Appendix A Sample Selection and Evaluation

A.1 Sample size calculation

We conducted sample size calculations for a cluster randomized trial with an individual-level binary outcome.[23] The estimates are based on pairwise comparisons between equal-sized study arms using a test of difference in proportions and assuming a two-sided alternative hypothesis. The model includes a random intercept for each school. The pairwise comparisons indicate that the study has sufficient power to detect differences in the probability of smoking of 5 percentage points or greater compared to the control arm. We based our calculations on the the meta-analysis of school-based smoking prevention programs by Thomas and Perera (2006). Combined social competence and social influences curricula are associated with an odds ratio of 0.49 (95% CI 0.28 to 0.87), while social competence curricula are associated with an odds ratio of 0.52 (95% CI 0.30 to 0.88). Using this minimum detectable effect, the study will have 80% power to detect an intervention-related reduction in smoking rates for the treatment group with a sample size of 72 schools.

We identified 78 schools in Kulon Progo and Sleman, but excluded 6 schools due to size and distance from the city of Yogyakarta. The intervention was implemented in 72 schools located in 19 subdistricts. These subdistricts are drawn from two districts: Sleman and Kulon Progo. We included 11 subdistricts from Kulon Progo and 8 from Sleman. We selected subdistricts in Sleman that are geographically proximate to Kulon Progo and have a similar socioeconomic profile. We exclude Kalasan and Ngaglik since they are the primary tobacco producing subdistricts in Sleman.[24]

Class size is typically between 12 and 20 students. We excluded schools with fewer than 12 male students in 7th grade to limit the project budget. We also excluded private schools that tend to draw students from a more privileged background. We identified 78 eligible schools. Due to transportation costs, we further excluded the 6 schools located farthest from Yogyakarta proper. If a school had one to three 7th grade classes, we included all male students, up to 60 students per school. If a school had four of more 7th grade classes, we randomly selected two or three classes to include in the sample, up to 60 students per school.

[23] Calculations were performed using Optimal Design Software for Multi-level and Longitudinal Research, version 3.01. The software is available for free download at: https://sites.google.com/site/optimaldesignsoftware/home.

[24] Some tobacco is also grown in the following subdistricts: Prambanan, Ngemplak, Sleman, Seyegan, and Tempel. Source: http://jogja.tribunnews.com/2015/04/19/dua-kecamatan-jadi-sentra-produksi-tembakau. Sleman borders the province of Central Java, where 25% of tobacco is grown.

A.2 Randomization

We used a pair matching procedure to randomly allocate schools to intervention arms. Studies have shown that pair matching outperforms other randomization methods in balancing arms (Imai et al., 2009; Bruhn and McKenzie, 2009). We formed pairs so as to minimize the Mahalanobis distance between the values of selected covariates so as to obtain pairs that are close in their covariate values. We then randomly assigned one unit to the treatment group and one unit to the control group. Mahalanobis distance is a scale-invariant distance metric that takes the inverse of covariates' variance-covariance matrix, thereby finding the pairs of units that are closest in multi-dimensional covariate space (King and Nielsen, 2019). Similarly, among the treatment group schools, we paired the two most similar schools by Mahalonobis distance and randomly assigned one to the commitment pledge arm and one to the pledge plus school competition arm. Thus, we randomly allocated 36 schools to the control arm, 18 schools to the commitment arm, and 18 schools to the commitment pledge plus school competition arm (Table A.1).

Table A.1: Number of schools by subdistrict

District	Control	Pledge	School competition
Sleman	17	12	7
Kulon Progo	19	6	11
No. schools	36	18	18

Our procedure matched on the following covariates: district, subdistrict, distance from the school to Yogyakarta proper, number of male students and classrooms in 7th grade, total number of students, teachers, classes, and student council members in the school, electricity capacity, and average national examination scores in mathematics. We combined information on school characteristics and enrollment (age, gender distribution, class size, and students' scores on national examination) from the website of the national education ministry (`http://sekolah.data.kemdikbud.go.id`) and information from the local education departments in Kulon Progo and Sleman. The matching procedure was performed in R.

A study investigator implemented the random allocation sequences using computer-generated random numbers, concealing the sequence from field staff, school personnel, and students until after the baseline survey was completed.

A.3 Survey

The survey includes separate questionnaires for students, parents, teachers, and principals. Students were surveyed at baseline and 8 months post-intervention. Parents and teachers were surveyed at baseline only.

The questions on tobacco knowledge were given to students, teachers and principals. The questions include: whether smoking is harmful to smokers' health, whether all cigarettes are equally harmful, whether smoking is dangerous to nonsmokers, and whether smoking causes the following diseases: stroke, impotence for male smokers, premature aging, chronic obstructive pulmonary disease (COPD), heart attacks and heart failure, and miscarriages during pregnancy. The correct answer is 'yes' to all the questions. Each correct response corresponds to one point for the respondent.

Risk preference is based on a hypothetical gamble using a yellow and blue marble. Students were asked to choose one out of six potential gambles with the following payoffs:

Table A.2: Hypothetical gambles

	Yellow	Blue
Option 1	IDR 10,000	IDR 10,000
Option 2	IDR 8,000	IDR 15,000
Option 3	IDR 6,000	IDR 19,000
Option 4	IDR 4,000	IDR 24,000
Option 5	IDR 2,000	IDR 28,500
Option 6	IDR 500	IDR 30,000

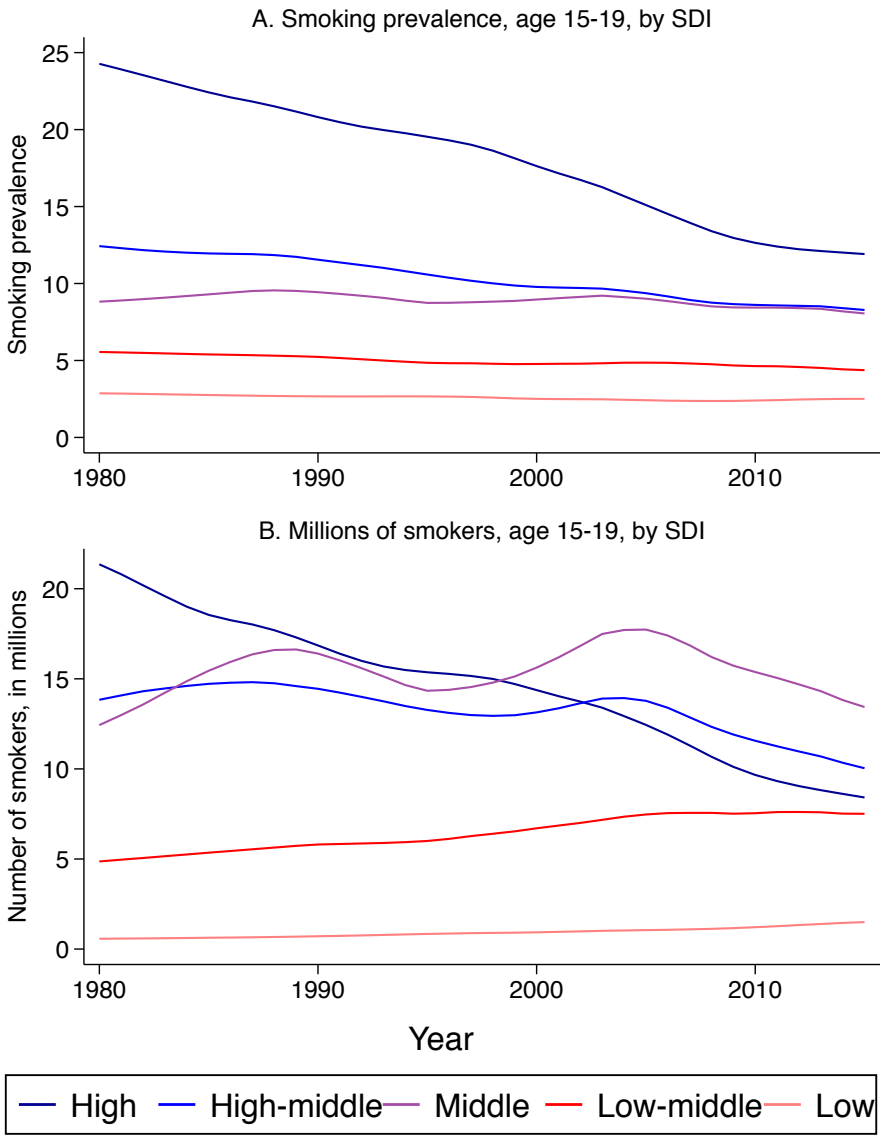
Notes: 1 USD is approximately IDR 14,000. Students were given two examples before they were asked to make their choice.

We code a respondent as risk seeking when he chooses option 4, 5, or 6.

Time inconsistency is based on the hypothetical timing of receiving money. We asked the following two questions: (i) whether students would rather receive IDR 100,000 today or IDR 200,000 in six months, (ii) whether students would rather receive IDR 100,000 in six months or IDR 200,000 in seven months. We code a respondent as time inconsistent when he first chooses to wait for 6 months (in (i)), but not willing to wait 7 months next (in (ii)).

Appendix B Additional Figures and Tables

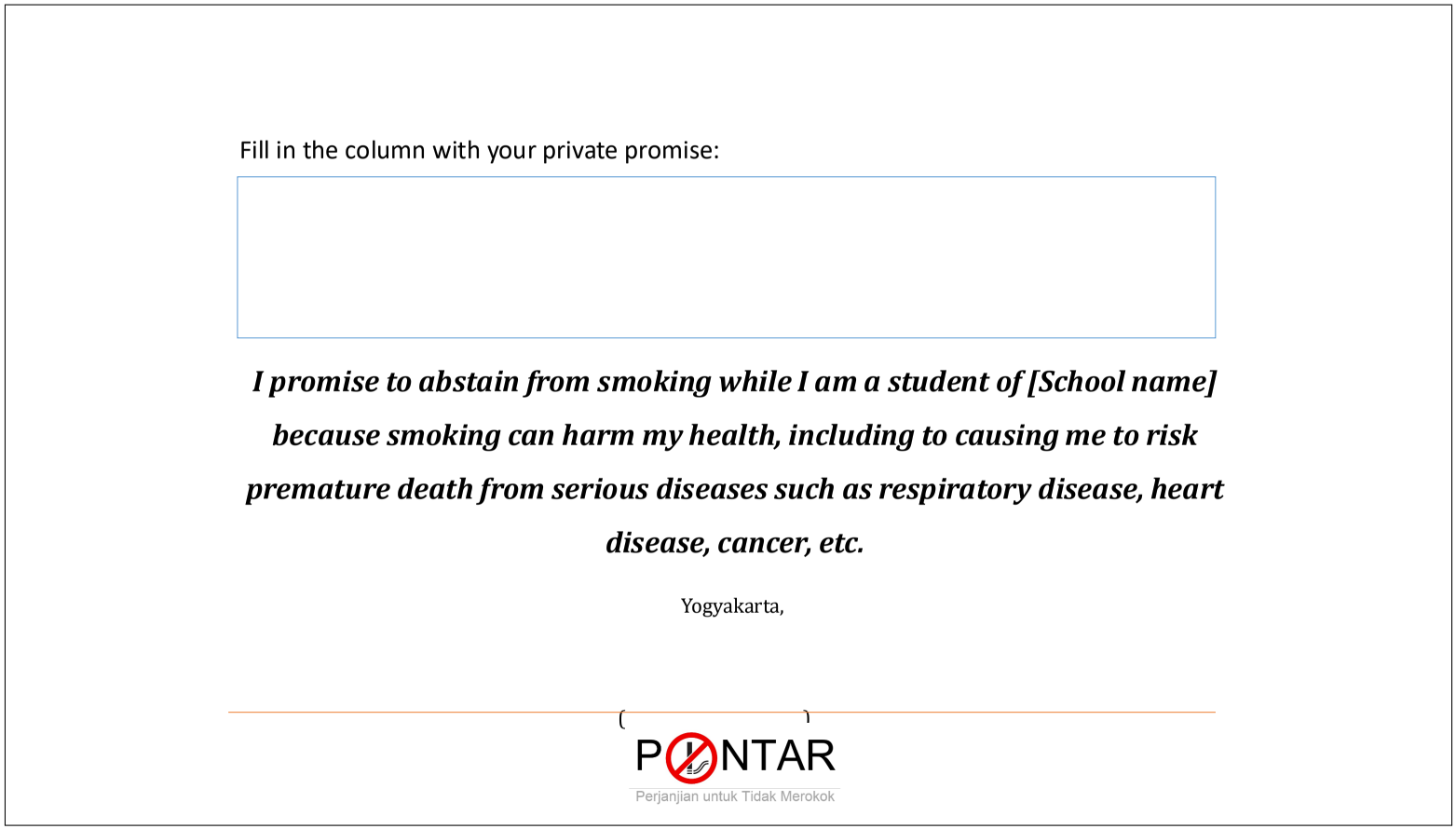
Figure B.1: Smoking trends among youth



Notes: The data are drawn from the Global Burden of Disease Study 2015, available at http://ghdx.healthdata.org/record/ihme-data/gbd-2015-smoking-prevalence-1980-2015. The Socio-Demographic Index (SDI), created by the GBD Study, is a summary measure of development, comprised of income per capita, educational attainment, and total fertility rate. Here, the SDI is split into quintiles based on 2015 values. Indonesia is in the "middle" grouping.

Figure B.2: Individual commitment pledge for students

At the end of the information session, students in treated schools were invited to sign the document below.



Fill in the column with your private promise:

I promise to abstain from smoking while I am a student of [School name] because smoking can harm my health, including to causing me to risk premature death from serious diseases such as respiratory disease, heart disease, cancer, etc.

Yogyakarta,

( )

PANTAR

Perjanjian untuk Tidak Merokok

After students filled in their private promise, they were invited to sign a separate document with the same statement with the rest of the class. The group document was then presented to the guidance councilor, who was encouraged to display the document in the classroom.

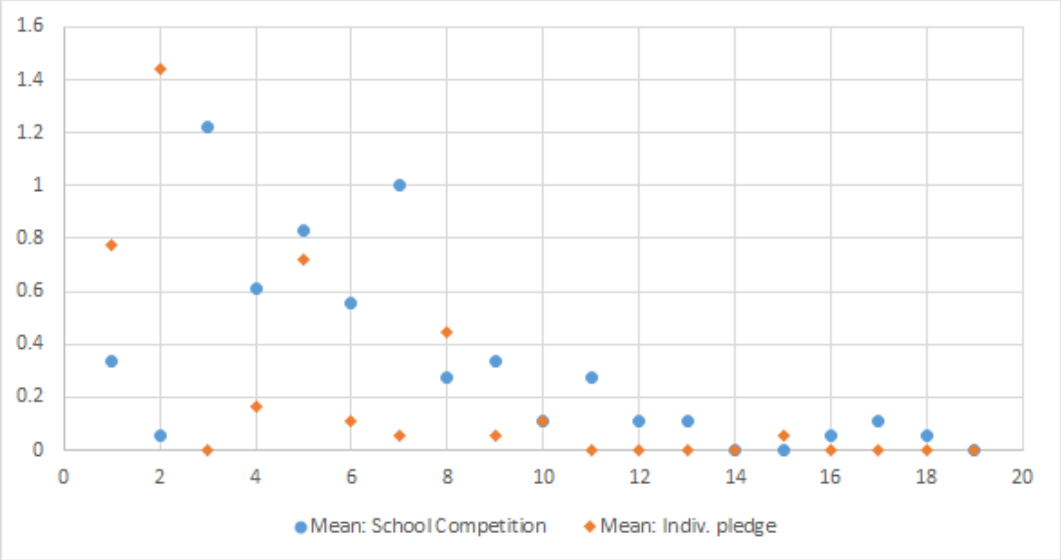
Figure B.3: Commitment pledge for parents

The following statement is attached to the consent forms that parents receive at baseline:

For this program, we invite your and your son's signature as proof of your son's promise to abstain from smoking. If your son smoked, your son would receive 10 demerit points and the school would report this to you. These demerit points would be tallied at the end of the academic year. Your son's success or failure to comply will be discussed when you receive your son's report card. We hope you would provide your support to help your son avoid smoking.

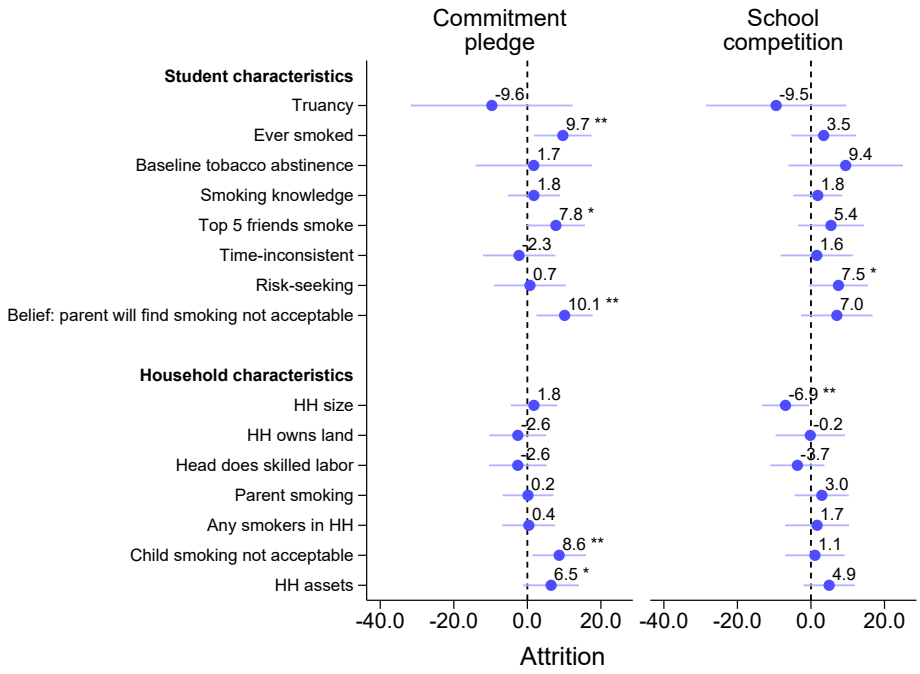
[Parent's signature] [Child's signature]

Figure B.4: Average number of reported smokers in treated group by week



Notes: This figure shows the average number of smokers reported in each sub-treatment arm in each week after the intervention was implemented. Differences between the two sub-treatment arms are not statistically significant.

Figure B.5: Attrition across control and treatment arms



Notes: The plot shows the interaction term between treatment and the variable of interest at baseline, expressed in percentage points. Continuous variables are dichotomized into the median split. Error bars are 95% confidence intervals. Pair FE included, robust standard errors are clustered by school. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Table B.1: Difference-in-differences estimates of program effects on verified smoking abstinence (full output)

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.006	0.008	0.008			
	(0.013)	(0.014)	(0.014)			
Treatment × Post	0.044**	0.044*				
	(0.022)	(0.022)				
Treatment × Wave=2			0.041*			
			(0.025)			
Treatment × Wave=3			0.046*			
			(0.025)			
Pledge				-0.016	-0.004	-0.003
				(0.017)	(0.017)	(0.017)
Competition				0.003	0.019	0.019
				(0.018)	(0.020)	(0.020)
Pledge × Post				0.052**	0.051**	
				(0.022)	(0.023)	
Competition × Post				0.036	0.037	
				(0.030)	(0.030)	
Pledge × Wave=2						0.053*
						(0.028)
Pledge × Wave=3						0.049*
						(0.027)
Competition × Wave=2						0.030
						(0.030)
Competition × Wave=3						0.043
						(0.035)
Wave=2	-0.017	-0.017	-0.016	0.026**	0.026**	-0.016
	(0.018)	(0.018)	(0.019)	(0.012)	(0.012)	(0.019)
Wave=3	-0.043**	-0.043**	-0.044**	-0.043**	-0.043**	-0.044**
	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.017)
Own baseline verified abstinence	0.623***	0.587***	0.587***	0.623***	0.587***	0.587***
	(0.019)	(0.018)	(0.018)	(0.019)	(0.018)	(0.018)
Avg. class baseline verified abstinence	0.134***	0.110**	0.110**	0.135***	0.110**	0.110**
	(0.046)	(0.044)	(0.044)	(0.046)	(0.044)	(0.044)
Missing own baseline	0.493***	0.469***	0.469***	0.493***	0.468***	0.469***
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Truancy		-0.057**	-0.057**		-0.057**	-0.058**
		(0.023)	(0.023)		(0.023)	(0.023)
Ever smoked (at baseline)		-0.075***	-0.075***		-0.075***	-0.075***
		(0.011)	(0.011)		(0.011)	(0.011)
Above-median tobacco knowledge (at baseline)		0.005	0.005		0.005	0.005
		(0.008)	(0.008)		(0.008)	(0.008)
More than 1 friend smoked (at baseline)		-0.049***	-0.049***		-0.049***	-0.049***
		(0.010)	(0.010)		(0.010)	(0.010)
Time inconsistent		0.002	0.002		0.002	0.002
		(0.010)	(0.010)		(0.010)	(0.010)
Risk seeking		-0.010	-0.010		-0.010	-0.010
		(0.010)	(0.010)		(0.010)	(0.010)
No. teachers who smoked		-0.007*	-0.007*		-0.007*	-0.007*
		(0.004)	(0.004)		(0.004)	(0.004)
Household size		-0.004	-0.004		-0.005	-0.005
		(0.003)	(0.003)		(0.003)	(0.003)
Household own land		0.005	0.005		0.005	0.005
		(0.009)	(0.009)		(0.009)	(0.009)
Household head in skilled occupation		0.003	0.003		0.003	0.003
		(0.010)	(0.010)		(0.010)	(0.010)
Parent smoked		-0.037***	-0.037***		-0.037***	-0.037***
		(0.008)	(0.008)		(0.008)	(0.008)
Belief that smoking is unacceptable		0.016*	0.016*		0.016*	0.016*
		(0.008)	(0.008)		(0.008)	(0.008)
Missing occupation		0.014	0.014		0.014	0.014
		(0.013)	(0.013)		(0.013)	(0.013)
Household asset count		0.002	0.002		0.002	0.002
		(0.004)	(0.004)		(0.004)	(0.004)
No. observations	7208	7208	7208	7208	7208	7208
R-squared	0.43	0.44	0.44	0.43	0.44	0.44
Dep. var. mean for control	0.786	0.786	0.786	0.786	0.786	0.786
Equality of sub-treatments (p-value)				0.578	0.621	0.823

Notes: Columns 1-3 pool the treatment arms. *Treatment* equals 1 if the school is randomized into treatment (pledge or pledge plus school competition arm). Columns 4-6 are based on Equation 1. *Pledge* (*Competition*) equals 1 if the school is randomized into pledge (pledge plus school competition arm). All columns include school pair fixed effects. Columns 3 and 6 interact treatment with wave indicators. Standard errors are clustered at the school level. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Table B.2: Cost-benefit calculations of program

	Delayed initiation		
	1 year	2 years	3 years
Effectiveness (%-point ↓ smoking)	2.45	0.82	0.27
Cost per smoker averted, in $	176	527	1,582
Benefits, in $:	3,336	5,869	8,327
Delayed cardiovascular disease	257	249	242
Delayed pulmonary disease	450	437	424
Productivity gain	2,630	5,183	7,661
Benefit-to-cost difference	3,160	5,341	6,745
Benefit-to-cost ratio	19.0	11.1	5.3

Notes: Our program effect at 8 months is 4.9 percentage points. We assume that the program effect will be one-half at large at 12 months and one-third as large every 12 months thereafter, based on Giné et al. (2010). Based on the expected 12-month effect, the cost per smoker averted would be $176. The cost per smoker increases as program effectiveness falls. We assume life expectancy is 67, retirement age at 60, GDP per capita at $3800. Costs due to second hand smoke are excluded. The gains are based on increasing labor market participation for 1 to 3 years, with a 3% discount rate. About 40% of smokers suffer from cardiovascular disease with a cost of $2,500. About 40% suffer from chronic obstructive pulmonary disease (COPD) with an associated cost of 5 days of missed activities and an annual 12% probability of $150 hospitalization cost. Under these assumptions, cardiovascular disease would occur between the ages of 58 to 60 and pulmonary disease onset would be between the ages of 39 to 41.

Table B.3: Attrition across treatment arms

	(1) Pledge	(2) Pledge plus competition
Panel A. Individual level		
Probability of being in 3 waves	-0.005	0.001
	(0.010)	(0.054)
No. observations	2764	2764
R-squared	0.45	0.45
Panel B. School level		
Share of students in 3 waves	0.056	0.167
	(0.169)	(0.164)
No. observations	72	72
R-squared	0.34	0.35

Notes: Panel A examines the probability of a student remaining in all 3 waves of the survey in the individual pledge (Column 1) and pledge plus school competition arms (Column 2). Similarly, Panel B examines the share of students remaining in all 3 waves of the survey. Standard errors are clustered at the school level. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Table B.4: Panel sample: Difference-in-differences estimates of program effects on verified smoking abstinence

	(1)	(2)	(3)	(4)	(5)
Pledge	-0.023	-0.023	-0.018	-0.009	-0.009
	(0.041)	(0.041)	(0.018)	(0.016)	(0.016)
Competition	-0.041	-0.041	-0.011	0.005	0.005
	(0.029)	(0.029)	(0.016)	(0.018)	(0.018)
Post	-0.037**				
	(0.016)				
Pledge × Post	0.060***	0.060***	0.059***	0.059***	
	(0.022)	(0.022)	(0.022)	(0.022)	
Competition × Post	0.059**	0.059**	0.059**	0.059**	
	(0.027)	(0.027)	(0.027)	(0.027)	
Wave=2		0.017	0.017	0.017	-0.027
		(0.012)	(0.012)	(0.012)	(0.019)
Wave=3		-0.046***	-0.044***	-0.044**	-0.044**
		(0.017)	(0.017)	(0.017)	(0.018)
Pledge × Wave=2					0.062**
					(0.025)
Pledge × Wave=3					0.055*
					(0.028)
Competition × Wave=2					0.055*
					(0.028)
Competition × Wave=3					0.063*
					(0.032)
R-squared	0.08	0.08	0.41	0.43	0.43
Equality of sub-treatments (p-value)	0.960	0.960	0.986	0.994	0.963
No. observations			6438		
Dep. variable mean for control group			0.807		
Pair fixed effect	Yes	Yes	Yes	Yes	Yes
Student and class baseline outcomes	No	No	Yes	Yes	Yes
Additional controls	No	No	No	Yes	Yes

Notes: This table re-estimates 1 after restricting the sample to individuals present in all 3 waves of the survey. The dependent variable is Verified smoking abstinence, defined as self-reporting abstinence and obtaining a negative cotinine test. *Post* equals 1 for the follow-up period. *Pledge* (*Competition*) equals 1 if the school is randomized into pledge (or pledge plus competition arm). All columns include pair fixed effects. Col. 1 pools the follow-up period. Cols. 2-4 replace *Post* with indicators for wave 2 (3 months post-intervention) and wave 3 (8 months post-intervention). Col. 3 adds baseline outcomes. Col. 4 adds: baseline ever smoked status, indicator for above median knowledge, indicator for having above-median friends who smoke, time inconsistency, risk seeking, household size, household land ownership, head of household in skilled occupation, any smoker in household, parents find smoking very unacceptable, asset count, and the number of male teachers who smoke in the school. Col. 5 interacts treatment with wave. Standard errors are clustered at the school level. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Appendix C Peer Effects

We explore the role of students' peer group on smoking, due to the nature of smoking as a social activity during adolescence and the large literature on peer effects in adolescent smoking (Footnote 16). The identification of peer effects is complicated by two well-known problems (Manski, 1993). First, peers may sort endogenously into groups or face unobserved group-level shocks. Second, a person's outcomes may causally affect the mean of his peer group, rather than the other way around (the reflection problem). Accounting for these identification challenges has been the focus of a growing literature examining peer effects in empirical settings (Bramoullé et al., 2009; Sacerdote, 2014; Advani and Malde, 2018).

We attempt to overcome these identification challenges using a novel identification strategy introduced by De Giorgi et al. (2010). The strategy leverages the fact that peer groups, formed at the individual level, often include a group of excluded, or non-overlapping, friends of friends. Under the assumption that students are randomized to classrooms and not influenced by their excluded peers, variation in the mean outcome of the excluded peer group is sufficient to overcome the reflection problem. Moreover, the mean outcome of the excluded peer group can be used as a valid instrument to address endogeneity due to possible correlated effects.

We perform two sets of instrumental variables (IV) analyses aimed at estimating peer effects. Our first IV analysis uses baseline social network information on friends and excluded friends of friends to estimate the effects of friends' abstinence at baseline on an index student's abstinence at follow-up. This analysis may be biased if sorting into friendship groups is endogenous. The first-stage F-statistic on the instrument is large (> 390 in Table C.1). Our second IV analysis exploits the quasi-random class assignment in 8th grade to provide plausibly exogenous variation in friendship networks as this generates variation in the number of 7th grade friends in the same 8th grade class. This refinement provides an alternative estimate of peer effects on abstinence in our setting. Again, the first-stage F-statistic on the instrument is large (> 140 in Table C.1). In further analyses, we analyze the role of friends and peers who smoke as sources of heterogeneous treatment effects. For all analyses, friendship networks are constructed based on a list of closest friends reported by each student at baseline. We identify the index student's friends and friends of friends using the list of 5 closest classmates at baseline by matching the index student's first and last names when he is listed as a friend by a classmate. [25]

We start with our first IV analyses of peer effects, assessing the role of friends' smoking

[25] In cases where the last name is not given on the friend list, we use the first name only if there are no other students with that same first name in the class. If there are multiple students with the same first name in the class, we code the identity as missing.

abstinence at baseline on an index student's smoking abstinence at follow-up. Our endogenous exposure is the number of friends who abstained at baseline. We instrument for this variable using the mean number of excluded friends of friends who abstained at baseline and estimate the difference-in-differences model with the full set of covariates, along with the size of the index person's friendship network (i.e., number of friends reported). We find that the program effect on the index student's smoking abstinence remains around 4 percentage points when we include the social network measures (Table C.1, columns 1-2, Panel A). Further, each additional friend who abstained at baseline is associated with a 2 to 6 percentage point increase in the probability of abstaining. The estimated effects are similar for the sub-treatment analysis (Panel B).

We next move to our more refined IV model of peer effects that exploit the quasi-random assignment of students to 8th grade classmates (Table C.1, columns 3-4, Panel A).[26] We estimate how abstinence varies with the number of abstaining friends who were assigned to the same 8th grade class. The program effect on smoking abstinence is about 4 percentage points, similar to our earlier estimated effect. In terms of peer effects, while noisy, abstinence in 8th grade increases by 3 to 5 percentage points for each additional 8th grade friend who abstained, similar to our earlier IV estimate. The estimated effects are similar for the sub-treatment analysis (Panel B).

To further explore the role of peers, we analyze the heterogeneity of treatment effects by peer characteristics (Table C.2). First, we interact treatment with the share of 7th grade 5 closest friends who abstained at baseline and stayed in the same 8th grade class. Second, using the 8-month followup, we exploit the quasi random 8th grade assignment (cross-section) and interact treatment with the share of the student's 8th grade peers who abstained 3 months after the intervention in 7th grade. We find no significant heterogeneity based on these measures. Third, we interact treatment with the student's 5 closest friends' predicted probability that he will smoke to explore how accurately peers can predict students' behavior. We find that students whose friends predicted to smoke are 0.3 percentage points more likely to abstain, suggesting the possibility that the intervention is effective for students who appear to be likely smokers to friends.

While some of these estimates are noisy, they support the importance of peer effects in tobacco use among adolescents in a lower income, high prevalence setting. We provide evidence that peer effects in this setting are similar to findings from the peer effects literature that focuses on adolescent tobacco use in high-income countries (Card and Giuliano, 2013; Fletcher, 2010; Fletcher and Ross, 2018). One study has also documented peer effects for smoking among adults in a middle-income country (Lowenstein et al., 2020).

[26] This analysis uses cross-sectional data from the 8 month follow-up only.

In our models of peer effects, it is possible that the assignment of students to new classmates in 8th grade was not random. Indonesian schools assign unique number-letter combinations to denote each class within each grade, e.g., 7A to denote class A in the 7th grade. We compare each school's assignment to the probability of assigning a student to the same class in 7th and 8th grades (i.e., moving from class 7A to 8A) based on school size. For example, if a school has 3 7th grade classes, then the probability is one third. We then compare the difference between the school's probability of same class assignment and the probability based on school size. To check for balance, we regress this difference on the treatment indicator, the covariate, and the interaction term (Table C.3 presents the coefficients of the interaction terms). The 8th grade interaction terms are not significant, suggesting similar characteristics across treated and control schools, thus allowing us to use the 8th grade peers of students as an additional source of experimental variation.

Table C.1: IV estimates of peer effects on smoking abstinence

	(1)	(2)	(3)	(4)
	All friends		Friends in the same 8th grade class	
No. friends abstained at baseline	0.056***	0.025***	0.052**	0.029
	(0.012)	(0.008)	(0.021)	(0.018)
Pledge	-0.010	-0.014	0.016	0.013
	(0.037)	(0.019)	(0.039)	(0.029)
Pledge × Post	0.053**	0.054**		
	(0.022)	(0.022)		
Competition	0.011	0.007	0.059*	0.059***
	(0.031)	(0.020)	(0.031)	(0.022)
Competition × Post	0.027	0.036		
	(0.030)	(0.029)		
Wave=2	0.025**	0.026**		
	(0.012)	(0.012)		
No. friends	-0.032***	-0.014***	-0.032***	-0.020**
	(0.008)	(0.004)	(0.010)	(0.008)
Pair fixed effect	Yes	Yes	Yes	Yes
Wave fixed effects	Yes	Yes	No	No
Baseline outcome	No	Yes	No	Yes
No. observations	7234	7234	2352	2352
R-squared	0.10	0.43	0.11	0.27
Dep. variable mean	0.781	0.781	0.766	0.766
F-statistic on instrument	411.6	400.0	154.9	149.4

Notes: This table shows the estimated effects of friends' abstinence on the index student's abstinence, using the number of excluded friends of friends who abstained at baseline as an IV for the number of friends who abstained at baseline. Columns 1 and 2 are difference-in-difference 2SLS estimates. Columns 3 and 4 are 2SLS estimates of abstinence in 8th grade (i.e., at 8 months) as a function of friends (and friends of friends) assigned to the same 8th grade class. Columns 1 and 3 include pair fixed effects. Columns 2 and 4 include pair fixed effects and student baseline outcomes. Standard errors are clustered at the school level. Robust standard errors are clustered by school. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Table C.2: Program effects on smoking abstinence by peers' smoking status

	(1)	(2)	(3)
		Peer characteristic	
	Share of 5 friends who abstained and in same 8th grade class	Share of 7th grade classmates who abstained and in same 8th grade class	Mean baseline belief of 5 friends that student will smoke
Pledge	-0.012	0.015	0.082**
	(0.037)	(0.080)	(0.035)
Competition	-0.001	0.073	0.071*
	(0.033)	(0.128)	(0.037)
Pledge × Post	0.059**		-0.000
	(0.029)		(0.032)
Competition × Post	0.035		-0.026
	(0.033)		(0.038)
Pledge × Characteristic	0.037**	0.027	-0.044**
	(0.018)	(0.107)	(0.018)
Competition × Characteristic	0.049**	-0.036	-0.039**
	(0.024)	(0.164)	(0.017)
Pledge × Post × Characteristic	-0.015		0.032*
	(0.017)		(0.017)
Competition × Post ×Characteristic	-0.012		0.037**
	(0.016)		(0.016)
Characteristic		0.181**	
		(0.077)	
Wave=2	-0.010		0.001
	(0.018)		(0.020)
Wave=3	-0.036**		-0.034*
	(0.017)		(0.019)
No. observations	7211	1985	5319
R-squared	0.16	0.29	0.17
Dep. var. mean for control group	0.781	0.776	0.781

Notes: The column headings represent the peer characteristics (*Characteristic*) interacted in each difference-in-differences model. Column 1 is the share of 5 friends who abstained at baseline and are in the same 8th grade class. Column 2 is the share of 7th grade classmates who abstained and are in the same 8th grade class. Column 3 is the mean baseline belief of respondent's 5 friends about the probability that the respondent would smoke in the next 3 months. Fully adjusted for baseline covariates. Standard errors are clustered at the school level. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Table C.3: Balance in 8th grade

	(1) Control	(2) Individual pledge	(3) School competition	(4) Adjusted difference (2) - (1)	(5) Adjusted difference (3) - (1)
Panel A. School characteristics					
Distance to Jogjakarta	17.391	16.004	19.027	-0.011	0.018
	(10.671)	(9.120)	(9.693)	(0.011)	(0.010)
Student-to-teacher ratio	14.771	3.388	2.525	-0.021	-0.045
	(3.122)	3.122	3.122	(0.024)	(0.029)
Average mathematics score	56.932	14.530	12.031	0.005	-0.005
	(14.536)	14.536	14.536	(0.007)	(0.008)
No. teachers who smoke	1.429	1.093	1.946	-0.047	0.008
	(1.521)	1.521	1.521	(0.091)	(0.060)
Number of classes	12.481	5.007	3.950	-0.027	-0.020
	(4.321)	4.321	4.321	(0.019)	(0.021)
No. of observations				72	72
Panel B. Student characteristics					
Truancy	0.039	0.054	0.064	-0.074	-0.078
	(0.193)	(0.225)	(0.245)	(0.082)	(0.110)
Ever smoked	0.730	0.739	0.735	-0.022	0.031
	(0.444)	(0.439)	(0.442)	(0.073)	(0.076)
Tobacco knowledge	5.619	5.646	5.859	0.097	-0.032
	(2.217)	(2.041)	(2.183)	(0.051)	(0.042)
No. 5 best friends smoke	1.538	1.716	1.829	-0.005	-0.028
	(1.704)	(1.756)	(1.765)	(0.080)	(0.073)
Time-inconsistent	0.704	0.645	0.668	-0.084	0.026
	(0.457)	(0.479)	(0.471)	(0.069)	(0.071)
Risk seeking	0.342	0.390	0.486	-0.037	0.011
	(0.474)	(0.488)	(0.500)	(0.057)	(0.087)
Parents find smoking unacceptable	0.251	0.238	0.245	0.018	0.000
	(0.434)	(0.426)	(0.431)	(0.050)	(0.064)
Panel C. Household characteristics					
Household size	4.755	4.499	4.888	0.009	0.023
	(1.656)	(1.258)	(1.760)	(0.012)	(0.014)
Land ownership	0.551	0.470	0.543	-0.010	0.099
	(0.498)	(0.499)	(0.499)	(0.050)	(0.058)
Parent in skilled occupation	0.348	0.316	0.284	0.108	-0.072
	(0.477)	(0.465)	(0.451)	(0.051)	(0.067)
Parent smoked	0.442	0.468	0.483	0.025	-0.014
	(0.497)	(0.499)	(0.500)	(0.036)	(0.037)
No. smokers in household	0.726	0.708	0.761	-0.069	-0.032
	(0.995)	(0.746)	(0.812)	(0.045)	(0.051)
Parents find smoking unacceptable	0.441	0.453	0.424	0.024	-0.015
	(0.497)	(0.498)	(0.495)	(0.066)	(0.066)
Asset count	6.454	6.399	6.620	0.011	0.026
	(1.264)	(1.326)	(1.353)	(0.020)	(0.017)

Notes: Each cell is the coefficient is the interaction term between the treatment variable and the characteristic of interest. The dependent variable is the probability that students are assigned to 8th grade randomly. Standard deviations are in parentheses in Columns 1 to 3. Each cell in Columns 4 and 5 is the coefficient on the treatment variable from a separate OLS regression with district fixed effects. Standard errors are clustered at the school level. Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.10$.

Advani, A., Malde, B., 2018. Credibly identifying social effects: accounting for network formation and measurement error. Journal of Economic Surveys J. Econ. Surv. 32 (4), 1016-1044.

Bramoullé, Y., Djebbari, H., Fortin, B., 2009. Identification of peer effects through social networks. J. Econometrics 150 (1), 41-55.

King, G., Nielsen, R., 2019. Why propensity scores should not be used for matching. Polit. Anal. 27 (4), 435-454.

Lowenstein, C., Dow, W.H., White, J.S., 2020. Peer effects in smoking cessation: an instrumental variables analysis of a worksite intervention in Thailand. SSM - Popul. Health 12, 100659. doi:10.1016/j.ssmph.2020.100659.

Manski, C.F., 1993. Identification of endogenous social effects: the reflection problem. Rev. Econ. Stud. 60 (3), 531-542. doi:10.2307/2298123.

Sacerdote, B., 2014. Experimental and quasi-experimental analysis of peer effects: two steps forward? Annu. Rev. Econ. 6 (1), 253-272. doi:10.1146/annurev-economics-071813-104217.