition measurement error proxy is the difference between the weak friendship network (in which all nominations generate friendships, so susceptible to self-reporting biases) and strong friendship network (reciprocated nominations generate friendships, so less susceptible to self-reporting bias) gender composition measures, and the achievement measurement error proxy is the difference between self-reported and transcript GPA scores (for the subsample for which transcript GPA scores are available). These results suggest that the instrument is uncorrelated with measurement error in self-reported GPA and peer gender composition, providing support for the empirical strategy.

Appendix Figures

FIGURE A1. FRIENDSHIP NOMINATION AND SAMPLING PROCESSES

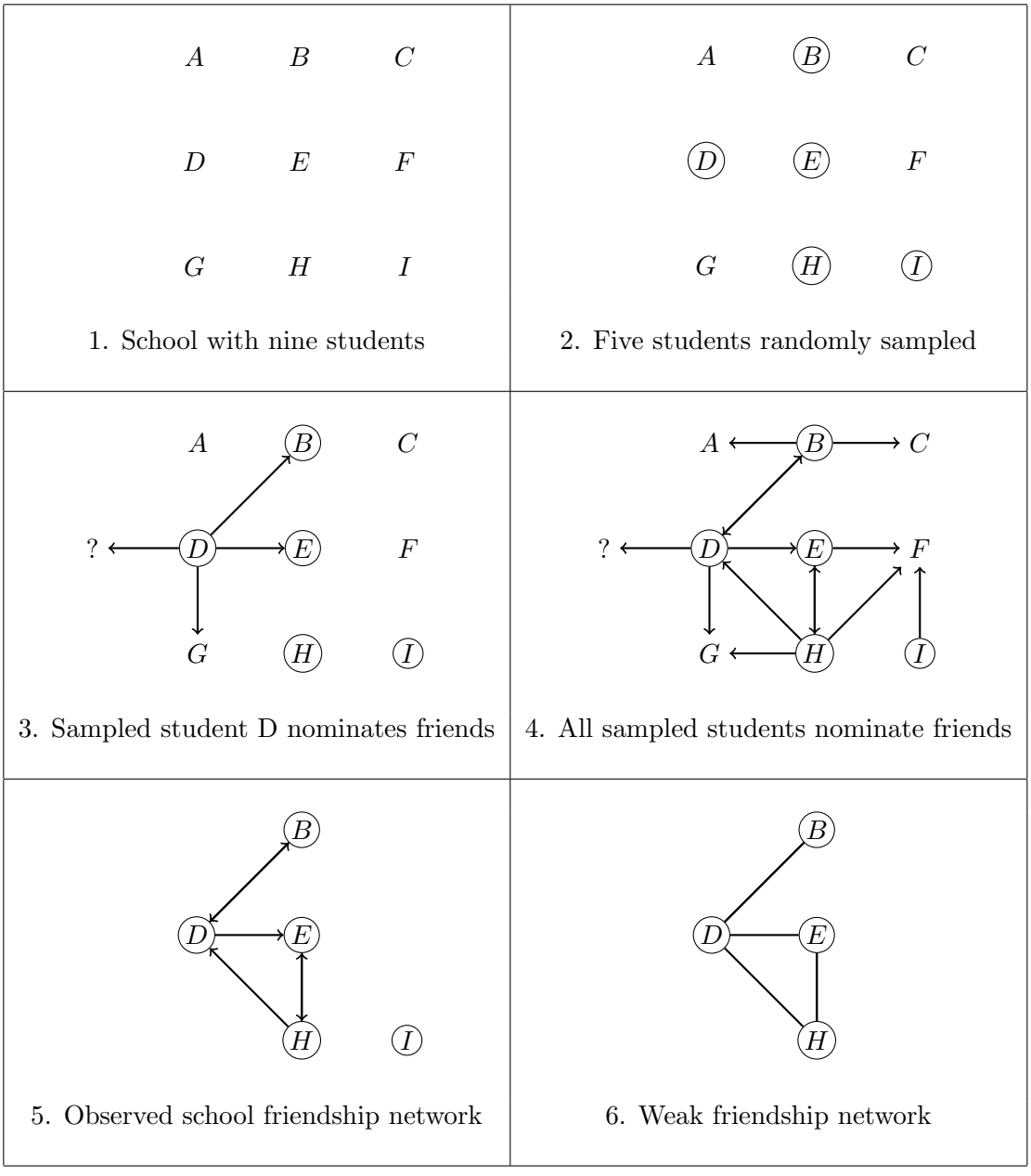
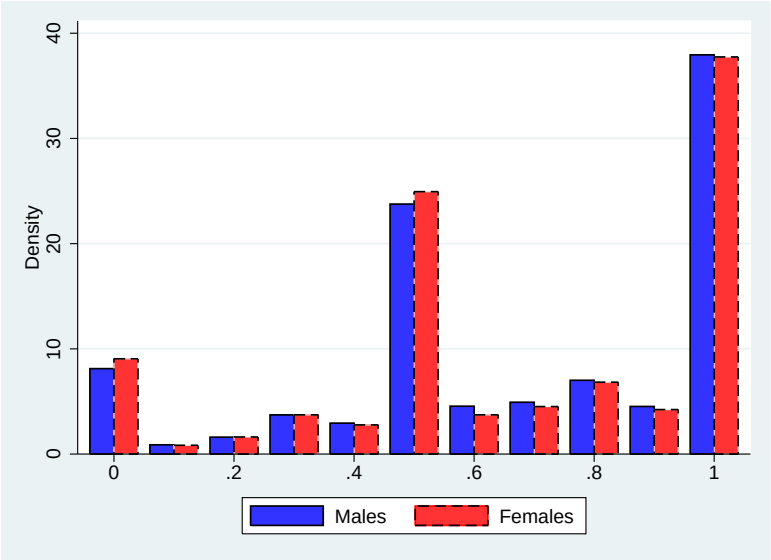
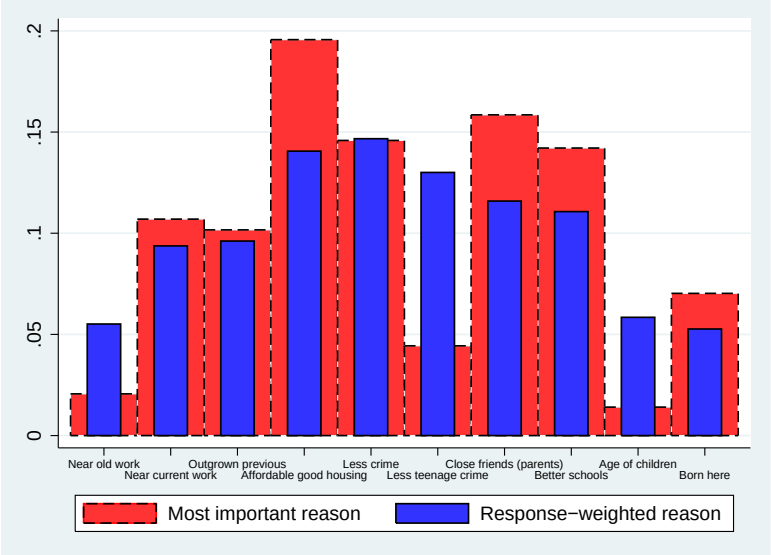


FIGURE A2. SHARE OF MATCHED FRIENDSHIP NOMINATIONS



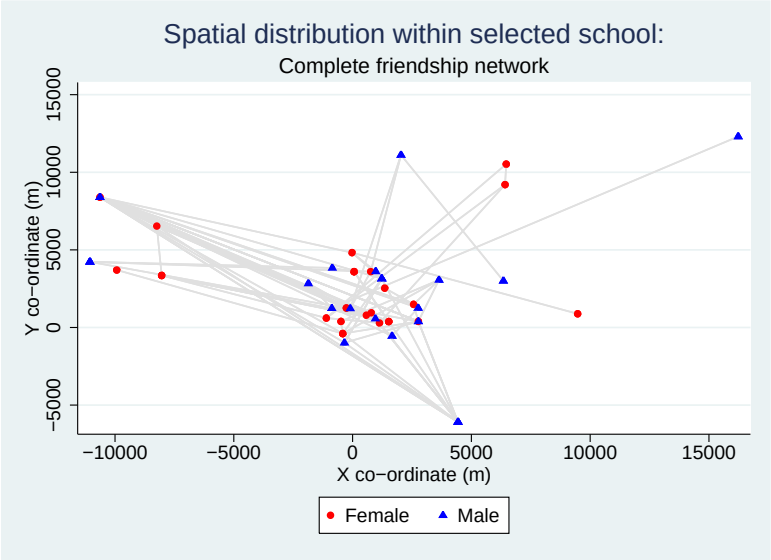
Note: The share of matched friendship nominations is defined as ratio of matched to total nominations. Sixtyeight percent of friendship nominations by individuals in the sample are matched.

FIGURE A3. PARENT MOTIVATION FOR HOUSING LOCATION



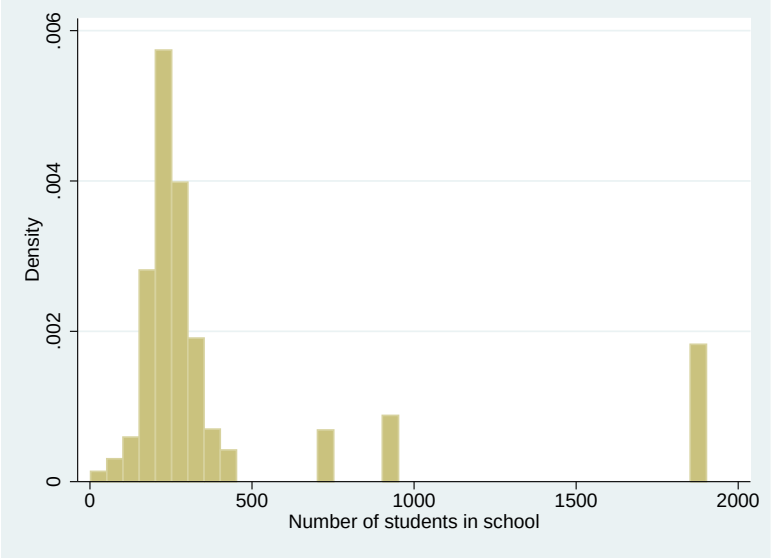
Note: Data obtained from 6404 parent interviews (75 percent of sample). The most important reason is an answer to the question: Which one statement describes the most important reason why you live in this neighborhood? The responseweighted reason is calculated from binary responses to statements of the form: You/your household lives here because X. The interviewed parent could answer yes to as many reasons as desired.

FIGURE A4. SPATIAL DISTRIBUTION WITHIN SELECTED SCHOOL



Note: There are 48 students sampled in the school forming 168 friendship pairs.

FIGURE A5. DISTRIBUTION OF OBSERVATIONS BY SCHOOL



Appendix Tables

Table B1—Descriptive statistics: controls

	Mean		
	All	**Males**	**Females**
Core demographics			
White	0.52	0.52	0.52
Black	0.20	0.20	0.20
Hispanic	0.16	0.16	0.16
Asian	0.09	0.10	0.09
Other	0.03	0.03	0.03
Not born in US	0.09	0.09	0.09
Age (years and months)	16.16	16.24	16.07
Home language			
English spoken at home	0.89	0.89	0.88
Spanish spoken at home	0.08	0.08	0.08
Mother education			
Mother did not graduate high school	0.18	0.17	0.19
Mother graduated high school	0.32	0.34	0.31
Mother attended some college	0.18	0.17	0.19
Mother graduated college	0.25	0.25	0.25
Father education			
Father did not graduate high school	0.14	0.14	0.14
Father graduated high school	0.23	0.24	0.22
Father attended some college	0.13	0.14	0.13
Father graduated college	0.22	0.22	0.21
Parent characteristics			
Interviewed parent not born in US	0.15	0.16	0.15
Not receiving public assistance	0.07	0.05	0.08
Receiving public assistance	0.78	0.80	0.77
Household income			
Household income: <$20k	0.14	0.14	0.15
Household income: $20k-$40k	0.21	0.22	0.21
Household income: $40k-$60k	0.19	0.19	0.18
Household income: >$60k	0.19	0.19	0.19
Household structure			
Mother in household	0.91	0.91	0.91
Father in household	0.71	0.73	0.69
Biological mother in household	0.86	0.86	0.86
Biological father in household	0.60	0.62	0.58
Grade repetition			
Has repeated at least one grade	0.19	0.24	0.15
Observations	8,435	4,124	4,311

Note: Categories for missing such that shares sum to one not reported but included in all analyses.

Table B2—Instrument first-stage estimates

	Gender-symmetric model	*Interaction model*	
	School friends		
	Share opposite gender	Share opposite gender	Female x share opp gender
	(1)	(2)	(3)
Nearest 20 schoolmates			
Share opposite gender	0.13***	0.12***	0.01
	(0.03)	(0.05)	(0.01)
Female		0.01	0.09**
x share opposite gender		(0.06)	(0.04)
Controls			
Female	-0.01	-0.02	0.33***
	(0.01)	(0.03)	(0.02)
Black	0.03*	0.03*	0.01
	(0.02)	(0.02)	(0.01)
Hispanic	0.03	0.03	0.01
	(0.02)	(0.02)	(0.01)
Asian	0.06**	0.06**	0.03
	(0.02)	(0.02)	(0.02)
Other	0.01	0.01	0.03
	(0.03)	(0.03)	(0.02)
Not born in US	0.01	0.01	0.00
	(0.01)	(0.01)	(0.01)
Age (years and months)	-0.03	-0.03	-0.01
	(0.02)	(0.02)	(0.01)
Other controls	x	x	x
School and grade fixed effects	x	x	x
Diagnostics			
F-statistic on excluded instruments	15.32	6.87	4.45
Observations	8435	8435	8435

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B3—OLS estimates of potential mechanisms and long-term outcomes

	Trouble getting along with teacher	Trouble paying attention in class	Trouble getting homework done	Trouble with other students
School friends				
Share opposite gender	0.02	0.03	-0.02	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)
	Number of friends	Relationship in past 18 months	Smoked in past 30 days	Drunk in past year
School friends				
Share opposite gender	0.59***	0.03	0.00	0.02
	(0.04)	(0.01)	(0.01)	(0.01)
	Subsequent year GPA	Graduated high school	Attended college	Ever married
School friends				
Share opposite gender	0.10***	0.01	0.02*	0.01
	(0.02)	(0.01)	(0.01)	(0.02)

Note: Full set of controls included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B4—Robustness check - instrument specification

	Overall GPA (A=4, D or lower=1)			
	(1)	(2)	(3)	(4)
Instrument specification				
20 nearest schoolmates	x	x		
Schoolmates within 2km			x	x
Weighted	x		x	
Unweighted		x		x
School friends				
Share opposite gender	-1.05**	-1.02**	-0.79	-1.38
	(0.53)	(0.47)	(0.68)	(1.06)
Controls				
Female	0.18***	0.18***	0.19***	0.19***
	(0.02)	(0.02)	(0.02)	(0.02)
Other controls	x	x	x	x
School and grade fixed effects	x	x	x	x
First-stage coefficients				
Share opposite gender in close neighborhood	0.13***	0.16***	0.08**	0.06**
	(0.03)	(0.03)	(0.03)	(0.03)
Diagnostics				
F-statistic on excluded instrument	15.32	14.46	6.37	4.46
Observations	8,435	8,435	8,160	8,160

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B5—Bootstrapped standard errors for IV estimates

	Overall GPA (A=4, D or lower=1)		Math & Science GPA	English & History GPA
	Gender-symmetric effects			
	(1)	(2)	(3)	(4)
School friends				
Share opposite gender	-0.84*	-1.05**	-1.58**	-0.67
(Analytical standard errors)	(0.51)	(0.53)	(0.72)	(0.54)
[Bootstrapped standard errors]	[0.54]	[0.45]	[0.69]	[0.55]
Controls		x	x	x
School and grade fixed effects	x	x	x	x
Observations	8,435	8,435	8,169	8,410

Note: Analytical robust standard errors clustered by school in parentheses. Standard errors from bootstrapping (50 replications) combined instrument selection procedure and IV estimation in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table B6—Sensitivity analysis - school urbanicity

	Overall GPA (A=4, D or lower=1)			
	(1)	(2)	(3)	(4)
School urbanicity				
Urban	x			
Suburban		x		x
Rural			x	x
School friends				
Share opposite gender	0.01	-0.96	-2.44	-1.31***
	(1.24)	(0.64)	(1.67)	(0.60)
Controls				
Female	0.20***	0.20***	0.17***	0.19***
	(0.06)	(0.03)	(0.05)	(0.02)
Other controls	x	x	x	x
School and grade fixed effects	x	x	x	x
First-stage coefficients				
Share opposite gender in close neighborhood	0.08	0.14***	0.11*	0.13***
	(0.07)	(0.04)	(0.06)	(0.03)
Diagnostics				
F-statistic on excluded instrument	1.39	10.04	3.70	14.30
Observations	1,892	4,456	2,087	6,543

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B7—Robustness check - distance from community origin

	School friends: Share opposite gender		
	Closest third	*Middle third*	*Furthest third*
	(1)	(2)	(3)
Nearest 20 schoolmates			
Share opposite gender	0.00	0.18***	0.15***
	(0.06)	(0.05)	(0.06)
Controls			
Other controls	x	x	x
School and grade fixed effects	x	x	x
Diagnostics			
F-statistic of excluded instrument	0.01	10.46	5.74
Observations	2,961	2,755	2,719

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B8—Robustness check - network density and friendship definitions

	Overall GPA (A=4, D or lower=1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample restriction								
None	x					x	x	x
Single friend nomination		x						
Five friend nomination			x					
At least two friends				x				
At least 75% nominations matched					x			
Friendship definition								
Any nomination	x	x	x	x	x			
Nominating friendships (out)						x		
Nominated friendships (in)							x	
Reciprocated nominations								x
School friends								
Share opposite gender	-1.05**	-0.84	-1.19	-0.83*	-1.08*	-0.59	-1.08*	-0.45
	(0.53)	(0.66)	(0.79)	(0.49)	(0.55)	(0.56)	(0.55)	(1.32)
Controls								
Female	0.18***	0.18***	0.19***	0.17***	0.20***	0.16***	0.21***	0.17***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.06)
Other controls	x	x	x	x	x	x	x	x
School and grade fixed effects	x	x	x	x	x	x	x	x
Observations	8,435	4,559	3,876	4,110	4,283	6,174	6,017	2,834

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B9—Placebo test - effect of share even birth month

	First stage		*OLS*	*IV*
	School friends			
	Share opposite gender	Share even birth month	GPA (A=4, D=1)	
	(1)	(2)	(3)	(4)
Nearest 20 schoolmates				
Share even birth month	0.03	0.21***		
	(0.04)	(0.04)		
School friends				
Share even birth month			0.01	-0.38
			(0.02)	(0.32)
Controls				
Female	-0.01	0.01	0.20***	0.20***
	(0.01)	(0.01)	(0.02)	(0.01)
Other controls	x	x	x	x
School and grade fixed effects	x	x	x	x
Observations	8,435	8,435	8,430	8,430

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B10—Falsification tests

	GPA	General health		Overall GPA (A=4, D or lower=1)		
		OLS	*IV*			
	(1)	(2)	(3)	(4)	(5)	(6)
General health	-0.12***					
	(0.01)					
School friends						
Share opposite gender		-0.04	0.31			
		(0.02)	(0.56)			
School urbanicity						
Urban				x		
Suburban					x	
Rural						x
Nearest 20 schoolmates						
Share opposite gender				0.00	-0.13*	-0.26**
				(0.11)	(0.08)	(0.11)
Controls						
Other controls	x	x	x	x	x	x
School and grade fixed effects	x	x	x	x	x	x
Observations	8434	8434	8434	1892	4456	2087

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE B11—MEASUREMENT ERROR FROM SELF-REPORTING BIAS

	Measurement error proxy (calculated for subset of sample)							
	Share opposite gender				GPA (A=4, D or lower=1)			
	All nominations				*Self-reported*			
	- reciprocated nominations				*- transcript*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nearest 20 schoolmates:	-0.00			-0.01	-0.06			-0.03
share opposite gender	(0.04)			(0.04)	(0.07)			(0.07)
Female		0.03***		0.03***		-0.10***		-0.12***
		(0.01)		(0.01)		(0.02)		(0.02)
GPA (A=4, D or lower=1; self-reported)			-0.01	-0.01			0.09***	0.10***
			(0.01)	(0.01)			(0.01)	(0.01)
Observations	2,834	2,834	2,834	2,834	3,811	3,811	3,811	3,811
R-squared	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03

Note: Indicator variables for school in saturated sample and period of interview included. Robust standard errors clustered by school in parentheses. *** p<0.01, ** p<0.05, * p<0.1.