"Bad Apple" Peer Effects in Elementary Classrooms: the Case of Corporal Punishment in the Home

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Abstract

This paper provides the first empirical evidence on the existence of negative spillover effects from children exposed to corporal punishment in the home (CPH). We find that interactions with peers suffering from CPH depress achievement in both math and language among Vietnamese fifth graders. Specifically, a one standard deviation increase in the Peers' Violence Index is associated with a reduction in the math and the language test scores by 0.11 and 0.14 standard deviations, respectively. These adverse impacts could potentially be attributed to the unfavorable changes in student academic aspirations, student actual learning efforts, and the inter-student relationships.

JEL codes: I20, I21, J18
Keywords: Corporal Punishment, Student Achievement, Peer Effects

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1 Introduction

Corporal punishment of children is a common child-rearing practice in many countries, and the legality of such practice differs in various settings (Global Initiative to End All Corporal Punishment of Children, 2016). Corporal punishment or physical punishment is defined as *"any punishment in which physical force is used and intended to cause some degree of pain or discomfort, however light"* (Pinheiro, 2006). The corporal punishment of children or teenagers, exercised by their parents or other lawful guardians, is referred to as corporal punishment in the home (CPH hereafter). CPH is considered primordial and is the child's first experience with violence (Straus et al., 2013). Previous studies show that such punitive practices hinder child development (Becker, 1964; Patterson, 1982; Gershoff, 2002). For example, CPH can lead to declined social competence as well as failing academic achievement (Straus et al., 1997; Straus and Paschal, 2009; Simons and Wurtele, 2010; Straus et al., 2013). However, parental use of corporal punishment of children remains a prevalent practice in developing countries (Monyooe, 1996; Oburu and Palmeru, 2003; Alyahri and Goodman, 2008; Rimal and Pokharel, 2014).

The direct damage of CPH to academic achievement has been documented in the literature. In particular, both Cherian (1994) and Adesope et al. (2017) report a negative association between CPH and school performance. Moreover, other studies point to the adverse impacts on children's cognitive development. In particular, CPH leads to lower IQ scores, poorer cognitive abilities, and smaller vocabularies (Straus and Paschall, 2009; MacKenzie et al., 2013). Nevertheless, the indirect consequences of CPH, such as the spillover effects to other children with whom the victim children interact, have been under-explored. Therefore, our study seeks to fill this gap in the literature.

This paper contributes to the literature by providing the first empirical evidence for the achievement impacts that CPH has on the victim child's classmates through peer interactions. Furthermore, the paper also sheds light on potential mechanisms driving these negative externalities. The closest research to ours are the studies on the spillover effects of domestic violence between spouses or partners. Specifically, children from families ridden with domestic violence tend to disrupt their classmates' learning (Carrell and Hoekstra, 2010; Carrell and Hoekstra, 2012). These works extensively analyze the consequences of domestic violence, which refers to the physical attack by one spouse or intimate partner on the other partner where the child is the witness to the assault. Our study, notwithstanding, focuses on the spillover effects of CPH, a violent disciplinary practice by parents that targets the children. We investigate how the victim children hamper their classmates' academic achievement.

Our study integrates two strands of literature. The first strand emphasizes the direct impacts of CPH on child development. For instance, parental adoption of corporal punishment could lead to increased aggressive behaviors (Straus et al., 1997; Simons and Wurtele, 2010) and cognitive problems (Cherian, 1994; Straus and Paschal, 2009) among children. Another consequence is the erosion of the parents-child relationship (Hirschi, 1969; Parke, 1977; Van Houten, 1983). Early exposure to violent disciplinary practices is also predictive of adult abuse of own child and spouse (Fry, 1993; Holden and Miller, 1997; Swinford et al., 2000) as well as adult criminality (Glueck and Glueck, 1950; McCord, 1979; Straus, 2013; Straus et al., 2013). The second line of research concentrates on the existence of peer effects on educational outcomes following peer interactions. For example, peer ability exerts non-negligible influences on student achievement (Hanushek et al., 2003; Lavy et al., 2011; Lavy et al., 2012; Burke and Sass, 2013; Antecol et al., 2016). Peer gender composition could positively affect students' both cognitive and non-cognitive outcomes (Lavy and Schlosser, 2011; Lu and Anderson, 2015; Eren, 2017).

Drawing on a sample where fifth-graders were randomly allocated to classrooms, we find that interactions with peers subject to CPH depress achievement in both math and language. Our results indicate that a one standard deviation increase in the Peers' Violence Index is associated with a decrease of 0.11 and 0.14 standard deviations in the math and the language test scores, respectively. Our mechanism analysis suggests that these negative consequences could be transmitted through the decline in student academic aspirations, negative changes in student actual efforts and the deterioration in the inter-student relationships.

Despite its private and social costs, violent child discipline remains common in developing countries (UNICEF, 2010). According to a UNICEF report in 2010, three out of four children suffer from violent disciplinary actions by their caregivers on a regular basis. Nonetheless, only 24 countries have adopted legislation that prohibits CPH, leaving so many children unprotected (Zolotor and Puzia, 2010). This paper provides support for the passage and implementation of such laws, by empirically documenting the adverse spillover impacts of CPH on educational outcomes. Furthermore, we extensively analyze the potential mechanisms through which CPH can hamper the learning of the victim children's classmates, thus offering meaningful implications on devising education policies.

The structure of the paper is as follows. Section 2 describes the data along with a series of randomization tests. Section 3 presents the empirical methodology. The main results are reported in Section 4. Section 5 discusses potential mechanisms and policy implications. Section 6 concludes our paper.

2 Data and Randomization Tests

2.1 Data

To estimate the negative spillover effects coming from children exposed to CPH, we employ the "Young Lives: School Survey, Vietnam, 2011-2012" (YLSSV, 2011-2012). The School Survey, conducted by the University of Oxford - Department of International Development (2015), is one part of the Young Lives study on childhood poverty among children in Ethiopia, India, Peru, and Vietnam. Due to the inconsistency in the cross-country questionnaires, we are unable to conduct the same analysis in other countries. The "YLSSV, 2011-2012" provides us with a sample of fifth-grade students in five selected provinces of Vietnam.[1] There are two rounds of the YLSSV, 2011-2012, and 2016-2017. We only adopt the former round because the item needed to construct our explanatory variable of interest, the frequency of being hit by parents, is unavailable in the latter one.

The smallest unit of observation in the "YLSSV, 2011-2012" is a student. At the beginning of the school year (October 2011), students completed a background questionnaire. Besides providing information on demographic characteristics and family backgrounds, students responded to a question on the frequency of being hit by parents at home. We use this item to construct our main explanatory variable, as described later in this section. At the end of the school year (April 2012), students were administered assessment tests in cognitive and non-cognitive domains, although these tests were initially implemented at the beginning of the school year. Cognitive tests cover mathematics and language (Vietnamese) knowledge that students were taught at school. Test scores in mathematics and language at the end of the school year constitute our outcome variables. In non-cognitive tests, students were inquired about their attitudes towards different aspects of their school life such as interactions with peers and teachers, how they perceive their interests in schoolwork, among others (see Appendix B for more details).

In addition to students, the "YLSSV, 2011-2012" provides us with detailed information on teachers. We are able to draw on various teacher demographics and qualification characteristics such as teacher gender, educational attainment, teaching experience, qualifications (training) received from various institutions, and teaching awards granted by different levels of administration. Furthermore, an important feature of the "YLSSV, 2011-2012" is that students can be matched with their classroom teachers, thus enabling us to observe each student along with their classmates and their teacher.

[1] These provinces include Ben Tre, Da Nang, Hung Yen, Lao Cai, and Phu Yen.

The dataset allows us to identify classrooms with randomly assigned students. In the teacher questionnaire, teachers were asked to report whether students were assigned to classrooms randomly or by other characteristics (e.g. ability in math, residency, etc.).[2] Because students tend to self-select into classrooms and peer groups similar to them (Hoxby 2000), we need to rely on the sample of classrooms with randomly assigned students, so as to credibly estimate the negative spillover effects of CPH. It is worth noting that parents can choose the school where they send their children, but they have no control over the classroom assignment. Our identification strategy hinges upon the random placement of students to classrooms within a school. We return to the random student allocation later in Section 2.2 after discussing important variables in the analysis.

In our final sample, there are 60 schools, 130 classrooms (corresponding to 130 teachers), and 2,506 students.[3] Table 1 presents the descriptive statistics of selected variables at both the student and the teacher level. The average end-of-year language and math achievement scores are approximately 0.04 of a standard deviation.[4] Variable Own Violence-Original Response is recoded from the student's original response to the question "Are you hit by parents". The range of Own Violence-Original Response includes 1-never/rarely, 2-sometimes, and 3-always, with the higher value corresponding to the higher frequency of being exposed to corporal punishment. The mean value of Own Violence-Original Response is 1.731.

From the original response above, we construct the z-score of the variable Own Violence-Original Response by standardizing the responses across all students, to form a new variable named as Own Violence Index. By construction, Own Violence Index has zero mean and unit standard deviation. Another way to measure CPH is to create a dummy variable (Exposed to Violence) that takes the value of one if the student is ever hit by his/her parents (i.e. Own Violence-Original Response equals either 2 or 3) and zero otherwise (i.e. Own Violence-Original Response equals 1). This way, on average, 68% of students in our sample are subject to CPH, slightly less than the percentage of children who experience any violent discipline in developing countries (74%), based on the data from UNICEF (2017).

[2] In the original questionnaire, the possible responses to the question on the method of allocating student to classrooms are ability in math, ability in Vietnamese, general ability, age, residency, ethnicity, and random allocation.

[3] On average, there are 2.2 fifth-grade classes per school. There are 26 schools with one class (26), 14 schools with two classes (28), 13 schools with three classes (39), three schools with four classes (12), one school with five classes (5), two schools with six classes (12), and one school with eight classes (8).

[4] All test scores are standardized. The average presented in Table 1 is not equal to zero because our sample only consists of classrooms where students were randomly assigned. Re-standardizing these test scores does not change our results.

Table 1: Summary Statistics

	Average	SD	Observations
Student Level			
Endline Language Score	0.039	1.001	2,506
Endline Math Score	0.043	1.012	2,506
Own Violence-Original Response	1.731	0.547	2,506
Own Violence Index	0	1	2,506
Exposed to Violence	0.679	0.467	2,506
Peers' Violence-Original Response	1.716	0.197	2,506
Peers' Violence Index	0	1	2,506
Fraction Exposed to Violence	0.674	0.171	2,506
Grade Repetition	0.042	0.201	2,506
Being Female	0.474	0.499	2,506
Being Minority	0.074	0.262	2,506
Mother Has College Degree	0.138	0.345	2,506
Father Has College Degree	0.155	0.362	2,506
Teacher/Class Level			
Female Teacher	0.739	0.439	130
Teacher Education	0.472	0.499	130
Teacher Qualification	0.471	0.499	130
Excellent Teacher Award	0.183	0.387	130
Teacher Experience	17.972	8.842	130
Fraction of Female students	0.472	0.097	130

NOTE: Own Violence-Original Response constructed from the original response is the answer to the question "Are you hit by parents?". Responses are recoded to take the value of 1 (rarely/never), 2 (sometimes), and 3 (always). Peers' Violence-Original Response is created by averaging the Own Violence-Original Response of students in his/her classroom, excluding the student himself/herself. Own Violence Index is generated by standardizing the Own Violence-Original Response. To form the Peers' Violence Index, we take the mean of the Own Violence Index of students in his/her classroom, excluding the student himself/herself, and finally re-standardizing this average. Exposed to Violence is an indicator that takes the value of one if the student is ever hit by his/her parents (i.e. Own Violence-Original Response equals either 2 or 3), and zero otherwise (i.e. Own Violence-Original Response equals 1). Fraction Exposed to Violence is the proportion of a student's peers whomever experience corporal punishment (Exposed to Violence equals one), excluding the student himself/herself.

Since our objective is to estimate the negative spillover effects of CPH-inflicted peers, we need to generate a peer measure on this aspect. To capture the extent to which a student's peers are exposed to CPH, we take the mean of the Own Violence Index of students in his/her class, excluding the student himself/herself, and finally re-standardizing this average. This measure of peers' exposure to CPH has zero mean and unit standard deviation. We refer to this newly constructed measure as Peers' Violence Index hereafter.[5] Since Peers' Violence Index is our main explanatory variable, we need to make sure that there is enough variation

[5] We also construct other peer measures of CPH: Peers' Violence-Original Response and Fraction Exposed to Violence. Peers' Violence-Original Response is the peer measure constructed from taking the average of Own Violence-Original Response, excluding the student himself/herself. Fraction Exposed to Violence, the peer measure of Exposed to Violence, is the proportion of a student's peers whomever experience corporal punishment by parents, excluding the student himself/herself.

of this index across classrooms in each school. First, we plot the raw distribution of the Peers' Violence Index in Figure 1. Second, in Figure 2, we plot the distribution of the residualized Peers' Violence Index, obtained by regressing the Peers' Violence Index on school fixed effects. According to Figure 1 and Figure 2, there seems to be large enough variation in our measure of peers' exposure to CPH.[6] In a final exercise, we examine the variance decomposition in the Peers' Violence Index. As shown in Table A1, within-school variation exists in the data, and this random variation accounts for roughly half of the total variation in our measure of peers' exposure to CPH. We also provide the correlation of some student and peer measures in Table A2 in the appendix.

Figure 1: Distribution of the Peers' Violence Index

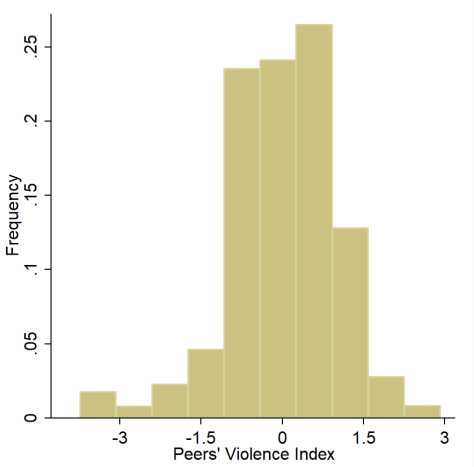
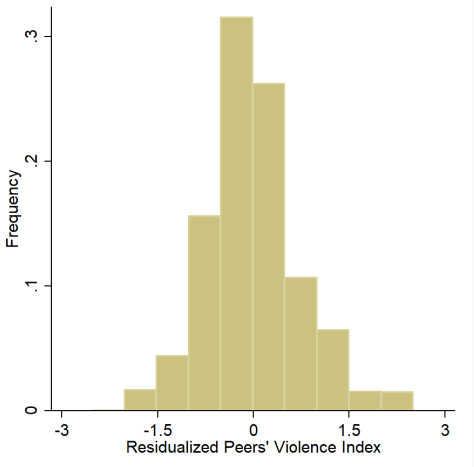


Figure 2: Distribution of the Residualized Peers' Violence Index



[6] We plot the distribution of the Peers' Violence-Original Response along with the residualized Peers' Violence-Original Response in Figure A1 and A2 in Appendix A. Figure A1 and A2 confirm that there is enough variation in the peers' exposure to CPH, regardless of the way we construct it.

The lower part of Table 1 presents the descriptive statistics of teacher-level variables. Female teachers take up most of the teachers, 74%. Approximately 47% of the teachers obtain at least a four-year university degree or earn some qualifications at a university. The fraction of teachers with "Excellent Teacher" Award granted by the provincial administration is 18%. The average teacher experience is roughly 18 years.

2.2 Randomization Tests

Because our identification of the impacts of CPH-inflicted peers relies on the random allocation of students, we conduct multiple tests to verify this randomness. First, to make sure that both students and teachers were randomly assigned to classrooms, we employ a re-sampling technique as in Carrell and West (2010) and Feld and Zolitz (2017). Specifically, for each school, we randomly draw 10,000 classes of equal size without replacement. We calculate the sums of student baseline characteristics. These characteristics include whether the student repeats any grade (Grade Repetition), student gender (Being Female), whether the student belongs to an ethnic minority group (Being Minority), and his/her mother has a college education (Mother Has College Degree).[7] The last baseline characteristic is the student's Own Violence Index. The fraction of simulated classes with values less than that of the observed class gives us the empirical p-values for each class. If students were indeed randomly assigned to classrooms, empirical p-values should be uniformly distributed. The uniform distribution of empirical p-values is tested using the Kolmogorov-Smirnov one-sample equality of distribution test and the χ^2 goodness-of-fit test. As reported in Panel A of Table 2, we fail to reject the null hypothesis of the uniform distribution of empirical p-values, suggesting that students were not selectively assigned to classrooms.

Next, to show that teachers were also randomly allocated with respect to student characteristics, we regress the empirical p-values from re-sampling by class on each of the teacher characteristics, conditional on school fixed effects. Teacher characteristics include education, qualifications, whether the teacher receives the "Excellent Teacher" Award, and experience.[8] The results from these 20 regressions are reported in Panel B of Table 2. Coefficients on all teacher characteristics are small and statistically insignificant, suggesting no trace of non-random allocation of teachers to classrooms.

[7] These four variables are 0/1 indicators.

[8] Teacher Education is a dummy variable taking the value of one if the teacher obtains at least a four-year university degree and zero otherwise. Teacher Qualification is an indicator taking the value of one if the teacher earns any qualifications at a university and zero otherwise. Excellent Teacher Award is a dummy that equals one if the teacher receives the "Excellent Teacher" Award granted by the provincial administration (the highest level) and zero otherwise. Teacher Experience is the number of years working as a teacher.

Table 2: Randomness Checks

	Grade Repetition (1)	Being Female (2)	Being Minority (3)	Mother Has College Degree (4)	Own Violence Index (5)
Panel A: Randomization of Students					
Kolmogorov-Smirnov p-value	0.999	0.999	0.701	0.956	0.999
Chi Test p-value	0.999	0.999	0.999	0.999	0.999
Panel B: Randomization of Teachers					
Teacher Education	0.072	-0.120	-0.001	0.048	-0.124
	(0.147)	(0.163)	(0.004)	(0.128)	(0.203)
Teacher Qualification	-0.021	0.047	0.037	0.108	-0.021
	(0.094)	(0.128)	(0.066)	(0.130)	(0.110)
Excellent Teacher	0.031	-0.013	0.029	0.062	-0.061
	(0.042)	(0.049)	(0.024)	(0.042)	(0.064)
Teacher Experience	0.005	-0.001	0.001	0.000	0.000
	(0.003)	(0.003)	(0.002)	(0.005)	(0.006)

NOTE: Each cell in Panel A represents the p-value from the Kolmogorov-Smirnov and χ^2 goodness-of-fit tests of the uniformity of the distribution of empirical p-value from re-sampling as described in Section 2.2. Each cell in Panel B represents estimates from regressions where the dependent variable is the empirical p-value and the regressor is teacher characteristic. All regressions are conditioned on school fixed effects. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

To further demonstrate that not only were students randomly placed into classrooms, but they were also randomly assigned to peers with various levels of exposure to CPH, we conduct a balancing test.[9] Specifically, we regress each of the student baseline characteristics on the Peers' Violence Index, conditional on school fixed effects. As shown in Panel A of Table 3, the Peers' Violence Index is statistically insignificant in explaining these baseline characteristics. We further conduct teacher-level regressions where student characteristics are replaced with teacher observables as dependent variables. The results reported in Panel B suggest that teachers were randomly allocated to students with different levels of violence exposure.

As an additional randomness check, for each school in our sample, we run a regression of each of the student baseline characteristics on class fixed effects and test for the (joint and individual) significance of these dummies. The joint tests are intended to evaluate whether at least one of the classroom fixed effects is statistically significant in explaining student baseline characteristics. The top panel of Table A3 reports the fraction of p-values from the joint tests being lower than 5%. The lower panel of Table A3 provides the proportion of classroom fixed effects having individual p-values less than 5%. These results lend some evidence to the random assignment of students to classrooms. Having said that, we call for some caution

[9] This is also known as the left-hand side balancing test (Pei et al., 2019).

in relying on this test due to the possibility of negative bias involved when the number of classes is small (Wang, 2010).

Table 3: Balancing Tests

	(1)	(2)	(3)	(4)	(5)
Panel A: Randomization of Students					
	Grade Repetition	Being Female	Being Minority	Mother Has College Degree	Own Violence Index
Peers' Violence Index	-0.003	0.000	0.002	-0.004	0.244
	(0.004)	(0.010)	(0.003)	(0.012)	(0.181)
Observations	2,506	2,506	2,506	2,506	2,506
Panel B: Randomization of Teachers					
	Teacher Education	Teacher Qualification	Excellent Teacher	Teacher Experience	
Peers' Violence Index	-0.010	-0.027	-0.128	-0.063	
	(0.016)	(0.041)	(0.116)	(1.160)	
Observations	130	130	130	130	

NOTE: Each cell reports the coefficient estimate on the Peers' Violence Index from regressions where each of the student (Panel A) and teacher (Panel B) characteristics is regressed on the Peers' Violence Index. All regressions are conditioned on school fixed effects. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

While the sample is restricted to randomly assigned classrooms (as reported by the teacher), we further conduct a series of randomization tests. Taken together, these analyses lend support to two important points: (i) students were randomly allocated to classrooms and peer groups, and (ii) the placement of teachers into classrooms and groups of students with different levels of CPH exposure are random.

3 Empirical Methodology

Reflection and self-selection are the two major methodological challenges in studies of peer effects (Manski, 1993; Hoxby, 2000). In our context, the reflection problem involves separating the effect that peers have on the student from the effect the student has on his/her classmates. Our solution is to employ the presence of a family problem - the corporal punishment of children - as an exogenous measure of peer quality. This is because a student's classmates cannot cause violence in his/her family. The self-selection problem refers to the situation when students self-select into classrooms and peer groups similar to them. Our solution is to draw from a sample where students were randomly allocated to classrooms.

We first examine the impact of peers' exposure to CPH on student achievement with a linear-in-means model in the following specification,

$$TS_{ics}^{end} = \beta_0 + \beta_1 PVI_{-i,cs} + SC'_{ics}\beta_2 + TC'_{cs}\beta_3 + \lambda_s + \epsilon_{ics} \quad (1)$$

where i, c, s represent student, class, and school. We denote by TS_{ics}^{end} the end-of-year test score in math/language. $PVI_{-i,cs}$ is the Peers' Violence Index, the class average of Own Violence Index, excluding student i. SC_{ics} is a set of student characteristics such as Own Violence Index, grade repetition status, gender, minority status, and parental education.[10] TC_{cs} is a set of class/teacher characteristics including class size, teacher gender, education, qualifications, experience, and having "Excellent Teacher" award.[11] We also denote by λ_s the school fixed effects and by ϵ_{ics} the error term. Standard errors throughout the paper are clustered at the class level.

The coefficient of interest β_1 captures the impacts of CPH-inflicted peers on student achievement. The Peers' Violence Index is constructed based on student responses in the beginning-of-year questionnaire, thus reflects the true peer interactions. The end-of-year classroom composition is almost identical to the initial assignment, i.e. over 99% of the students remain in the same class.

In order to isolate the impacts of peers' exposure to violence, we need to control for other potentially correlated factors. We attempt to take into account other important peer measures such as the spillover of peer achievement, peer parental education, and peer gender composition, all of which could jointly be determined with the level of peers' exposure to CPH and student achievement (Hanushek et al., 2003; Lavy and Schlosser, 2011; Lavy et al., 2012; Burke and Sass, 2013; Antecol et al., 2016; Eren, 2017). We introduce into equation

[10] Own Violence Index is constructed as described in Section 2.1. Grade Repetition is an indicator taking the value of one if the student repeats any grade and zero otherwise. Student gender is represented by a Being Female dummy that equals one if the student is female and zero otherwise. Being Minority is an indicator that takes the value of one if the student belongs to an ethnic minority group. Parental education is reflected by two dummies respectively representing whether the mother and the father have a college degree. We also include in SC_{ics} three measures of student baseline characteristics obtained from the first wave of the data: Level of family support, academic ability, and motivation to succeed at school. The responses range from 1-very high to 5-very low.

[11] Female Teacher is a dummy indicating if the teacher is female. Teacher Education is a dummy variable taking the value of one if the teacher obtains at least a four-year university degree and zero otherwise. Teacher Qualification is an indicator taking the value of one if the teacher earns qualifications at a university and zero otherwise. Excellent Teacher Award is a dummy that equals one if the teacher receives the "Excellent Teacher" Award granted by the provincial administration (the highest level) and zero otherwise. Teacher Experience enters the regressions as various indicators representing different year ranges to account for the nonlinear returns of teacher experience (Ost, 2014).

(1) a class-level vector $CL_{-i,cs}$ that includes the average peer achievement (peers' test scores at the beginning of the school year), the fraction of female students, and the average peer parental education (all excluding the student himself/herself), as follows,

$$TS_{ics}^{end} = \beta_0 + \beta_1 PVI_{-i,cs} + SC'_{ics}\beta_2 + TC'_{cs}\beta_3 + CL'_{-i,cs}\beta_4 + \lambda_s + \epsilon_{ics} \tag{2}$$

With the inclusion of $CL_{-i,cs}$, the coefficient of interest β_1 reflects the effects of CPH-inflicted peers through channels other than peer achievement, peer parental education, and peer gender composition.[12] In addition to a linear-in-means model given in equation (1) and (2), we further explore a nonlinear model along the lines of student baseline achievement, as peer effects have been shown to be nonlinear in prior studies (Hoxby 2000; Burke and Sass 2013; Imberman et al. 2012; Antecol et al. 2016). It is worth noting that baseline achievement refers to the student test scores in math and language at the beginning of the school year. Our nonlinear specification is given by,

$$TS_{ics}^{end} = \theta_0 + \sum_{k=1}^{3} I_{ics}^{k} PVI_{-i,cs}\theta_{1,k} + SC'_{ics}\theta_2 + TC'_{cs}\theta_3 + \lambda_s + \epsilon_{ics} \tag{3}$$

where I_{ics}^{k} is a categorical variable indicating whether student i's baseline achievement score is in tercile k (k = top third, middle third, bottom third) of the school-level baseline achievement distribution. In this model, low achievers and high achievers could potentially be affected differently by interactions with peers who are exposed to CPH. Furthermore, we could also explore the heterogeneous effects of CPH-inflicted peers based on student Own Violence Index where I_{ics}^{k} indicates the tercile of the student's Own Violence Index. In other words, the negative spillover effects may differ depending on the extent to which a student is subject to violent disciplinary actions by their parents.

4 Results

Before providing the main results on the spillover effects, we briefly examine the direct impacts of being subject to CPH on student achievement in Table 4. We regress endline achievement scores in math (Column 1 through 3) and language (Column 4 through 6) on student Own Violence Index and other student as well as teacher characteristics (captured in SC'_{ics} and TC'_{cs} in equation (1) to (3)). We report the coefficient estimates on the Own

[12] Average peer achievement in math (language) is the class-level mean of the beginning-of-year test scores in math (language), excluding student i. Peer gender composition is measured by the fraction of female students in a class, excluding student i. In constructing peer parental education, we calculate the mean of the two indicators, Mother Has College Degree and Father Has College Degree for each student, then take the class-level average of that measure excluding that of student i.

Violence Index in Table 4. The estimating results suggest that students exposed to CPH are more likely to underperform at school. Specifically, a one standard deviation increase in the Own Violence Index is associated with a decrease in math and language achievement by around 0.04 standard deviations. The inclusion of student gender and parental education leaves the estimated effects of CPH virtually unchanged (Column 2, 3, 5, and 6). The findings are in line with previous studies which show that CPH is negatively associated with student academic performance and cognitive ability (Straus and Paschall, 2009; MacKenzie et al., 2013; Adesope et al., 2017).

Table 4: Direct Effects of CPH

	Y = Endline Math Score			Y = Endline Language Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Own Violence Index	-0.039**	-0.041**	-0.039**	-0.042**	-0.034*	-0.033*
	(0.017)	(0.017)	(0.018)	(0.019)	(0.018)	(0.018)
Being Female		-0.022	-0.017		0.223***	0.226***
		(0.038)	(0.038)		(0.039)	(0.039)
Parental Education			0.160**			0.136**
			(0.074)			(0.068)
Observations	2,506	2,506	2,506	2,506	2,506	2,506

NOTE: The table reports the coefficient estimate on the Own Violence Index. Regressions are conditioned on school fixed effects, student characteristics (captured in SC'_{ics} in equation (1)-(3)), teacher characteristics (captured in TC'_{cs} in equation (1)-(3)). Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

We proceed to our main analysis. The linear-in-means estimates of the effects that peers' exposure to CPH has on student achievement are presented in Table 5. Column 1 through 4 reports the effects on the math test score while Column 5 through 8 presents the impacts on the language test score. In Column 1 and 5, we present the baseline results from estimating equation (1) without the inclusion of other peer measures. We detect negative and significant impacts of interacting with CPH-inflicted peers on student achievement. Particularly, a one standard deviation increase in the Peers' Violence Index is associated with a reduction in the math and language test scores by 0.11 and 0.14 standard deviations, respectively.

Not only is violent discipline by parents bad for the academic performance of the victim children (Table 4), but interactions with classmates who fall victim to such discipline also lower student achievement. The magnitude of the spillover effects is larger than that of the direct effects, as reported in Table 4. It seems that the negative repercussions of corporal punishment are magnified through peer interactions. Our finding is consistent with prior studies which report peer effects are greater than parental influences in multiple domains.

For example, Flay et al. (1994) uncover that friends' smoking produces a larger effect on adolescents' smoking behavior than parents. Allen et al. (2003) document that peers play a more important role than parents in adolescents' drug use behavior.[13]

Table 5: Impacts of Interacting with CPH-Inflicted Peers on Student Achievement

	Y = Endline Math Score				Y = Endline Language Score			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Peers' Violence Index	-0.107*	-0.128**	-0.129**	-0.131**	-0.137***	-0.141***	-0.139***	-0.140***
	(0.057)	(0.055)	(0.055)	(0.056)	(0.048)	(0.048)	(0.048)	(0.049)
Average Peer Achievement		0.339***	0.338***	0.322***		0.086	0.09	0.061
		(0.120)	(0.119)	(0.122)		(0.119)	(0.121)	(0.122)
Fraction of Female Students			-0.321	-0.394			0.319	0.225
			(0.588)	(0.594)			(0.461)	(0.473)
Peer Parental Education				0.437				0.530
				(0.386)				(0.370)
Observations	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506

NOTE: The table reports the coefficient estimate β_1 on the Peers' Violence Index. Regressions are conditioned on school fixed effects along with other student-teacher-class observables. Student and teacher-level controls are detailed in Section 3. Peer achievement is class-average beginning-of-year test scores in math/language. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Next, we gradually control for a variety of peer measures that could potentially be correlated with the Peers' Violence Index and student achievement at the same time. Reported in Column 2 and 6 of Table 5, once we add the average baseline peer achievement as a regressor to rule out the direct academic channel, our estimated effects of peers' exposure to CPH become more statistically and economically significant. A one standard deviation increase in the Peers' Violence Index is associated with a decline in math and language achievement by 0.13 and 0.14 standard deviations, respectively. The coefficient on the average peer achievement is significant for the math test score but not the language test score. In Column 3 and 7, we add the fraction of female students in the class to our regressions. The inclusion of peer gender composition leaves our estimates virtually unchanged in terms of magnitude and the significant level.

Finally, Column 4 and 8 report the estimating results of our most extensive specifications. Here, we control for peer parental education in addition to the Peers' Violence Index, peer achievement, and peer gender composition. With the inclusion of these peer measures,

[13] We replicate Column 1 and 5 of Table 5 but replace the Peers' Violence Index with the average peer baseline achievement, the fraction of female students and peer parental education as explanatory variables in Column 1 through 3 and 5 through 7 of Table A4. Unlike the Peers' Violence Index, we do not find consistent and statistical evidence on the impacts of these peer measures.

our estimates reflect the effects of CPH-inflicted peers through channels other than peer achievement, peer parental education, and peer gender composition. According to the most extensive specifications, interacting with CPH-inflicted peers still has negative and significant impacts on both math and language achievement. A one standard deviation increase in the Peers' Violence Index leads to a 0.13 standard deviation decrease in the math test score and a 0.14 standard deviation reduction in the language test score. Overall, Table 5 provides suggestive evidence for the existence of peer effects driven by CPH on student academic performance.

As a robustness exercise, we estimate the same specifications as Table 5 but replace the Peers' Violence Index with the fraction of peers exposed to CPH (Fraction Exposed to Violence). The results are reported in Table A5. We still find negative and significant impacts of CPH-inflicted peers on student achievement. Specifically, a ten percentage point increase in the proportion of peers exposed to CPH is associated with a decrease in the math and language test scores by approximately 0.08 and 0.09 standard deviations, respectively. The inclusion of other peer measures does not change our conclusion.

Taken together, the results in Table 5 indicate that interactions with CPH-inflicted peers have non-negligible ramifications on student achievement.[14] To put these estimates into perspective, the effect of interacting with peers subject to CPH is approximately half of the effect observed from decreasing teacher quality by one standard deviation (Nye et al., 2004; Kane and Staiger, 2008; Hanushek, 2011). These results underline the negative externalities of CPH, in a sense that such practice generates adverse spillover effects on the achievement of the student's classmates, which goes beyond the consequences on the victim child. Our finding is consonant with Carrell and Hoekstra (2010) who document that children from troubled families depress their classmates' performance.

Our next exercise explores the non-linear impacts of peers' exposure to CPH on student achievement. First, we ask whether these negative effects are more pronounced on students at the bottom than those at the top of the baseline achievement distributions. Here, students are divided into terciles based on their position in the school-level baseline achievement distribution (i.e. whether he/she belongs to the top third, middle third, or bottom third of the distribution). The results from this analysis are presented in Panel A of Table 6. Second, we are also interested in the heterogeneous effects of CPH-inflicted peers in terms of student

[14] We also estimate the effects of CPH-inflicted peers using the same specification as our baseline model on different samples: (i) schools where all classrooms have students randomly assigned, (ii) schools where students are not randomly allocated, and (iii) schools with only one fifth-grade classroom. We still observe the negative spillover effects of CPH (Table A6).

Own Violence Index. In other words, the negative spillover effects may differ depending on the extent to which a student is subject to violent disciplinary actions by their parents. Analogous to baseline achievement, we group students into terciles based on their position in the school-level distribution of the Own Violence Index. We report the results from this analysis in Panel B of Table 6. Point estimates in Table 6 suggest weak heterogeneity in the effects of CPH-inflicted peers along the lines of student ability and Own Violence Index. Students in the middle third of the test score distribution seem to be affected the least, while those in the middle third of the Own Violence Index distribution appear to bear the most consequences.

Table 6: Impacts of Interacting with CPH-Inflicted Peers - Nonlinear Model

	Endline Math Score (1)	Endline Language Score (2)
Panel A: Heterogeneity by Baseline Achievement		
Bottom Third × Peers' Violence Index	-0.112*	-0.144**
	(0.067)	(0.056)
Middle Third × Peers' Violence Index	-0.091	-0.119**
	(0.057)	(0.051)
Top Third × Peers' Violence Index	-0.121*	-0.150**
	(0.070)	(0.061)
Observations	2,506	2,506
Panel B: Heterogeneity by Own Violence Index		
Bottom Third × Peers' Violence Index	-0.096	-0.129***
	(0.063)	(0.049)
Middle Third × Peers' Violence Index	-0.159***	-0.155**
	(0.057)	(0.066)
Top Third × Peers' Violence Index	0.043	-0.125
	(0.075)	(0.079)
Observations	2,506	2,506

NOTE: The table reports the coefficient estimate $\theta_{1,k}$ on the interaction between the Peers' Violence Index and tercile indicators for the student's baseline achievement (Panel A) as well as Own Violence Index (Panel B) as in equation (3). See Table 5 for other control variables. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

5 Mechanisms and Discussion

In this section, we examine the potential pathways to the impacts of CPH-inflicted peers. Prior studies put forward multiple mechanisms underlying peer effects. For example, the composition of peers could lead to changes in the classroom/learning environment, inter-student and teacher-student relationships (Lavy and Schlosser, 2011; Eren, 2017). Gershoff and Grogan-Kaylor (2016) report that exposure to CPH is associated with internalizing behavioral problems. Students with these problems can further instill the negativity in the

classroom environment. Moreover, violent disciplinary actions by parents increase children's externalizing behavioral problems, making them more likely to exhibit aggressive behaviors toward their peers (Becker, 1964; Patterson, 1982; Gershoff and Grogan-Kaylor, 2016). Either way, the presence of CPH-inflicted classmates could generate a toxic environment, as a result, disrupt the learning of the class and unfavorably influence other students' schooling aspirations (Lavy et al., 2011; Lavy and Schlosser, 2011; Eren, 2017). Besides, since troubled children are more liable to disciplinary problems, they tend to have low-quality inter-student relationships (Lavy et al., 2011). These violence-prone children could exhaust teachers, thus deteriorate the teacher-student relationships and lower student academic performance (Lavy et al., 2011; Lavy and Schlosser, 2011).

It is important in policy design to understand the mechanisms behind the spillover effects of CPH. In exploring the underlying mechanisms, we draw on the student questionnaire. Students were asked to rate their assessment of the schooling environment, their emotion and attitude toward classmates, teachers, as well as their own learning. We estimate our baseline regression given in equation (1) but use mechanism variables as outcomes.

We categorize potential mechanisms into three groups: (i) changes in academic aspirations, (ii) changes in student actual efforts, and (iii) changes in inter-student and teacher-student relationships. All the mechanism variables except Physical Bully are indicators re-coded from students' original responses to take the value of one if the student agrees or strongly agrees with the statement, and zero if the student disagrees or strongly disagrees with the statement. Physical Bully is a dummy variable derived from student response to the question "Are you physically bullied at school?". Physical Bully takes the value of one if the student is either always or sometimes physically bullied in the school environment and zero if he/she is never/rarely bullied. We capture the changes in academic aspirations by three dummy variables, including whether the student is willing to do his/her best to pass all subjects (Willingness to Do Best), whether the student thinks he/she can go to college if working hard (College Expectations), and whether the student often feels like quitting school (Feel like Quitting School). Changes in student actual efforts are represented by whether the student studies hard for exams (Study Hard), whether the student can follow the lessons easily (Follow Lessons), whether the student daydreams a lot in class (Daydream in Class), and whether the student persists when faced with difficult questions (Not Give Up). We capture the changes in inter-student and teacher-student relationships by whether the student is able to help his/her classmates in schoolwork if permitted (Help Classmates), whether the student is physically bullied at school (Physical Bully), and whether the student thinks his/her teacher considers him/her a low achiever (Low Teacher Expectation).

The estimating results for student academic aspirations are reported in Panel A of Table 7. It is evident that children exposed to violent discipline by parents generate unfavorable impacts on their classmates' schooling aspirations. Specifically, the Peers' Violence Index is statistically and economically significant in explaining student intentions to drop out and the low college expectations, although it is insignificant in predicting the student's willingness to do best in school. It is possible that the presence of CPH-inflicted peers could depress student academic aspirations for staying in schools and college expectations, thus affecting test scores.

Table 7: Potential Mechanisms for the Impacts of Interacting with CPH-Inflicted Peers

	(1)	(2)	(3)	(4)
Panel A: Student Academic Aspiration				
	Willingness to Do Best	College Expectations	Feel like Quitting School	
Peers' Violence Index	-0.006	-0.019**	0.011*	
	(0.006)	(0.008)	(0.007)	
Observations	2,423	2,430	2,420	
Panel B: Student Actual Efforts				
	Study Hard	Follow Lessons	Daydream in Class	Not Give Up
Peers' Violence Index	-0.010**	-0.022*	0.023*	-0.010
	(0.004)	(0.012)	(0.013)	(0.013)
Observations	2,434	2,430	2,427	2,426
Panel C: Inter-student, Teacher-student Relationships				
	Help Classmates	Physical Bully	Low Teacher Expectation	
Peers' Violence Index	-0.010	0.037**	-0.027	
	(0.010)	(0.017)	(0.018)	
Observations	2,437	2,488	2,422	

NOTE: The table reports the coefficient estimate β_1 on the Peers' Violence Index in equation (1). See Table 5 for other control variables. Standard errors provided in the parentheses are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Moving to student actual efforts, Panel B shows that a rise in the Peers' Violence Index is associated with a reduction in the probability that the student studies hard for exams and follows the lessons easily. An increase in the Peers' Violence Index makes the student more likely to daydream in class, but it is not statistically significant in explaining the student's persistence when faced with difficulties in schoolwork. It appears that the changes in student actual efforts, especially in preparing for tests and paying attention to lectures, could be one pathway to the effects of CPH-inflicted peers on student achievement.

Regarding the changes in inter-student and teacher-student relationships, as evident in Panel C, a higher Peers' Violence Index is significantly correlated with the increased incidence of physical bullies at school. There is no significant effect of the Peers' Violence Index on the probability of the student helping classmates or having low expectations from teachers. The result implies that the impacts of CPH-inflicted peers could potentially be transmitted through the deterioration in the inter-student relationships proxied by the increased incidence of physical bullies at school. We do not have enough statistical evidence for the impact on the teacher-student relationship quality.

While previous studies underscore the immense private costs of the parental adoption of violent child discipline (Becker, 1964; Patterson, 1982; Whipple and Richey, 1997; Gershoff, 2002), our results emphasize the negative externalities of such practice. We provide compelling evidence that students subject to CPH hurt their classmates' learning. Particularly, we detect a reduction of 0.11 standard deviations in math achievement and a decline of 0.14 standard deviations in language achievement in response to a one standard deviation increase in the Peers' Violence Index. These effects are commensurate with those of increasing class size by five to ten students per class (Fredriksson et al., 2012), or decreasing per-pupil expenditure by 500 USD (Greenwald et al., 1996). While our results show how students subject to CPH affect their classmates at school, they may understate the full extent of the negative spillover effects on others. It is because students are likely to interact with peers outside of their classroom and in their neighborhood.

The presented results have important implications for social policies. CPH imposes a social cost that goes beyond the private cost borne by the victim children. Although the United Nations adopted the Convention on the Rights of the Child in 1989, only 24 countries pass legislation that bans corporal punishment of children (Zolotor and Puzia, 2010). Despite both the private and social costs, CPH remains common in developing countries where the probability of being exposed to corporal punishment is three out of four among children aged 2 to 14 (UNICEF, 2010). The prevalence of physical punishment is highest among the 5-9 age group. Alyahri and Goodman (2008) show that over 50% of Yemeni caregivers and around 25% of urban Yemeni caregivers reported using harsh corporal punishment as a way of disciplining children. The endorsement of physical punishment of children is also prevalent in sub-Saharan Africa (Monyooe, 1996; Oburu and Palmerus, 2003). Our study provides support for the passage and implementation of laws that prohibit the corporal punishment of children. Given the adverse spillover effects of violent child discipline, interventions that target improvements in the family environment may produce larger favorable gains than previously estimated.

The findings of this paper are also relevant to education policies, with a suggestion that changing the classroom composition of students may adversely affect the academic performance of those exposed to peers who are CPH victims. Careful consideration should be given to any decision on the allocation of students to classrooms. In light of the negative externalities of CPH, getting disadvantaged students exposed to CPH-inflicted peers could potentially perpetuate the achievement gap. This is consistent with the suggestions in Carrell and Hoekstra (2010) who focus on children living in domestic violence ridden families.

6 Conclusion

This paper contributes to the literature by presenting the first empirical evidence on the adverse spillover effects of CPH on the achievement of other students in elementary classrooms. The studied context is a developing country, Vietnam, where the adoption of violent child discipline is still a prevalent problem. Our findings suggest that fifth-grade students exposed to CPH harm their classmates' learning. In other words, interacting with peers who suffer from CPH lowers student achievement. Specifically, a one standard deviation increase in the Peers' Violence Index is associated with a reduction in the math and the language test scores by 0.11 and 0.14 standard deviations, respectively. These effects are comparable to those of increasing class size by approximately five to ten students per class (Fredriksson et al., 2012), or decreasing per-pupil expenditure by 500 USD (Greenwald et al., 1996), or decreasing teacher quality by half of a standard deviation (Nye et al., 2004; Kane and Staiger, 2008; Hanushek, 2011).

The negative spillover effects on achievement could be transmitted through the unfavorable changes in student academic aspirations, student actual efforts, and the deterioration in the inter-student relationships. Particularly, interactions with CPH-inflicted peers make students less likely to expect to go to college but more likely to feel like quitting schools. It is possible that these troubled peers also decrease the probability of the student studying hard for tests and paying attention to lectures. Moreover, we present suggestive evidence that the presence of more peers exposed to CPH erodes the quality of the inter-student relationships by increasing the incidence of physical bullies.

Collectively, our results have meaningful implications for education and social policies. We present the first concrete empirical evidence for the existence of a "bad apple" peer effect where students exposed to CPH hamper their classmates' academic performance. Education policies that alter the student composition across classrooms/schools may hurt the achievement of those exposed to CPH-inflicted children. Our findings justify the allocation of more resources to tackle the CPH problem in developing countries. It is necessary for policymakers to take

into account the social cost of such violent practice that exceeds the private cost faced by the victim children. According to UNICEF (UNICEF, 2010), three out of four children suffer from corporal punishment by their caregivers on a regular basis, meaning that many children are left unprotected. Our results lend support to the passage of legislation that prohibits the corporal punishment of children.

References

[1] Adesope, Akinola Olusegun, Olusegun Ogunwuyi, and Okunade Adelayo Olorode. (2017). Effects of Corporal Punishment on Learning Behaviour and Students Academic Performance in Public Secondary Schools in Ibarapa East Local Government, Oyo State. *International Journal of Advanced Academic Research, 3*(10),14-20.

[2] Allen, M., Donohue, W. A., Griffin, A., Ryan, D., and Turner, M. M. M. (2003). Comparing the Influence of Parents and Peers on the Choice to Use Drugs: A Meta-analytic Summary of the Literature. *Criminal Justice and Behavior, 30*(2), 163-186.

[3] Alyahri, A., and Goodman, R. (2008). Harsh Corporal Punishment of Yemeni Children: Occurrence, Type and Associations. *Child Abuse and Neglect, 32*(8), 766-773.

[4] Antecol, H., Eren, O., and Ozbeklik, S. (2016). Peer Effects in Disadvantaged Primary Schools Evidence from a Randomized Experiment. *Journal of Human Resources, 51*(1), 95-132.

[5] Becker, W. C. (1964). Consequences of Different Kinds of Parental Discipline. *Review of Child Development Research, 1*(4), 169-208.

[6] Burke, M. A., and Sass, T. R. (2013). Classroom Peer Effects and Student Achievement. *Journal of Labor Economics, 31*(1), 51-82.

[7] Carrell, S. E., and Hoekstra, M. (2012). Family Business or Social Problem? The Cost of Unreported Domestic Violence. *Journal of Policy Analysis and Management, 31*(4), 861-875.

[8] Carrell, S. E., and Hoekstra, M. L. (2010). Externalities in the Classroom: How Children Exposed to Domestic Violence Affect Everyone's Kids. *American Economic Journal: Applied Economics, 2*(1), 211-28.

[9] Carrell, S. E., and West, J. E. (2010). Does Professor Quality Matter? Evidence from Random Assignment of Students to Professors. *Journal of Political Economy, 118*(3), 409-432.

[10] Cherian, V. I. (1994). Self-reports of Corporal Punishment by Xhosa Children from Broken and Intact Families and their Academic Achievement. *Psychological Reports, 74*(3), 867-874.

[11] Eren, O. (2017). Differential Peer Effects, Student Achievement, and Student Absenteeism: Evidence From a Large-Scale Randomized Experiment. *Demography, 54*(2), 745-773.

[12] Feld, J., and Zolitz, U. (2017). Understanding Peer Effects: On the Nature, Estimation, and Channels of Peer Effects. *Journal of Labor Economics, 35*(2), 387-428.

[13] Flay, B. R., Hu, F. B., Siddiqui, O., Day, L. E., Hedeker, D., Petraitis, J., ... and Sussman, S. (1994). Differential Influence of Parental Smoking and Friends' Smoking on Adolescent Initiation and Escalation and Smoking. *Journal of Health and Social Behavior*, 248-265.

[14] Fredriksson, P., Ockert, B., and Oosterbeek, H. (2012). Long-term Effects of Class Size. *The Quarterly Journal of Economics, 128*(1), 249-285.

[15] Fry, D. P. (1993). The Intergenerational Transmission of Disciplinary Practices and Approaches to Conflict. *Human Organization*, 176-185.

[16] Gershoff, E. T. (2002). Corporal Punishment by Parents and Associated Child Behaviors and Experiences: a Meta-analytic and Theoretical Review. *Psychological Bulletin, 128*(4), 539.

[17] Gershoff, E. T., and Grogan-Kaylor, A. (2016). Spanking and Child Outcomes: Old Controversies and New Meta-analyses. *Journal of Family Psychology, 30*(4), 453.

[18] Global Initiative to End All Corporal Punishment of Children. (2016). Corporal Punishment of Children: Summary of Research on its Impact and Associations. Website: www.endcorporalpunishment.org and https://web.archive.org/web/20170424065706/http://www.endcorporalpunishment.org:80/progress/prohibiting-states/

[19] Glueck, E. T., and Glueck, S. (1950). Unraveling Juvenile Delinquency, Cambridge, MA: Harvard University Press.

[20] Greenwald, R., Hedges, L. V., and Laine, R. D. (1996). The Effect of School Resources on Student Achievement. *Review of Educational Research, 66*(3), 361-396.

[21] Hanushek, E. A. (2011). The Economic Value of Higher Teacher Quality. *Economics of Education Review, 30*(3), 466-479.

[22] Hanushek, E. A., Kain, J. F., Markman, J. M., and Rivkin, S. G. (2003). Does Peer Ability Affect Student Achievement?. *Journal of Applied Econometrics, 18*(5), 527-544.

[23] Hirschi, T. (1969). Causes of Delinquency. Berkeley, CA: Univer.

[24] Holden, G. W., and Miller, P. C. (1997, April). Cognitive versus Emotional Parenting: Alignments between Child-rearing Cognitions, Emotions, and Reported Behavior. *In Biennial Meeting of the Society for Research in Child Development, Washington, DC.*

[25] Hoxby, C. (2000). *Peer Effects in the Classroom: Learning from Gender and Race Variation* (No. w7867). National Bureau of Economic Research.

[26] Imberman, S. A., Kugler, A. D., and Sacerdote, B. I. (2012). Katrina's Children: Evidence on the Structure of Peer Effects from Hurricane Evacuees. *American Economic Review, 102*(5), 2048-82.

[27] Lavy, V., and Schlosser, A. (2011). Mechanisms and Impacts of Gender Peer Effects at School. *American Economic Journal: Applied Economics, 3*(2), 1-33.

[28] Kane, T. J., and Staiger, D. O. (2008). Estimating Teacher Impacts on Student Achievement: An Experimental Evaluation(No. w14607). National Bureau of Economic Research.

[29] Lavy, V., Paserman, M. D., and Schlosser, A. (2011). Inside the Black Box of Ability Peer Effects: Evidence from Variation in the Proportion of Low Achievers in the Classroom. *The Economic Journal, 122*(559), 208-237.

[30] Lavy, V., Silva, O., and Weinhardt, F. (2012). The Good, the Bad, and the Average: Evidence on Ability Peer Effects in Schools. *Journal of Labor Economics, 30*(2), 367-414.

[31] Lu, F., and Anderson, M. L. (2015). Peer Effects in Microenvironments: The Benefits of Homogeneous Classroom Groups. *Journal of Labor Economics, 33*(1), 91-122.

[32] MacKenzie, M. J., Nicklas, E., Waldfogel, J., and Brooks-Gunn, J. (2013). Spanking and Child Development Across the First Decade of Life. *Pediatrics, 132*(5), e1118-e1125.

[33] Manski, C. F. (1993). Identification of Endogenous Social Effects: The Reflection Problem. *The Review of Economic Studies, 60*(3), 531-542.

[34] McCord, J. (1979). Some Child-rearing Antecedents of Criminal Behavior in Adult Men. *Journal of Personality and Social Psychology, 37*(9), 1477.

[35] Monyooe, L. A. (1996). Teachers' Views towards Corporal Punishment in Lesotho Schools. *Psychological Reports, 79*(1), 121-122.

[36] Nye, B., Konstantopoulos, S., andHedges, L. V. (2004). How Large are Teacher Effects?. *Educational Evaluation and Policy Analysis, 26*(3), 237-257.

[37] Oburu, P. O., and Palmerus, K. (2003). Parenting Stress and Self-reported Discipline Strategies of Kenyan Caregiving Grandmothers. *International Journal of Behavioral Development, 27*(6), 505-512.

[38] Ost, B. (2014). How do Teachers Improve? The Relative Importance of Specific and General Human Capital. *American Economic Journal: Applied Economics, 6*(2), 127-51.

[39] Parke, R. D. (1977). Some Effects of Punishment on Children's Behavior–Revisited. *Contemporary Readings in Child Psychology/[compiled by] E. Mavis Hetherington, Ross D. Parke.*

[40] Patterson, G. R. (1982). *Coercive Family Process* (Vol. 3). Castalia Publishing Company.

[41] Pei, Z., Pischke, J. S., and Schwandt, H. (2019). Poorly Measured Confounders are more Useful on the Left than on the Right. *Journal of Business & Economic Statistics, 37*(2), 205-216.

[42] Pinheiro, Paulo Sergio. (2006). "Violence against Children in the Home and Family". World Report on Violence Against Children. Geneva, Switzerland: United Nations Secretary-General's Study on Violence Against Children. ISBN 978-92-95057-51-7.

[43] Rimal, H. S., and Pokharel, A. (2014). Corporal Punishment and its Effects in Children. *Journal of Kathmandu Medical College, 2*(3), 156-161.

[44] Simons, D. A., and Wurtele, S. K. (2010). Relationships between Parents' Use of Corporal Punishment and their Children's Endorsement of Spanking and Hitting Other Children. *Child Abuse and Neglect, 34*(9), 639-646.

[45] Straus, M. A. (2013). Concordance between Parents in Use of Corporal Punishment and its Relation to Belief in the Death Penalty by University Students in 15 Nations.

[46] Straus, M. A., and Paschall, M. J. (2009). Corporal Punishment by Mothers and Development of Children's Cognitive Ability: A Longitudinal Study of Two Nationally Representative Age Cohorts. *Journal of Aggression, Maltreatment and Trauma, 18*(5), 459-483.

[47] Straus, M. A., Douglas, E. M., and Medeiros, R. A. (2013). *The Primordial Violence: Spanking Children, Psychological Development, Violence, and Crime*. Routledge.

[48] Straus, M. A., Sugarman, D. B., and Giles-Sims, J. (1997). Spanking by Parents and Subsequent Antisocial Behavior of Children. *Archives of Pediatrics and Adolescent Medicine, 151*(8), 761-767.

[49] Swinford, S. P., DeMaris, A., Cernkovich, S. A., and Giordano, P. C. (2000). Harsh Physical Discipline in Childhood and Violence in Later Romantic Involvements: The Mediating Role of Problem Behaviors. *Journal of Marriage and Family, 62*(2), 508-519.

[50] UNICEF Global Database on Child Discipline. Available at https://data.unicef.org/topic/child-protection/violence/violent-discipline/. Last updated 2017.

[51] Unicef. (2010). Child Disciplinary Practices at Home: Evidence from a Range of Low-and middle-income Countries. New York: *UNICEF*.

[52] University of Oxford. Department of International Development. (2015). Young Lives: School Survey, Vietnam, 2011-2012. [data collection]. UK Data Service. SN: 7663.

[53] Van Houten, R. (1983). Punishment: From the Animal Laboratory to the Applied Setting. In *Effects of Punishment on Human Behavior*(pp. 13-44).

[54] Wang, L. C. (2010). Peer Effects in the Classroom: Evidence from a Natural Experiment in Malaysia.

[55] Whipple, E. E., and Richey, C. A. (1997). Crossing the Line from Physical Discipline to Child Abuse: How Much is Too Much?. *Child Abuse and Neglect, 21*(5), 431-444.

[56] Zolotor, A. J., and Puzia, M. E. (2010). Bans against Corporal Punishment: A Systematic Review of the Laws, Changes in Attitudes and Behaviours. *Child Abuse Review, 19*(4), 229-247.

Appendix A

Figure A1: Distribution of Peers' Violence-Original Responses

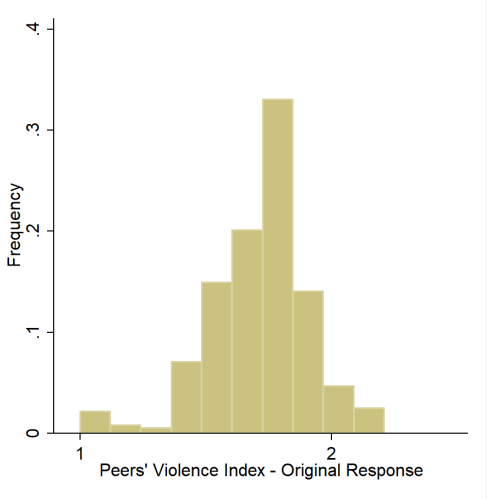


Figure A2: Distribution of Residualized Peers' Violence-Original Responses

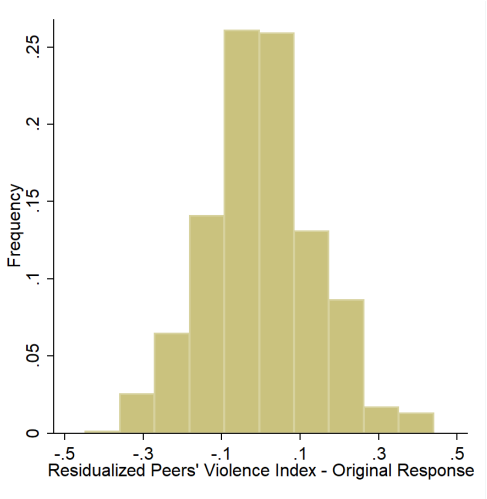


Table A1: Decomposition of Variance in the Peers' Violence Index

Peers' Violence Index	Sum Squares
Within School	49.11
Between School	49.67
Total	97.83

Table A2: Correlation Matrix

	Peers' Violence Index	Peer Language Achievement	Peer Math Achievement	Peer Parental Education	Endline Language Test Score	Endline Math Test Score	Own Parental Education
Peers' Violence Index	1						
Peer Language Achievement	0.0011	1					
Peer Math Achievement	0.0128	0.779	1				
Peer Parental Education	0.1305	0.4411	0.3779	1			
Endline Language Test Score	-0.0466	0.2647	0.2969	0.2177	1		
Endline Math Test Score	-0.08	0.3435	0.4247	0.2746	0.6871	1	
Own Parental Education	0.0593	0.2088	0.1781	0.3987	0.1251	0.1642	1

Table A3: Additional Randomness Checks 2

	Grade Repetition (1)	Being Female (2)	Being Minority (3)	Mother Has College Degree (4)	Own Violence Index (5)
Fraction of Fixed Effects jointly having p-value <0.05	0.016	0.033	0.000	0.133	0.166
Observations	130	130	130	130	130
Fraction of Fixed Effects Individually having p-value <0.05	0.015	0.038	0.000	0.069	0.161
Observations	130	130	130	130	130

Table A4: Other Measures of Peer Effects

	Y = Endline Math Score				Y = Endline Language Score			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average Peer Achievement	0.301**				0.048			
	(0.124)				(0.120)			
Fraction of Female Students		-0.286				0.365		
		(0.622)				(0.479)		
Peer Parental Education			0.512				0.562	
			(0.375)				(0.359)	
Peers' Violence Index				-0.107*				-0.137***
				(0.057)				(0.048)
Observations	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506

NOTE: Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A5: Impacts of Interacting with CPH-Inflicted Peers - Other CPH Measures

	Y = Endline Math Score				Y = Endline Language Score			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction Exposed to Violence	-0.750**	-0.854***	-0.855***	-0.873***	-0.920***	-0.929***	-0.928***	-0.953***
	(0.346)	(0.326)	(0.327)	(0.332)	(0.273)	(0.271)	(0.267)	(0.275)
Average Peer Achievement		0.337***	0.336***	0.319***		0.068	0.073	0.041
		(0.116)	(0.115)	(0.118)		(0.116)	(0.118)	(0.120)
Fraction of Female Students			-0.273	-0.354			0.367	0.265
			(0.585)	(0.591)			(0.437)	(0.448)
Peer Parental Education				0.479				0.584
				(0.377)				(0.364)
Observations	2,506	2,506	2,506	2,506	2,506	2,506	2,506	2,506

NOTE: The table reports the coefficient estimate β_1 in equation (1) where the Peers' Violence Index is replaced with the fraction of peers exposed to CPH, Fraction Exposed to Violence. The Own Violence Index is replaced with a dummy variable that takes the value of one if the student is ever hit by his/her parents and zero otherwise. Fraction Exposed to Violence gives the proportion of a student's peers who ever experience CPH. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A6: Impacts of Interacting with CPH-Inflicted Peers - Other Samples

	Y = Endline Math Score			Y = Endline Language Score		
	(1)	(2)	(3)	(4)	(5)	(6)
Peers' Violence Index	-0.132**	-0.484**	-0.602	-0.142***	-0.433*	-0.780***
	(0.056)	(0.203)	(0.375)	(0.049)	(0.253)	(0.252)
Observations	2,367	737	214	2,367	737	214
Sample	All 5th grade classrooms randomized	Schools that do not randomize	Schools with only one 5th grade classroom	All 5th grade classrooms randomized	Schools that do not randomize	Schools with only one 5th grade classroom

NOTE: There are 57 (out of 60) schools that randomly assign students to all classes. Standard errors are clustered at the class level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix B

The "Young Lives: School Survey, 2011-2012" was conducted for a subsample of the Young Lives younger-cohort children. Young Lives is an international study focusing on childhood poverty, covering 12,000 children in Ethiopia, India, Peru and Vietnam (www.younglives.org.uk). The study is funded by the University of Oxford's Department for International Development, the Netherlands Ministry of Foreign Affairs, and Irish Aid. Due to the inconsistency in the cross-country questionnaires, this paper only employs the school survey data that target Vietnamese children, the "Young Lives: School Survey, Vietnam, 2011-2012" (YLSSV, 2011-2012).

The "YLSSV, 2011-2012" involves the Young Lives younger cohort in Vietnam who were in grade five in the 2011-2012 school year along with their classmates. The survey design consists of two waves of data collection. In the first wave (October 2011), information on student, teacher, class, and school was collected. Student information includes background/demographic characteristics as well as assessment of cognitive and noncognitive abilities. The background/demographic characteristics can be treated as control (pre-treatment) variables since they do not change over time. In the second wave (April 2012), students were re-tested for their cognitive and noncognitive abilities in the same structure as in the first wave. Student performance on cognitive and non-cognitive assessment tests administered in wave 2 (April 2012, the end of the school year) can be treated as outcome variables. We believe that using the end-of-school-year test scores should be correct in a sense that they fully capture the extent of exposure during the academic year. Table B1 through B3 provide the questions that form the variables used in our paper. The complete information on the data including survey design, all questionnaires, and data dictionaries etc. is available at the Young Lives study website: https://www.younglives.org.uk/content/vietnam-school-survey.

Questions administered to students and teachers at the beginning of the school year (i.e. wave 1) are reported in Table B1 and B2, respectively. Responses to questions on the background characteristics of students and teachers can be regarded as the control variables, i.e. pre-treatment variables. Questions asked at the end of the school year (i.e. wave 2) are reported in Table B3. These non-cognitive measures along with the scores on the academic assessment tests are considered the left-hand-side (outcome) variables.

Table B1: Wave 1 - Student Questionnaire

Original Question	Response	Coding
Are you a boy or a girl	1=Boy 2=Girl	Being Female=1 if Response=2, and =0 otherwise
What is your ethnic group?	1=Kinh, 2=H'mong 3=Cham, 4=Ede 5=Ba Na, 6=Nung 7=Tay, 8=Dao 9=Day, 10=Other	Being Minority=0 if Response=1, and =1 otherwise
What is your mother's education level	0=Never been to school 1=Primary school 2=Lower secondary school 3=Upper secondary school 4=Higher education	Mother Has College Degree=1 if Response=4, and =0 otherwise
What is your father's education level	0=Never been to school 1=Primary school 2=Lower secondary school 3=Upper secondary school 4=Higher education	Father Has College Degree=1 if Response=4, and =0 otherwise
Have you ever repeated any grades at school?	0=No 1=Yes	Grade Repetition=1 if Response=1, and =0 otherwise
Are you hit by parents?	1= Always 2= Sometimes 3= Rarely/never	Own Violence-Original Response=1 if Response=3, =2 if Response=2, and =3 otherwise
Are you physically bullied at school?	1= Always 2= Sometimes 3= Rarely/never	Physical Bully=0 if Response=3, and =1 otherwise

Table B2: Wave 1 - Teacher Questionnaire

Original Question	Response	Coding
Gender	1=Male 2=Female	Female Teacher=1 if Response=2, and =0 otherwise
What is the highest level of general education	1=Primary/lower secondary 2=Upper secondary 3=Vocational training school 4=College 5=University/higher	Teacher Education=1 if Response≥4, and =0 otherwise
What is the highest level teacher training?	0=I am not trained 1=Short course/crash course 2=2 years 3=3 years (college) 4=≥4 years (university/higher)	Teacher Qualification=1 if Response≥3, and =0 otherwise
Have you ever been awarded the title of excellent	0=Never 1=Yes, school level 2=Yes, district level 3=Yes province/higher level	Excellent Teacher Award=1 if Response=3, and =0 otherwise
What is the main method used to allocate pupils to this class?	1=Randomly 2=By ability in math 3=By ability in Vietnamese 4=By general ability 5=By age 6=By ethnicity 7=By location of residence 8=There is one grade 5 class 9=Others	
Age	Continuous variable	
Years of teaching experience	Continuous variable	

Table B3: Wave 2 - Student Questionnaire

Original Question	Response	Coding
I am willing to do my best to pass all subjects	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Willingness to Do Best=1 if Response≤2, and =0 otherwise
If I work hard I think I can go to the college or university	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	College Expectation=1 if Response≤2, and =0 otherwise
I often feel like quitting school	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Feel Like Quitting School=1 if Response≤2, and =0 otherwise
I study hard for my tests	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Study Hard=1 if Response≤2, and =0 otherwise
I can follow the lessons easily	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Follow Lessons=1 if Response≤2, and =0 otherwise
I day dream a lot in class	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Daydream in Class=1 if Response≤2, and =0 otherwise
I do not give up easily when I am faced with a difficult question in my schoolwork	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Not Give Up=1 if Response≤2, and =0 otherwise
I am able to help my classmates with their schoolwork if permitted	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Help Classmates=1 if Response≤2, and =0 otherwise
My teachers feel that I am poor in my work	1=Strongly agree 2=Agree 3=Disagree 4=Strongly disagree	Low Teacher Expectation=1 if Response≤2, and =0 otherwise