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ABSTRACT

Stand Against Bullying: An Experimental School Intervention*

Despite the growing evidence on the negative consequences of school bullying, there is no consensus regarding the most effective strategies to fight this problem. We study the impact of a randomized intervention to reduce school bullying in urban public schools in Peru, a country where violence re-mains a major challenge. The intervention consisted of two components: i) increasing awareness among students about the negative consequences of bullying and encouraging them to stand against this problem, and ii) facilitate students' ability to report violent incidents, by promoting the use of a new Government program for submitting online confidential reports. Our results indicate that the intervention reduced students' bystander behavior and increased their willingness to report violence. Using administrative data, we also find that the intervention reduced the likelihood of changing schools and of dropping out, and improved student achievement in standardized tests in the medium term. Importantly, we find that the intervention had a more limited impact among children that are exposed to violence at home. While depression and isolation were significantly reduced among non-exposed students, this effect disappears among children living in a violent environment. Overall, these findings are promising and reveal that encouraging students to stand up against bullying and providing them with the means to do it may have beneficial effects over their well-being and educational performance, even in violent settings.

JEL Classification: D04, I20, I28

Keywords: school violence, anti-bullying programs, student achievement, school dropout, randomized control trial, Peru

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1. Introduction

In recent years, school bullying has become a widespread phenomenon. According to data from the National Center for Education Statistics (NCES), about 21% of students aged between 12 and 18 in the US reported being victims of some kind of bullying at school during 2015. Even worse, the same survey reveals that two thirds of bullied students were victimized at least once a month during the school year and only 43% reported the incident to an adult at school. Evidence from social sciences suggests that bullying may be very costly for everyone involved. While victims have been found to exhibit lower engagement with school and poorer measures of social adjustment and psychological well-being[1], perpetrators are at higher risk of developing personality disorders and violent attitudes (Rigby, 2003; Houbre et al., 2006; Esbensen & Carson, 2009; Farrington & Ttofi, 2011). Not surprisingly, this issue is increasingly attracting attention from the academia, civil society and policy-makers alike.

In the psychological literature, the definition of bullying incorporates three key elements (Olweus, 1993; Farrington, 1993). First, it consists on physical or verbal attacks or other forms of intimidation that are intended to cause fear, distress, or injury over victims. Second, bullying necessarily involves an imbalance of power, where one or more powerful perpetrators harass children that are mostly helpless against these offenses. Third, bullying consists of repeated incidents between the same children that are prolonged over a period of time. All of these features are likely to emerge and be reinforced in school settings, where students of different backgrounds meet repeatedly for long hours and peer pressure is likely to enhance violent attitudes (Salmivalli, 2010; Sarzosa & Urzúa, 2015).

Despite the awareness about the potential costs of bullying, there is no consensus regarding the best strategies to address this problem. In this regard, school-wide interventions have been proposed as a potentially effective policy instrument. The first large-scale intervention of this kind to be systematically evaluated was the Olweus Bullying Prevention Program (OBPP) in Norway, which decreased bullying victimization by up to 50% by providing basic information about bullying to all members of the school community (Olweus, 1993 & 1994). However, evidence on the effectiveness of other school-wide programs is scarce and mixed[2]. Moreover, most existing studies lack a proper

[1] Bullying also seems to be associated with increased chances of committing suicide among the youth. A review of 37 studies by Kim & Leventhal (2008) found that bullying victims are between 2 to 5 times more likely to consider suicide than non-victims. However, the authors also note that methodological limitations make it impossible to infer a causal relationship.

[2] See Smith et al. (2004), Merrell et al. (2008), and Ttofi & Farrington (2011).

evaluation design and, to the best of our knowledge, no such interventions have yet been evaluated in a developing country.

To fill this gap in the literature, we study the impact of a randomized school-wide intervention to prevent bullying among secondary students in urban public schools in Peru. The intervention had two components: i) increasing awareness among students about the negative consequences of bullying and encouraging them to stand against this problem; and ii) facilitate students' ability to report violent incidents, by promoting the use of the online platform SiSeVe ("Yes, we see it"), which was implemented by the Peruvian Ministry of Education (MoE) in 2013 to provide an opportunity for victims or witnesses of school violence to report incidents. The main idea behind this design was to not only encourage students to stand up against bullying –by helping victims, reducing passive support of bullying, and increasing the report of incidents–, but also to facilitate the means for them to do something about it.

Peru is a particularly relevant setting to analyze the effectiveness of an anti-bullying intervention for two reasons. First, violence continues to be one of the country's most serious challenges, especially at home[3]. Moreover, around 75% of Peruvian children and adolescents have experienced psychological or physical violence at school at least once during their lives (INEI, 2015b). An international comparison reveals that schools in Peru and Latin America are remarkably more violent than those in developed countries, where previous studies have been conducted (UNICEF, 2014). Second, we argue that evaluating anti-bullying programs in a developing country such as Peru can be helpful to determine whether a relatively simple intervention can be effective in a context of limited resources and weak institutional support[4]. Considering that the most promising results of school-wide interventions have been found in countries with modern and more advanced school systems, we contribute to the literature by exploring whether these programs can improve well-being and educational outcomes in disadvantaged settings.

Our findings indicate that an intervention that encourages students to stand up against bullying and provides them with the means to do it might be a promising and cost-effective model to address this issue. We find that the intervention reduced the likelihood of a bystander behavior and increased students' willingness to report school violence. Moreover, we find evidence of improvements in emotional well-being. Depression –as measured by a shortened version of the Center for Epidemiological Studies-Depression (CES-D) index– was significantly reduced, particularly

[3] The country's DHS survey reveals that 32.6% of women in 2015 had been victims of physical and/or sexual violence during their lives (INEI, 2015a). By 2013, 67.7% of children under 5 in the country were victims of psychological or physical violence perpetrated by their parents (León et al., 2016).

[4] For instance, average public expenditure per student in Peru was around 2000 USD in 2015, less than one fifth of the OECD average. Despite recent improvements, the country's expenditure in Education relative to GDP remains close to 3.5%, while the Latin American average is approximately 4.5% (OECD, 2016).

among male students. Using administrative data, we are also able to test whether the intervention improved educational outcomes. Our results indicate that the treatment significantly reduced the probability of school dropout in the next school year. We also find that bullying victims experienced significant reductions in school mobility (i.e., changing to another school) and improved test scores in national standardized tests one year after the intervention. This suggests that our intervention was successful in improving the learning environment for students affected by violence, and that these effects are persistent in the medium term.

Importantly, our analysis also indicates that the effects of the intervention on emotional well-being, attitudes towards bullying and academic achievement seem to disappear among students that are exposed to a high degree of violence at home. This is consistent with previous literature that documents that domestic violence is a strong predictor of disruptive behavior at school and poor emotional well-being.

The results of this study can be analyzed from the perspective of a dynamic model of skill formation (Cunha & Heckman, 2007 & 2008; Cunha et al., 2010). Nowadays, it is known that noncognitive skills are multidimensional, malleable, and that they interact closely with cognitive skills during their formation stages[5]. Recent evidence suggests that school bullying may be closely related to the development of noncognitive skills during childhood. Sarzosa (2017) documents that victimization at age 14 reduces current skill accumulation by up to 40% of a standard deviation, which may trigger a self-reinforcing mechanism that opens an ever-growing skill gap for victims. A growing body of studies on the educational and labor market consequences of bullying supports these results (Brown & Taylor, 2008; Ammermüller, 2012; Ponzo, 2013; Sarzosa & Urzúa, 2015). For instance, Eriksen et al. (2014) found that victims suffer in terms of academic GPA, and this effect increases with the severity of bullying.

Moreover, a related strand of literature has shown that disruptive students may also generate long-lasting negative externalities in the classroom, leading to poorer emotional well-being, risky behaviors and lower academic achievement among their peers (Figlio, 2007; Carrell & Hoekstra, 2010; Lavy & Schlosser, 2011; Kristoffersen et al., 2015). This suggests that reducing the incidence of bullying may have important effects over the emotional well-being and academic achievement of all students, even if they are not directly victimized. This is consistent with our results, since we found that both victims and non-victims benefited from the intervention.

[5] Studies have found that noncognitive skills may have a large influence over educational attainment and labor market performance, sometimes even of the same magnitude as cognitive skills (Heckman et al. 2006; Waddel, 2006; Cobb-Clark & Tan, 2011; Lindqvist & Vestman, 2011).

Our work is also related to a recent strand of literature that evaluates the implementation of behavioral programs aimed at improving educational and labor market performance among vulnerable populations. For instance, Blattman et al. (2017) find that behavioral therapy improved many measures of noncognitive skills among criminally engaged men in Liberia, leading to persistent reductions in crime and violence when complemented with financial support. Heller et al. (2017) also found large effects of three interventions aimed at reducing crime and school dropout among disadvantaged youth in Chicago. In a setting more similar to our study, Dinarte (2017) documents that after-school programs for violent students in El Salvador improved their behavior and academic performance. Interestingly, she also finds positive spillover effects for non-enrolled students. Although these studies support the effectiveness of behavioral programs in reducing violence and improving labor market outcomes in vulnerable contexts, none of them have focused on the specific problem of school bullying.

Overall, our findings contribute to the literature in several ways. First, we highlight the role of the peer group in encouraging or deterring violent behaviors. Our results show that involving all students in the solution of the problem –by encouraging them to take action against school violence and providing them with the means to do it effectively– may be a promising policy alternative to just targeting interventions at potentially violent individuals. Second, we show that the effects of an anti-bullying intervention may go beyond changes in attitudes towards violence and emotional well-being. In line with previous studies that link school violence to lower human capital accumulation, treated children exhibited improved academic performance and educational attainment in the middle-term. Moreover, students that are not directly involved in violent incidents also appear to benefit from a less violence-friendly environment at school. Third, our results indicate that high levels of domestic violence may significantly reduce the benefits of an anti-bullying strategy targeted exclusively at students. Since apparently our intervention design was not enough to offset an unhealthy environment at home, future studies should explore alternatives like involving parents directly in anti-bullying interventions.

Finally, we provide the first experimental evidence that school-wide anti-bullying interventions may also be effective in developing countries, even when the prevalence of violence is particularly high. Our findings indicate that low-intensity and relatively simple intervention aimed at reducing school violence may be a promising and cost-effective policy option in such settings[6]. This is relevant for generalizability and scaling purposes, particularly in contexts where budgets and institutional capabilities are more likely to be constrained.

[6] While the behavioral interventions evaluated in Blattman et al. (2017), Heller et al. (2017) and Dinarte (2017) involve regular sessions distributed throughout a relatively long period of time, our intervention spanned only a few school-days.

The remaining of this paper is organized as follows. In Section 2, we describe the context of school violence in Peru and the SiSeVe initiative. Section 3 explains the design and implementation of the intervention. Our sources of information and our empirical strategy are analyzed in detail in Section 4. Section 5 presents and discusses our results, and explores the potential heterogeneities in the effects of the intervention. Finally, Section 6 concludes.

2. Background

2.1. Bullying and violence in Peru

School violence affects millions of students in Peru. The Peruvian National Survey on Social Relations (ENARES) conducted in 2015 reveals that approximately 75.3% of children and 73.8% of adolescents in the country have experienced any kind of violence at school at least once (INEI, 2015b). Even worse, 47.4% of adolescents aged 12 to 17 (the ages spanning secondary education in Peru) were victims of violence by their peers during the last twelve months. Violence in Peruvian schools may take many forms. While psychological violence is the most common type (42.7% of adolescents), a striking 18.4% also experienced physical violence and 19.9% were victims of sexual violence at school during 2015. These figures indicate that schools in Peru are highly violent settings[7]. In fact, 80.3% of violent incidents took place inside the classroom.

According to the ENARES survey, most of the victims of school violence in Peru do not receive appropriate support. In 2015, only 48.7% of adolescents that reported being victims of violence by their peers during the last twelve months asked for help. Tolerance for school violence among Peruvian students is also worryingly high. 79.5% of adolescents reported having witnessed violence at school in 2013 (INEI, 2015b). However, only 45.2% tried to help or report the incident. In contrast, 29.1% of witnesses did not do anything to prevent the incident, and 27.8% took part in it or encouraged it. Overall, this situation provides an appropriate setting to test the effectiveness of an intervention aimed at increasing awareness of the consequences of bullying and encouraging students to stand up against this problem.

It is difficult to compare the prevalence of school violence in Peru with other countries because of the variety of methodologies employed to measure this phenomenon. However, a recent study by UNICEF attempted to build comparable statistics on bullying victimization based on two large-scale international surveys (UNICEF, 2014). Figure 1 displays bullying prevalence in countries with available data. The study finds that more than 40% of students in Peru aged between 13 and 15

[7] Sexual minorities are at higher risk of being victims of bullying. Cardenas et al. (2011) finds that 66.7% of LGBT students have been victims of bullying due to their sexual orientation at schools in Lima and Callao, the country's main metropolitan area.

had been victims of school violence in the last couple of months. In contrast, the corresponding figure in the United States was between 20% and 30%, while most European countries also displayed rates of 30% or lower. In this regard, an international comparison provides compelling evidence that the Peruvian school system is remarkably more violent than those in developed countries where previous studies on the effectiveness of anti-bullying programs have been conducted.

Many reasons could explain the high prevalence of school violence in Peru. Although the country has successfully reduced poverty rates during the last decades, evidence suggests that factors like past civil conflicts, economic crises, and political turbulence have all had long-term impacts on its citizens. For instance, Gutiérrez & Gallegos (2016) show that female exposure to conflict violence during the 1980s and early 1990s increases their later risk of being a perpetrator and a victim of domestic violence. In a similar vein, León & Benavides (2013) document that violence against women is a strong predictor of child physical abuse in Peru, thus triggering a vicious cycle of intergenerational transmission of violence. Statistical data collected through the country's demographic surveys confirm the gravity of this situation: in 2015, 32.6% of Peruvian women had been victims of physical and/or sexual violence during their lives (INEI, 2015a). Domestic violence against children also remains at strikingly high levels: by 2013, 67.7% of children under 5 in the country were victims of psychological or physical violence perpetrated by their parents (León et al., 2016).

Still, international evidence suggests that violence is not only high in Peru, but an endemic problem in most countries in the region. A study by UNESCO conducted between 2006 and 2007 suggests that bullying prevalence among sixth graders in 16 countries in Latin America and the Caribbean is relatively high. 51% of students in the region reported experiencing some type of bullying within the past month, while the corresponding figure in Peru was approximately 45%. Domestic violence also remains at critical levels in Latin America and the Caribbean. A comparative study by the World Health Organization estimated that the lifetime prevalence of intimate partner violence against women in the region ranged from 25.8% to 33.9%, while the average rate in high-income countries was 23.2% (WHO, 2013). Similarly, a comparison of household survey data shows that despite its high rates of domestic violence against women, Peru ranks in the middle among 12 Latin American and Caribbean countries (Bott et al., 2013). This turns Peru into an appropriate setting to study the effectiveness of policies to fight violence in the region.

2.2. The SiSeVe Initiative

In 2011, the Peruvian Government decided to put in place measures against school violence by establishing a law that promotes a peaceful coexistence in educational institutions. The objective of this law is to provide students with a safe school environment by preventing, identifying, resolving,

and eliminating bullying in schools. Additionally, since 2013, the Ministry of Education (MoE) has been attempting to strengthen the law by promoting a nationwide strategy against school violence.

An important initiative in this context was the implementation of SiSeVe ("Yes, we see it"), an online platform that facilitates reporting school violence by victims or witnesses. Students, parents, friends, or any witness to a violent incident can anonymously report an incident. The report is then forwarded to the local education authorities, who must verify the authenticity of the report and ensure that victims are protected from future harm. The online platform also includes relevant information on the resources available in the community to protect children and adolescents from any kind of violence. This initiative spans multiple ministries, including the Ministry of Health, Ministry of Women and Vulnerable Populations, Ministry of Justice, Ministry of the Interior (i.e., National Security), and the Public Ministry. Overall, this strategy aims to help students break the cycle of violence they have been exposed to since a young age, and thereby prevent these and other forms of violence in the future.

3. The Intervention

The intervention was carried out during October 2015, and it was conducted by a specialized team that worked directly with the MoE. Only students from the first and second grades of secondary education (13-14 years old) participated. Before the intervention, the team received training sessions on school violence, the SiSeVe platform, and the activities and materials to be delivered. The intervention was coordinated with the pedagogical team of the Regional Education Department (DRE) and the Local Education Management Unit (UGEL). During implementation, all treated schools received a visit from the intervention team and some unannounced visits from regional and local authorities.

In order to be eligible for the intervention, schools had to satisfy the following criteria: i) being a public school (either under direct public administration or under private administration), ii) offering enrollment in secondary grades, iii) being located in an urban area, iv) having computers connected to Internet, and v) not participating in other interventions by the MoE. Access to computers and Internet were required because the SiSeVe platform is an online platform. From all schools that met the criteria, we randomly selected 33 schools for treatment and 33 schools for control. Figure 2 presents the geographic distribution of treatment and control schools.

The objective of the intervention was to encourage students to stand up against bullying by reporting incidents, helping victims and avoiding a passive bystander behavior. This approach is justified on the idea that bullying is a group process where all members of the school community play a role (Richard et al., 2011). To achieve its goal, the intervention had two complementary components

that were delivered jointly in all treated schools: i) increasing awareness among students about the negative consequences of bullying and encouraging them to stand against this problem, and ii) facilitate students' ability to report violent incidents, by promoting the use of the online SiSeVe platform. The main idea behind this design was to not only encourage students to stand up against bullying (by helping victims, reducing passive support of bullying, and increasing the report of incidents), but also to facilitate the means for them to do something about it.

The first component consisted of three types of activities aimed at raising awareness about the negative effects of peer violence and encouraging students to stand up against it: i) workshops about bullying, including the provision of information on the long-term consequences of school violence on school performance; ii) hands-on activities oriented at reinforcing the messages provided during the workshops, including crafting posters, bulletin boards, in-school parades and role-playing games; and iii) distribution of informative material about school violence. Although the execution of these activities may have varied slightly between schools depending on the circumstances (e.g., the time available), the message provided was the same: to encourage students to stand up against bullying and to actively help those in need and to report violence whey they witness it.

For the second component, the intervention team had three main tasks: i) signing up schools to the SiSeVe system, ii) training teachers, students, and parents on how to use the SiSeVe platform, and iii) launching an awareness campaign to increase students, teachers, and parents' knowledge about the SiSeVe platform. The intervention team promoted the SiSeVe platform by showing the school community how to access, register, and use the online tool. The team also explained key aspects of how the SiSeVe platform works, like the fact that users are guaranteed anonymity and that all reports are addressed by local authorities. Finally, each school received a detailed informational package[8] about the resources available to prevent and solve school violence episodes. Annex 1 provides a detailed description of the intervention structure, activities, and initiatives that each component involved.

Our intervention design is in line with previous literature that suggests that school-wide programs may be more effective in reducing school violence than strategies targeted at individual bullies and victims. For instance, a systematic evaluation of the Olweus Bullying Prevention Program (OBPP) implemented in Norway during the decade of 1990 found promising results. After the provision of basic information about bullying to all members of the school community, bullying victimization decreased by up to 50% (Olweus, 1993 & 1994). More recently, the KiVa anti-bullying

[8] The informational package was called: "10 Recursos para Prevenir y Atender casos de Violencia Escolar" (Ten Resources to Prevent and Address Cases of School Violence)

program in Finland was also found to reduce victimization and improve some measures of emotional well-being (Kärnä et al., 2011; Williford et al., 2012).

Nevertheless, existing evidence on the effectiveness of other school-wide programs is scarce and mixed at best (Smith et al., 2004; Vreeman & Carroll, 2007; Merrell et al., 2008; Ttofi & Farrington, 2011). Most evaluations lack a proper design and there is still no clarity of the potential effects of such interventions over student well-being and academic achievement. Moreover, all rigorous evidence on successful programs comes from countries where the quality of the school system and governmental support are high. To the best of our knowledge, no such interventions have yet been evaluated in the context of a developing country, where school violence is likely to be an even more urgent issue.

4. Methods

4.1. Data and summary statistics

Questionnaires were administered to children in both treated and control children before and after the intervention. The surveys were collected by a specialized team, different from the intervention team. Surveyors were previously trained by specialists from the MoE.

The timing of the surveys is shown in Figure 3. The baseline survey was collected from April 2015 through May 2015 in treatment and control schools. The same questionnaire was administered in an endline survey between one and two months after the intervention, from November 2015 through December 2015. The response rate to the follow-up survey reached 92%. Fielding the endline one to two months after the intervention was an administrative constraint, since the school year ends in December in Peru, followed by a long summer break between January and March. Thus, our goal was to measure if the intervention had any effects before the break.

We performed balance checks on schools characteristics (e.g., the number of students and teachers per school, students per classroom, type of administration, among other relevant variables) for the 66 schools in our sample. Consistent with the random assignment to the intervention, we find no statistically significant differences between treatment and control schools (see Table 1). Additionally, the survey collected detailed characteristics for all students in the first and second years of secondary education. Table 2 compares children in treated and control schools. No significant differences are found in terms of gender, age, household composition, subjective health status and exposure to violence at home. Regarding socioeconomic status, we find that district-level measures such as average income per capita and the Human Development Index do not differ between treatment and control schools. Although the share of children with access to water at home is somewhat larger

in control schools, the proportion of poor children (which takes into account access to water as well as other measures of household wealth) is statistically similar across treatment groups.

Aside from this information, the survey collected detailed self-reported information that allowed us to construct indexes measuring several aspects of an individual's emotional well-being, their perceptions about violence in their schools, and their attitudes towards violence. All indexes were based on scales developed in prior studies. Annex 2 shows the detailed construction process of each index and Annex 3 shows their reliability (Cronbach's Alpha). Panel A of Table 3 presents the averages for these indexes at baseline for treated and control schools, indicating no statistical differences before the intervention.

The indexes measure the following dimensions: i) depression, by asking students questions on feelings of helplessness and hopelessness, loss of interest in activities, and happiness; ii) isolation, by asking about how often children felt left out, isolated from others, and if they lacked companionship; iii) general school climate perception, by asking about the relationship between teachers and students, violence around school areas, school safety, and satisfaction; iv) in-school violence perception, by asking about specific violent episodes such as verbal abuse, physical harassment, cyberbullying, and treats; v) help-seeking behavior, by asking whether students are likely of seeking help from someone at school and of reporting bullying episodes to school authorities and teachers; vi) bystander behavior, by asking question about students' behavior when they witness different acts of bullying at school; and vii) learning expectations, by asking about their beliefs on how school violence affected their learning process.

Additionally, we use two sources of information to determine whether a child is a bullying victim or perpetrator: i) self-reported victimization and perpetration, and ii) peer nominations. Regarding the first measure, we asked students whether they had been involved in different types of violent incidents during the last month, either as victims or perpetrators[9]. As for the peer nomination data, the survey included a section where students could nominate other children in their classroom that had been involved in different types of bullying incidents during the last month. They were allowed to name up to three of their peers in each category. We then classified students as victims or perpetrators according to the number of nominations they received in each category.

Given the short time between the intervention and the endline survey, we are only able to measure the short-term effects of the intervention on individuals' emotional well-being, perceptions and attitudes, as well as subjective measures of bullying victimization and perpetration. Nevertheless,

[9] Students' answers ranged from 0 (never) to 2 (more than once). Questions referred to verbal intimidation, verbal aggression, physical assault, threats of physical assault, and cyberbullying. We constructed two measures of victimization and perpetration: one that indicated whether the student had been involved in at least one act of violence, and one that summed all answers to the questions in each category, thus providing a measure of intensity.

we are able to measure medium-term effects using administrative data provided by the MoE. In particular, we use data from a national online system for educational institutions called SIAGIE, which simplifies the registration process for student's enrollment, attendance, and performance.[10] This allows us to construct two indicators of school enrollment: school dropout, which we define as not being enrolled in any educational institution (public or private) in Peru the year after the intervention, and school mobility, which we define as not being enrolled in the same school the year after the intervention.

Additionally, to measure academic achievement we use individual scores in national standardized tests for three subjects: Reading Comprehension, Mathematics, and History, Geography and Economics. However, since only children in the second grade of secondary education take these tests, our sample for these outcomes is restricted to those students that were in the first grade in 2015, and therefore took the national standardized tests the year after the intervention. In Panel B of Table 3 we report dropout and mobility rates for the two years preceding the intervention, calculated among all students enrolled in the first and second grades of secondary education of the schools in our sample. We also report average scores in national standardized taken in 2015. Since the test on History, Geography and Economics was first administered in 2016, there is no baseline score available. We find no statistical differences between treatment con control schools in any of these outcomes.

4.2. Empirical Approach

With the baseline and follow-up information in our survey, we are able to depict a difference-in-difference approach to identify the effect of the intervention over several self-reported measures of child attitudes, perceptions, and emotional well-being, as well as a set of measures of bullying victimization and perpetration. We estimate the regression model in equation (1), where i indexes students, j indexes schools, and t indexes time.

$$I_{ijt} = \alpha_0 + \alpha_1 time_t + \alpha_2 T_j * \ time_t + \ \varphi_i + \epsilon_{ijt} \qquad (1)$$

The dependent variable I_{ijt} represents the standardized constructed indexes; the variable T_j equals 1 if the student belongs to a treated school and 0 otherwise; the variable $time_t$ equals 0 for the baseline round of surveys (prior to the intervention) and 1 for the follow-up round (after the intervention); and the term φ_i captures fixed effects at the student level. Standard errors ϵ_{ijt} are clustered at the school level. Since the information used to construct the indexes was collected through self-administered questionnaires, some children failed to provide an answer to all the relevant items in the survey. We

[10] Additionally, the SIAGIE data provides information about school characteristics such as type of administration, school size, school type (single-sex or co-educational), and educational levels.

therefore employ inverse probability weighting methods to prevent missing answers from biasing our results.

The individual fixed effects included in equation (1) control for any unobserved characteristics at the student, school or regional level that are stable in time. This allows us to remove any remaining differences between students in the treatment and control groups that could potentially arise even after the random assignment of the intervention. Our coefficient of interest in equation (1) is α_2, which represents the additional change in outcome y_{ijt} among treated students relative to the control group.

As discussed above, we are also interested in knowing whether the intervention modified real behavior and educational outcomes, aside from its influence on self-reported measures of well-being, perceptions, and attitudes. Therefore, we estimate the effect of the treatment over two additional sets of outcomes. First, we focus on whether students' involvement in bullying episodes was altered by the intervention. We use self-reported bullying victimization and perpetration, as well as two indicators for whether a student in the same classroom nominated the individual as a bullying victim or perpetrator. These two approaches allow us to compare each child's perceived situation with the reports from her peers. Second, we test whether the intervention affected middle-term educational outcomes. In particular, we evaluate school dropout and scores in the standardized national tests for three subjects: Reading Comprehension, Mathematics, and History, Geography and Economics.

To assess the effect of the intervention over bullying victimization and perpetration and middle-term educational outcomes, we estimate the OLS model in equation (2).

$$Y_{ijr} = \beta_0 + \beta_1 T_j + \beta_2 X_i + \beta_3 Z_j + \delta_r + \epsilon_{ijr} \qquad (2)$$

Where Y_{ij} represents the outcome variable for child i in school j and T_j is an indicator of whether the school belongs to the treatment group; X_i and Z_j denote vectors of baseline characteristics at the individual and school levels, and δ_r captures region fixed effects. As in equation (1), standard errors ϵ_{ijr} are clustered at the school level. For the standardized tests, we added the school's average score in the previous year as an additional control to account for potential differences in overall school achievement.

5. Results

5.1. Measuring the overall impact of the intervention

A. Child attitudes, perceptions, and emotional well-being

In Tables 4 and 5 and Figure 4, we show the results of estimating equation (1) for five measures of child attitudes and perceptions (school climate, In-school violence perception, report of violence incidents, bystander behavior, and learning expectations) and two measures of emotional well-being (depression and isolation). We only report the estimates for the coefficient of interest, α_2.[11] Considering that the follow-up surveys were administered only a few months after the intervention, these coefficients should be interpreted as the short-term effect of the intervention over the subjective outcomes.

The most sizable effects are observed among indicators of child attitudes towards violence. Column (3) of Table 4 shows that the intervention is associated with a statistically significant increase of 0.107 standard deviations in the index for reporting violence incidents. This means that after the intervention, treated students state that they are more likely to seek help from someone at school and to report bullying episodes to school authorities and teachers. This effect might be driven by different factors. For instance, it could be the result of a better understanding of the negative consequences of bullying among students, but also of a more receptive attitude among teachers and school authorities. In particular, the increase in the index for reporting violent incidents might also be a consequence of students being presented with the SiSeVe platform, which provides a new option to speak up and report violence incidents.

To investigate this issue further, we analyzed data on reports entered in the SiSeVe system. This allows us to contrast the children's self-reported attitudes with actual records of reports. Figure 5 shows the total number of reports linked to treatment and control schools during the months before and after the intervention. Although the number of reports entered is small (suggesting that still much of daily violent incidents go unreported) we do observe a notorious increase in the treatment schools in the period that followed the intervention. This difference seems to wind down between December and March, coinciding with the summer break. Still, this information suggests that the intervention encouraged reports of violent incidents in treated schools, which likely made it easier for teachers and school authorities to act upon them. Moreover, these findings provide support for the validity of our measure of self-reported willingness to report violent incidents.

Consistent with this result, column (4) of Table 4 shows that the intervention also reduced the index of bystander behavior by 0.07 standard deviations (significant at 5%), meaning that students in treated schools reported to be less likely to encourage bullying acts, more likely to report them and more likely to help the victims of bullying than students in control schools. This finding is important because bystanders have been shown in the psychological literature to be key actors in bullying incidents. By reducing support for violence among regular students, potential aggressors are likely to

[11] Full estimation results will be available on an online appendix.

be discouraged. Together, the effects on bystander behavior and willingness to report provide compelling evidence that the intervention was successful in changing attitudes toward violence among treated students, thus making bullying more visible and less accepted in the school community. However, we do not find evidence of significant changes in child perceptions. Although the estimated effects over the indexes of School Climate, In-school Violence Perception, and Learning Expectations are in the expected direction, none of them are statistically different from zero.

We report average treatment effects over two measures of child emotional well-being in Table 5. Although the effects over our indexes of depression and isolation are in the expected direction, none of them are significant. However, we find suggestive evidence that the intervention might have been effective in reducing depression among the most troubled children. Specifically, Column 2 shows that the intervention reduced the probability of severe depression by 0.024 percentage points, or 8% relative to the control group mean (the coefficient is significant at 10%). Moreover, in Section 5.2 we provide evidence that this result might be hiding important heterogeneities in the effect on the intervention.

B. Educational outcomes

As we discussed in Section 4, we are able to use administrative data to assess whether the intervention affected middle-term education outcomes, aside from its impact on the subjective indicators analyzed so far. In table 6, we show the results of estimating equation (2) over school dropout in the following year, as well as on scores in standardized national tests.

Column (1) displays the effect of the intervention over school dropout the year after the intervention. Our estimated coefficient for β_1 is statistically significant, and shows that students in treated schools were 1 percentage point less likely to drop out of school after the intervention. To put this result in perspective, the dropout rate in control schools was 3% in the same year (2016). Regarding academic achievement, columns (3) and (5) of Table 6 report significant improvements of 0.074 and 0.086 standard deviations in the scores for Reading Comprehension and History, Geography and Economics, respectively. We find no significant results in the Mathematics test.

Overall, these findings are important for two reasons. First, they show that the intervention had an effect not only on students' self-reported attitudes and perceptions, but also on objective educational outcomes. We therefore provide evidence of the potential effectiveness of a low-intensity intervention aimed at improving the learning environment over students' achievement. This is relevant in the context of a developing country where school quality and governmental capabilities are generally low. Second, the significant effects on dropout rates and test scores one year after the

treatment show that the impact of the intervention also lasts over the medium term, even affecting outcomes in the next academic year.

5.2. Who benefits from the intervention?

A. Heterogeneous effects by gender and poverty status

After presenting our main results, we now explore potential heterogeneities in the magnitude of the effects of the intervention. In this regard, a natural question is whether the impact differs by the gender of the victim. Panel A of Table 7 report the effect of the intervention on self-reported attitudes and perceptions for male and female students separately. The only index where differences turn out to be significant is the School Climate scale, which was improved in 0.116 standard deviations among girls, while no effect was found for boys. In turn, Panel A of Table 8 reports heterogeneous effects by gender over the students' emotional well-being. Surprisingly, significant differences arise in the effect on the probability of severe depression. This outcome decreased significantly by 4.4 percentage points among male students, while no effect was found among girls (difference is significant at 5%). Though we cannot reject the hypothesis that the effect on the depression index is equal for both genders, the effect is notably larger and more robustly estimated for male students.

We present heterogeneous treatment effects by gender over educational outcomes in Panel A of Table 8. We find that the effect of the intervention over school mobility and test scores in Reading Comprehension and History, Geography and Economics are notably larger and more precisely estimated among boys (significant at 5% for mobility and 1% for ECE scores). In contrast, treatment effects on these outcomes are not statistically different from zero among girls. Although we fall short of rejecting the hypothesis of differential effects, these results are suggestive that the middle-term effects of the intervention on educational outcomes might be stronger among male children. An exception is the treatment effect on school dropout, which is significant for both groups.

Regarding poverty status, we find no differences in the treatment effect over self-reported attitudes and perceptions of emotional well-being (see Panel B of Tables 7 and 8). When analyzing potential differences in educational outcomes (Panel B of Table 9), we find that the intervention significantly reduced school dropout and mobility by 1.528 and 2.502 percentage points among poor children. Moreover, test scores in Reading Comprehension and History, Geography, and Economics in this group improved by 0.097 and 0.142 standard deviations (significant at 5% and 1% respectively). In contrast, only the school dropout and the score in History, Geography, and Economics improved significantly among non-poor children, and the point estimates are considerably smaller. None of these effects are statistically different between groups, but they point to a somewhat

larger impact of the intervention over educational attainment and academic performance among poor children.

B. Heterogeneous effects by bullying victimization and exposure to violence at home

Using the information from the Peer Nomination section of the survey, we also explore whether the effects of the intervention differed by victimization status. Specifically, we classified all children that were nominated at least once by their peers for being the victim of a violent incident during the last month as bullied children. Panel C of Tables 7 and 8 show that the effect of the treatment over self-reported attitudes, perceptions and emotional well-being was not statistically different between bullied and non-bullied children. In contrast, results presented in Panel C of Table 9 show that improvements in educational outcome might have been larger among bullying victims. In fact, the reduction in mobility was of 2.853 percentage points among bullied children, while the effect was not statistically different from zero among the rest. Point estimates are also larger and more robustly estimated among bullied children in the three standardized tests. In particular, the treatment effect on the score in Mathematics becomes significant among bullied children (0.106 standard deviations), and this estimate is statistically different from the effect among the remaining students.

Finally, one remaining question is whether the environment at home may offset the positive impact of the intervention. This hypothesis is in line with previous findings in the literature of peer effects in the classroom. In particular, evidence suggests that exposure to domestic violence is a strong predictor of disruptive behaviors at school, which include involvement in violent incidents such as bullying (Carrell & Hoekstra, 2010; Kristoffersen et al., 2015). Our survey asked students if they had been victims or witnesses of physical or verbal violence at home during the last month, which allows us to construct a measure of exposure to domestic violence.

In Panel D of Table 7, we test whether the effect of the treatment over self-reported attitudes and perceptions differed according to our measure of exposure to violence at home. Interestingly, we find that the reduction in bystander behavior was mainly concentrated among children not exposed to violence at home: while this group experienced a significant reduction of 0.118 standard deviations in the constructed index, the treatment effect was much smaller and non-significant among exposed children (the null hypothesis of equal treatment effects is rejected at the 5% level). Moreover, Panel D of Table 8 shows that reductions in depression were also larger among children not exposed to violence at home. The intervention signifcantly reduced the Depression Index by 0.07 standard deviations and the probability of severe depression by 4.2 percentage points among non-exposed children, while these effects were not statistically different from zero for the rest. These differences are significant for both outcomes, which reinforces the idea that domestic violence offsets the impact

of our intervention on emotional well-being. On the other hand, treatment effects on educational outcomes seem to be less dependent on exposure to violence at home.

5.3. Does the composition of the classroom matter?

In Section 3, we stressed that our school-wide intervention approach is supported by the notion that all students play a role by contributing to a more or less violence-friendly environment at school. For instance, it may be the case that a troubled individual is more likely to bully other children in a classroom where bullying is common practice. Similarly, a larger share of non-violent students in the classroom might potentially deter violent behaviors through lower social acceptance or a larger possibility of a peer reporting a violent incident.

To test these hypotheses, we exploit our peer nomination data to construct measures of violence and bullying victimization in the classroom. Specifically, we construct two indexes: i) share of children in the classroom that received at least one nomination as either bullying perpetrators or victims, and ii) share of children in the classroom that received at least one nomination as a bullying victim. While the first measure aims to capture potential heterogeneities by the level of generalized violence in the classroom, the second is used to test whether the intervention was more effective in classrooms where a large fraction of children are victimized. We then classified classrooms as highly violent if they were among the 25% with the highest share of bullying victims or children involved an violent incidents, respectively.

Tables 10 and 11 report the effects of the treatment on constructed indexes by composition of the classroom. However, we find no clear differences in the impact on the children's attitudes, perceptions, or emotional well-being. Instead, classroom composition appears to influence the magnitude of the effect on educational outcomes. In particular, column (2) of Table 12 shows that the reduction in school mobility is much larger and more precisely estimated in classrooms with high prevalence of violence and a large share of bullying victims (difference significant at 5%). Regarding academic performance, we find that highly violent classrooms experienced improvements of 0.134 and 0.196 standard deviations in the scores in ECE Reading and History, Geography, and Economics, while the effect of the treatment in the remaining classrooms was not significant (see columns 3, 4, and 5 of Panel A). A similar pattern is observed in the 25% classrooms with the largest shares of bullying victims (see Panel B of Table 12). Moreover, performance in Math was significantly improved by 0.092 standard deviations in this group, and this effect is statistically different from the remaining classrooms (p-value=0.045). Overall, these findings suggest that the treatment was more effective in improving educational outcomes in classrooms with high prevalence of violence.

5.4. Effect of the intervention on bullying victimization and perpetration

We now turn to analyzing the effects of the intervention over measures of bullying victimization and perpetration. As was mentioned in Section 4.1, we employ two sources of information for each of these outcomes. First, we use the answers to the survey to construct two variables: a binary indicator that takes the value of 1 if the student reports having been involved in a bullying incident during the last month (as a victim or an aggressor, respectively), and a victimization/perpetration index that reflects the intensity of the student's involvement. Second, we use the information collected through peer nominations to create two variables: one that indicates whether another student in the classroom nominated each child as a bullying victim or perpetrator, and one with the total number of nominations received. Since the latter measures consider the opinions of all students in the classroom, we can abstract from the potential bias that might arise from a child's own perception of bullying victimization or perpetration.

Still, it is important to note that the overall impact of the intervention on our measures of bullying victimization and perpetration is uncertain, since it is possible that two opposing effects are in play simultaneously. On the one hand, increased awareness about the negative consequences of bullying and the tools available to fight it might reduce bullying incidents through a deterrence effect. In other words, it is expected that the intervention makes bullying more costly for perpetrators through stronger punishments and less social support, leading to a reduction in victimization and perpetration. On the other hand, the expected increase in willingness to "speak out" and "act out" might motivate students to report more violent incidents in the survey. If this were the case, both our self-reported and peer nomination measures of bullying would rise after the intervention. Ultimately, both reactions are likely to offset each other, at least in the short-term. Unfortunately, our data does not allow us to disentangle these effects.

Table 10 displays the results for this set of outcomes. Panel A reports the effects of the intervention on our victimization indicators. We find no significant effects over the self-reported measures. However, columns (3) and (4) suggest that the treatment might have reduced bullying victimization according to peer nomination data (effects are significant at the 10% level). Regarding bullying perpetration, none of the estimated coefficients are significant. This lack of an effect is consistent with our hypothesis regarding the effects of the intervention over survey-based bullying reports. Moreover, it is important to consider that perceptions of bullying victimization and perpetration are likely to be stable in time, even when actual incidents may have decreased in number or gravity. Considering that the follow-up survey was administered only one to two months after the intervention, it was unlikely that bullying outcomes - as perceived by the students- would have changed dramatically.

6. Final remarks

Using an experimental design, we evaluate the effects of a school-wide anti-bullying intervention that combined information about an online tool to report cases of violence and activities to increase awareness about the negative consequences of bullying. Particularly, we focus on its effects on the treated students' self-reported measures of well-being, as well as their attitudes and perceptions towards violence and the importance of a friendly learning environment. Moreover, we are also able to test whether the program improved educational outcomes by combining our data with administrative records of test scores and school dropout and mobility.

Our results indicate that the program reduced students' likelihood of a bystander behavior in the presence of violence, and their willingness to report violent incidents. These findings are supported by administrative records in the SiSeVe platform, which show that reports of violent incidents increased in the months following the intervention. We also find suggestive evidence of a reduction in bullying victimization, though our data does not allow us to disentangle the possible effects at play. Regarding educational outcomes, we find that the intervention reduced the probability of dropout in the next school year among all students. Moreover, school mobility and test scores in the subjects of Reading Comprehension and History, Geography and Economics were largely improved among bullying victims. This is one of the first studies to show that an anti-bullying intervention may positively impact academic achievement. Moreover, these results show that the effects were not short-lived, but lasted over the following school-year.

However, we note that the effects of the intervention over the students' attitudes towards violence, emotional well-being and academic achievement seem to disappear when children are exposed to a high degree of violence at home. These findings suggest that it is difficult for a low-intensity school-based intervention aimed at raising awareness of the importance to fight bullying in the school community to have an impact on children who are raised in a violent environment.

Overall, our findings are encouraging and reveal that a simple and relatively cheap intervention may have beneficial effects over students' attitudes towards violence, emotional well-being and educational achievement. Our study is among the first to evaluate an anti-bullying program in a developing country. International evidence shows that schools in Peru and Latin America are remarkably more violent than those in developed countries where previous studies have been conducted. We provide the first experimental evidence that these interventions may be effective, even when the quality of the educational system is low.

We believe that our promising results should encourage further research on potential policy tools to fight bullying in developing countries. Still, further policies should be designed to address the problem of domestic violence, since our results have shown that a poor environment at home may

offset the potential benefits of school-based interventions to improve the learning environment at school.

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Tables and Figures

A. Tables

Table 1: Baseline Balance of school observable characteristics

	Control	Treatment	Difference (T – C)	p-value (T = C)
# students at secondary level	723.091	900.938	177.847	0.448
School administration (public = 0, private = 1)	0.045	0.063	0.017	0.822
% Single-sex schools (men)	0.000	0.063	0.063	0.246
% Single-sex schools (women)	0.091	0.063	-0.028	0.756
% Co-educational schools	0.909	0.875	-0.034	0.744
# teachers at secondary level	44.227	51.313	7.085	0.579
# students per teacher (secondary)	15.451	16.387	0.936	0.559
# sections (secondary)	26.273	30.875	4.602	0.562
# students per section	25.575	27.533	1.957	0.391
Tutoring committee (1=Yes)	0.900	0.786	-0.114	0.370
% schools in the coast region	0.636	0.625	-0.011	0.945
% schools in the highlands region	0.318	0.375	0.057	0.724
% schools in the amazon region	0.045	0.000	-0.045	0.401
Enrollment (log.)	6.971	6.989	0.018	0.922

Notes: ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively.

Table 2: Baseline balance of child observable characteristics

	Control	Treatment	Difference (T – C)	p-value (T = C)
% Female	0.431	0.487	0.056	0.292
Average age	13.169	13.233	0.063	0.294
% Delayed students (1 = more than two years behind)	0.045	0.045	0.001	0.918
% Migrant students	0.264	0.285	0.022	0.360
% Separated parents	0.401	0.419	0.018	0.510
% Experience violence at home	0.417	0.403	-0.014	0.577
% Bullying victims (self-reported)	0.732	0.737	0.009	0.710
% Bullying victims (peer nomination)	0.230	0.205	-0.025	0.351
Average # of siblings	2.841	2.886	0.044	0.743
Average health status (1 = lowest / 4 = highest)	2.979	2.984	0.004	0.894
% health problem or disability	0.060	0.060	-0.001	0.934
% Poor	0.263	0.324	0.060	0.250
% Water supply at home	0.913	0.866	-0.047*	0.094
% Electricity at home	0.981	0.978	-0.002	0.659
% Bathroom at home	0.910	0.905	-0.005	0.866
% Internet users	0.665	0.656	-0.010	0.855
Average HDI (at district level)	0.519	0.512	-0.007	0.792
Average income per capita (at district level)	709.403	696.021	-13.382	0.814

Notes: ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively.

Table 3: Baseline balance of outcomes of interest

	Control	Treatment	Difference (T – C)	p-value (T = C)
Panel A: Constructed Indexes				
Depression	8.745	8.886	0.141	0.512
Isolation	4.428	4.491	0.063	0.312
School Climate	2.133	1.849	-0.284	0.715
In-school violence perception	5.128	5.460	0.333	0.234
Report of violence incidents	10.810	10.663	-0.147	0.602
Bystander behavior	2.191	2.155	-0.036	0.662
Learning expectations	4.831	4.738	-0.093	0.512
Panel B: Educational outcomes (school level)				
Dropout[a] (2013)	0.067	0.063	-0.004	0.791
Dropout[a] (2014)	0.047	0.056	0.009	0.403
Mobility[b] (2013)	0.159	0.160	0.001	0.926
Mobility[b] (2014)	0.141	0.156	0.015	0.338
ECE – Reading Comprehension (2015)	731.200	728.109	-3.091	0.859
ECE – Mathematics (2015)	746.952	727.350	-19.602	0.442

Notes: ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. National standardized tests in Reading Comprehension and Mathematics were implemented in the second grade of secondary education for the first time in 2015. The test in History, Geography, and Economics was implemented for the first time in 2016 (after the intervention).

[a] Dropout: Percentage of students that were enrolled in the school the previous year (first and second grades of secondary education) that were not enrolled in any school

[b] Mobility: Percentage of students that were enrolled in the school the previous year (first and second grades of secondary education) that were not enrolled in the same school

Table 4: Effect of the intervention on constructed indexes – attitudes and perceptions

	School Climate	Violence Perception	Report of Violence	Bystander Behavior	Learning Expectations
	(1)	(2)	(3)	(4)	(5)
Treatment Effect	0.037	-0.012	0.107***	-0.078**	0.029
	(0.055)	(0.047)	(0.031)	(0.035)	(0.033)
Fixed Effects	Child	Child	Child	Child	Child
Observations	19,233	19,410	19,457	19,434	19,486
R-squared	0.000	0.000	0.002	0.001	0.000

Notes: The table reports average treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. All outcomes are standardized.

Table 5: Effect of the intervention on constructed indexes – emotional well-being

	Depression Index	P(Severe Depression)	Isolation Index	P(Severe Isolation)
	(1)	(2)	(3)	(4)
Treatment Effect	-0.042	-0.024*	-0.022	-0.001
	(0.026)	(0.013)	(0.025)	(0.002)
Fixed Effects	Child	Child	Child	Child
Observations	19,001	19,001	19,459	19,459
R-squared	0.000	0.001	0.000	0.001

Notes: The table reports average treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. Depression Index and Isolation Index are standardized outcomes. Severe Depression and Severe Isolation indicate that the non-standardized index is higher than an established threshold.

Table 6: Effect of the intervention on educational outcomes

	Enrollment		Performance		
	Dropout[a]	Mobility[b]	ECE Reading	ECE Math	ECE HGE
	(1)	(2)	(3)	(4)	(5)
Treatment Effect	-1.014**	-1.516	0.048	-0.002	0.069*
	(0.413)	(1.050)	(0.035)	(0.039)	(0.040)
Fixed Effects	Region	Region	Region	Region	Region
Observations	14,920	14,920	6,447	6,448	6,331
R-squared	0.017	0.016	0.139	0.142	0.075

Notes: The table reports average treatment effects on school enrollment the year following the intervention and scores in national standardized tests taken by students in the younger cohort one year after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. All regressions include a dummy indicating whether the child was in first or second grade during the intervention, her personal characteristics (sex, lack of access to basic services, internet use, number of siblings, an indicator for separated parents), school characteristics (administration, enrollment, students per section), socioeconomic indicators at the district level (gdp per capita and human development index), and indicators for exposure to violence at home, peer-reported bullying victimization, and her perceptions of school climate and school violence (at baseline). Regressions on ECE scores also include the average score at the school level from the previous year. Since ECE HGE (History, Geography and Economics) was taken for the first time in 2016, the baseline score in Reading Comprehension is used (results are robust to using the score in Mathematics instead).

[a] Dropout: Student was not enrolled in any school the year following the intervention (control mean: 2.931%)

[b] Mobility: Student was not enrolled in the same school the year following the intervention (control mean: 12.856%)

Table 7: Heterogeneous effects on constructed indexes – attitudes and perceptions

	School Climate	Violence Perception	Report of Violence	Bystander Behavior	Learning Expectations
	(1)	(2)	(3)	(4)	(5)
Panel A: by gender					
i. T x Male	-0.017	-0.005	0.098**	-0.080*	0.037
	(0.070)	(0.060)	(0.041)	(0.042)	(0.042)
ii. T x Female	0.116**	-0.021	0.113***	-0.057	0.010
	(0.051)	(0.053)	(0.036)	(0.041)	(0.042)
p-value (i = ii)	0.093	0.800	0.751	0.594	0.631
Observations	19,187	19,388	19,444	19,418	19,482
Panel B: by poverty status					
i. T x Not Poor	0.025	0.002	0.102***	-0.073**	0.027
	(0.056)	(0.051)	(0.029)	(0.036)	(0.037)
ii. T x Poor	0.065	-0.058	0.105	-0.091	0.024
	(0.065)	(0.046)	(0.064)	(0.058)	(0.045)
p-value (i = ii)	0.392	0.175	0.950	0.757	0.954
Observations	19,233	19,410	19,457	19,434	19,486
Panel C: by bullying victimization					
i. T x Not Bullied	0.036	-0.014	0.094***	-0.078**	0.038
	(0.058)	(0.044)	(0.032)	(0.035)	(0.033)
ii. T x Bullied	0.030	0.008	0.079**	-0.090*	0.021
	(0.065)	(0.087)	(0.037)	(0.053)	(0.058)
p-value (i = ii)	0.896	0.757	0.729	0.804	0.718
Observations	16,977	17,138	17,179	17,159	17,203
Panel D: by exposure to violence at home					
i. T x No Violence at Home	0.056	-0.043	0.130***	-0.118***	0.053
	(0.055)	(0.047)	(0.040)	(0.033)	(0.038)
ii. T x Violence at Home	0.000	0.033	0.067**	-0.025	0.001
	(0.065)	(0.055)	(0.033)	(0.050)	(0.042)
p-value (i = ii)	0.254	0.051	0.158	0.017	0.189
Observations	18,601	18,775	18,813	18,786	18,836

Notes: The table reports heterogeneous treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. All outcomes are standardized. "Poor" indicates lack of access to any basic service at home (survey measure); "Bullied" indicates whether the child was nominated as a victim by at least one of her peers during the last month; "Violence at home" indicates whether the child reported being a victim or witness of violent attitudes at home during the last month.

Table 8: Heterogeneous effects on constructed indexes – emotional well-being

	Depression Index	P(Severe Depression)	Isolation Index	P(Severe Isolation)
	(1)	(2)	(3)	(4)
Panel A: by gender				
i. T x Male	-0.065*	-0.044***	-0.021	0.001
	(0.034)	(0.016)	(0.029)	(0.003)
ii. T x Female	-0.027	-0.005	-0.041	-0.003
	(0.035)	(0.014)	(0.033)	(0.003)
p-value (i = ii)	0.411	0.041	0.562	0.352
Observations	18,948	18,948	19,449	19,449
Panel B: by poverty status				
i. T x Not Poor	-0.047	-0.028**	-0.020	0.000
	(0.030)	(0.013)	(0.025)	(0.002)
ii. T x Poor	-0.024	-0.010	-0.024	-0.004
	(0.043)	(0.024)	(0.043)	(0.005)
p-value (i = ii)	0.635	0.457	0.919	0.342
Observations	19,001	19,001	19,459	19,459
Panel C: by bullying victimization				
i. T x Not Bullied	-0.051*	-0.031**	-0.031	0.002
	(0.028)	(0.014)	(0.023)	(0.002)
ii. T x Bullied	-0.042	-0.032	-0.015	-0.008
	(0.053)	(0.025)	(0.050)	(0.005)
p-value (i = ii)	0.873	0.945	0.721	0.045
Observations	16,787	16,787	17,176	17,176
Panel D: by exposure to violence at home				
i. T x No Violence at Home	-0.070***	-0.042***	-0.039	-0.001
	(0.024)	(0.014)	(0.028)	(0.002)
ii. T x Violence at Home	0.000	-0.002	0.015	-0.000
	(0.041)	(0.018)	(0.038)	(0.004)
p-value (i = ii)	0.068	0.046	0.183	0.946
Observations	18,377	18,377	18,809	18,809

Notes: The table reports heterogeneous treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. "Poor" indicates lack of access to any basic service at home (survey measure); "Bullied" indicates whether the child was nominated as a victim by at least one of her peers during the last month; "Violence at home" indicates whether the child reported being a victim or witness of violent attitudes at home during the last month. Depression Index and Isolation Index are standardized outcomes. Severe Depression and Severe Isolation indicate that the non-standardized index is higher than an established threshold.

Table 9: Heterogeneous effects on educational outcomes

	Enrollment		Performance		
	Dropout[a]	Mobility[b]	ECE Reading	ECE Math	ECE HGE
	(1)	(2)	(3)	(4)	(5)
Panel A: by gender					
i. T x Male	-0.783*	-1.854**	0.095***	0.050	0.119***
	(0.419)	(0.824)	(0.034)	(0.035)	(0.037)
ii. T x Female	-0.974**	-0.842	0.018	-0.019	0.050
	(0.440)	(0.867)	(0.036)	(0.037)	(0.038)
p-value (i = ii)	0.740	0.372	0.105	0.155	0.169
Observations	15,781	15,781	6,867	6,866	6,745
Panel B: by poverty status					
i. T x Not Poor	-0.686**	-1.055	0.047	0.012	0.069**
	(0.350)	(0.689)	(0.029)	(0.029)	(0.030)
ii. T x Poor	-1.528**	-2.502**	0.097**	0.034	0.142***
	(0.600)	(1.180)	(0.048)	(0.049)	(0.051)
p-value (i = ii)	0.198	0.260	0.345	0.670	0.194
Observations	15,781	15,781	6,867	6,866	6,745
Panel C: by bullying victimization					
i. T x Not Bullied	-0.839**	-0.889	0.044	-0.014	0.074**
	(0.354)	(0.696)	(0.029)	(0.030)	(0.031)
ii. T x Bullied	-0.979*	-2.853**	0.101**	0.106**	0.119**
	(0.563)	(1.109)	(0.045)	(0.046)	(0.048)
p-value (i = ii)	0.821	0.106	0.255	0.019	0.393
Observations	15,781	15,781	6,867	6,866	6,745
Panel B: by exposure to violence at home					
i. T x No Violence at Home	-0.931**	-1.552**	0.064**	-0.005	0.085***
	(0.384)	(0.755)	(0.031)	(0.032)	(0.033)
ii. T x Violence at Home	-0.786*	-1.111	0.050	0.052	0.087**
	(0.454)	(0.894)	(0.038)	(0.038)	(0.040)
p-value (i = ii)	0.788	0.678	0.750	0.209	0.968
Observations	15,781	15,781	6,867	6,866	6,745

Notes: The table reports heterogeneous treatment effects on school enrollment the year following the intervention and scores in national standardized tests taken by students in the younger cohort one year after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. All regressions include a dummy indicating whether the child was in first or second grade during the intervention, her personal characteristics (sex, lack of access to basic services, internet use, number of siblings, an indicator for separated parents), school characteristics (administration, enrollment, students per section), socioeconomic indicators at the district level (gdp per capita and human development index), and indicators for exposure to violence at home, peer-reported bullying victimization, and her perceptions of school climate and school violence (at baseline). Regressions on ECE scores also include the average score at the school level from the previous year. Since ECE HGE (History, Geography and Economics) was taken for the first time in 2016, the baseline score in Reading Comprehension is used (results are robust to using the score in Mathematics instead). "Poor" indicates lack of access to any basic service at home (survey measure);

"Bullied" indicates whether the child was nominated as a victim by at least one of her peers during the last month; "Violence at home" indicates whether the child reported being a victim or witness of violent attitudes at home during the last month.
[a] Dropout: Student was not enrolled in any school the year following the intervention (control mean: 2.931%)
[b] Mobility: Student was not enrolled in the same school the year following the intervention (control mean: 12.856%)

Table 10: Heterogeneous effects by classroom composition on constructed indexes – attitudes and perceptions

	School Climate	Perception of Violence	Report of Violence	Bystander Behavior	Learning Expectations
	(1)	(2)	(3)	(4)	(5)
Panel A: by violence in the classroom					
i. T x Low Violence	0.073	0.022	0.109***	-0.074**	0.029
	(0.045)	(0.046)	(0.031)	(0.034)	(0.030)
ii. T x High Violence	-0.092	-0.083	0.045	-0.097	0.050
	(0.099)	(0.070)	(0.051)	(0.061)	(0.075)
p-value (i = ii)	0.053	0.066	0.288	0.709	0.761
Observations	16742	16901	16942	16922	16966
Panel B: by victimization in the classroom					
i. T x Low Victimization	0.059	0.008	0.090***	-0.067**	0.016
	(0.047)	(0.042)	(0.031)	(0.033)	(0.033)
ii. T x High Victimization	-0.060	-0.051	0.097*	-0.111*	0.088
	(0.108)	(0.087)	(0.054)	(0.065)	(0.060)
p-value (i = ii)	0.209	0.403	0.898	0.490	0.177
Observations	16742	16901	16942	16922	16966

Notes: The table reports heterogeneous treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. All outcomes are standardized. "High Violence" indicates that the classroom ranks among the 25% with the largest share of students involved in violent incidents, as measured by them receiving at least one nomination as bullying victims or perpetrators during the last month; "High Victimization" indicates that the classroom ranks among the 25% with the largest share of bullying victims, as measured by them receiving at least one nomination for being bullied during the last month.

Table 11: Heterogeneous effects by classroom composition on constructed indexes – emotional well-being

	Depression Index	P(Severe Depression)	Isolation Index	P(Severe Isolation)
	(1)	(2)	(3)	(4)
Panel A: by violence in the classroom				
i. T x Low Violence	-0.032	-0.026**	-0.022	-0.000
	(0.029)	(0.013)	(0.028)	(0.003)
ii. T x High Violence	-0.104**	-0.051**	-0.053	-0.002
	(0.042)	(0.023)	(0.039)	(0.004)
p-value (i = ii)	0.093	0.227	0.458	0.656
Observations	16558	16558	16941	16941
Panel B: by victimization in the classroom				
i. T x Low Victimization	-0.031	-0.024*	-0.030	0.000
	(0.029)	(0.013)	(0.027)	(0.003)
ii. T x High Victimization	-0.109**	-0.056**	-0.030	-0.004
	(0.047)	(0.025)	(0.041)	(0.003)
p-value (i = ii)	0.109	0.193	0.997	0.413
Observations	16558	16558	16941	16941

Notes: The table reports heterogeneous treatment effects on constructed indexes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. "High Violence" indicates that the classroom ranks among the 25% with the largest share of students involved in violent incidents, as measured by them receiving at least one nomination as bullying victims or perpetrators during the last month; "High Victimization" indicates that the classroom ranks among the 25% with the largest share of bullying victims, as measured by them receiving at least one nomination for being bullied during the last month. Depression Index and Isolation Index are standardized outcomes. Severe Depression and Severe Isolation indicate that the non-standardized index is higher than an established threshold.

Table 12: Heterogeneous effects by classroom composition on educational outcomes

	Enrollment		Performance		
	Dropout[a]	Mobility[b]	ECE Reading	ECE Math	ECE HGE
	(1)	(2)	(3)	(4)	(5)
Panel A: by violence in the classroom					
i. T x Low Violence	-0.783**	-0.919	0.032	0.019	0.048
	(0.334)	(0.693)	(0.029)	(0.030)	(0.031)
ii. T x High Violence	-0.901*	-2.532**	0.134***	0.018	0.196***
	(0.531)	(1.104)	(0.047)	(0.048)	(0.050)
p-value (i = ii)	0.842	0.190	0.056	0.981	0.008
Observations	15577	15577	6834	6833	6714
Panel B: by victimization in the classroom					
i. T x Low Victimization	-0.924***	-0.624	0.023	-0.011	0.023
	(0.336)	(0.699)	(0.030)	(0.031)	(0.032)
ii. T x High Victimization	-0.480	-3.765***	0.140***	0.092**	0.222***
	(0.526)	(1.092)	(0.044)	(0.045)	(0.046)
p-value (i = ii)	0.453	0.011	0.020	0.045	0.000
Observations	15577	15577	6834	6833	6714

Notes: The table reports heterogeneous treatment effects on school enrollment the year following the intervention and scores in national standardized tests taken by students in the younger cohort one year after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. All regressions include a dummy indicating whether the child was in first or second grade during the intervention, her personal characteristics (sex, lack of access to basic services, internet use, number of siblings, an indicator for separated parents), school characteristics (administration, enrollment, students per section), socioeconomic indicators at the district level (gdp per capita and human development index), and indicators for exposure to violence at home, peer-reported bullying victimization, and her perceptions of school climate and school violence (at baseline). Regressions on ECE scores also include the average score at the school level from the previous year. Since ECE HGE (History, Geography and Economics) was taken for the first time in 2016, the baseline score in Reading Comprehension is used (results are robust to using the score in Mathematics instead). "High Violence" indicates that the classroom ranks among the 25% with the largest share of students involved in violent incidents, as measured by them receiving at least one nomination as bullying victims or perpetrators during the last month; "High Victimization" indicates that the classroom ranks among the 25% with the largest share of bullying victims, as measured by them receiving at least one nomination for being bullied during the last month.

[a] Dropout: Student was not enrolled in any school the year following the intervention (control mean: 2.931%)

[b] Mobility: Student was not enrolled in the same school the year following the intervention (control mean: 12.856%)

Table 13: Effect of the intervention on bullying outcomes

Panel A: Bullying Victim

	Self-Report		Peer Nomination	
	P(Victim)	Victimization Index	P(At least one nomination)	Total Nominations
	(1)	(2)	(3)	(4)
Treatment Effect	0.019	0.084	-0.035*	-0.166*
	(0.015)	(0.101)	(0.018)	(0.097)
Fixed Effects	Child	Child	Child	Child
Observations	19,392	19,392	19,512	19,512
R-squared	0.010	0.003	0.077	0.051

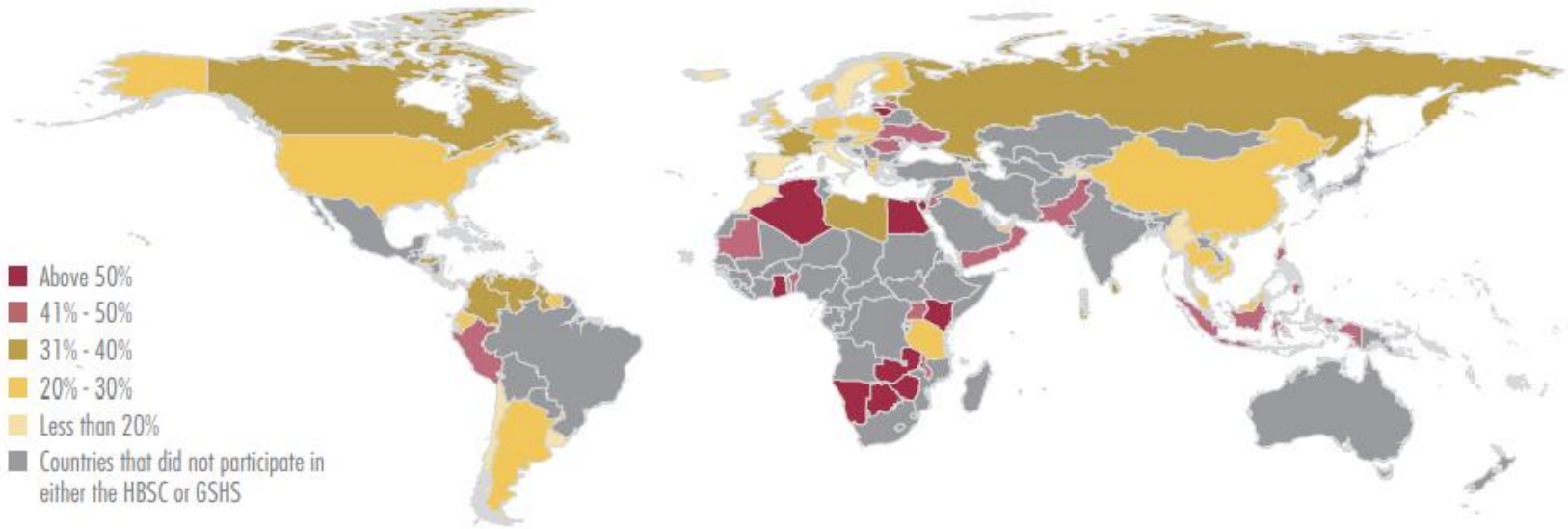
Panel B: Bullying Perpetrator

	Self-Report		Peer Nomination	
	P(Perpetrator)	Perpetration Index	P(At least one nomination)	Total Nominations
	(1)	(2)	(3)	(4)
Treatment Effect	-0.010	-0.012	0.002	-0.168
	(0.016)	(0.034)	(0.016)	(0.105)
Fixed Effects	Child	Child	Child	Child
Observations	19,472	19,472	19,512	19,512
R-squared	0.012	0.002	0.012	0.017

Notes: The table reports average treatment effects on bullying outcomes measured through student surveys one month after the intervention. ***, ** and * indicate statistical significance at the 0.01, 0.05 and 0.10 levels respectively. Clustered standard errors at school level are reported in parenthesis. Self-reported Victim and Perpetrator are indicators of whether the child reported being a victim/perpetrator of at least one type of bullying during the last month. Victimization Index and Perpetration Index are standardized outcomes.

B. Figures

Figure 1: Percentage of adolescents aged 13 to 15 years who reported being bullied at least once in the past couple of months, by country



Source: UNICEF (2014). Data from the Health Behaviour in School-aged Children Study - HBSC (2009/2010) and the Global School-based Student Health Surveys - GSHS (2003-2013)

Figure 2: Location of Study Schools by Treatment Status (Regions)

Figure 3: Intervention Timeline (school calendar and data collection)

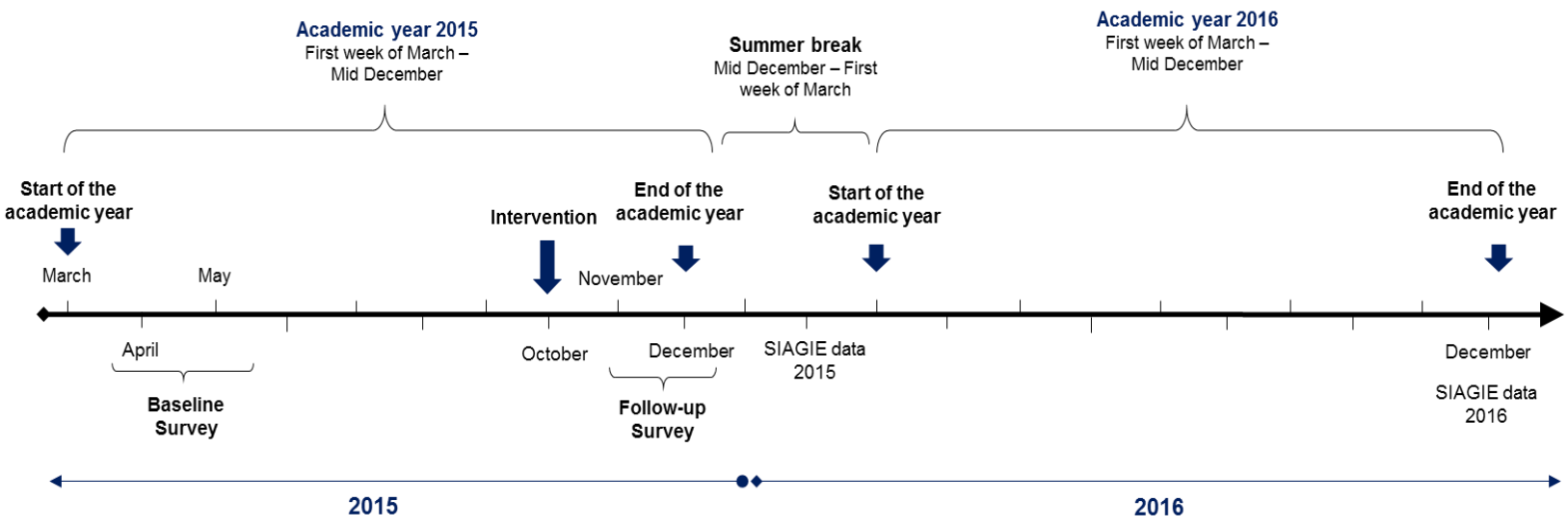
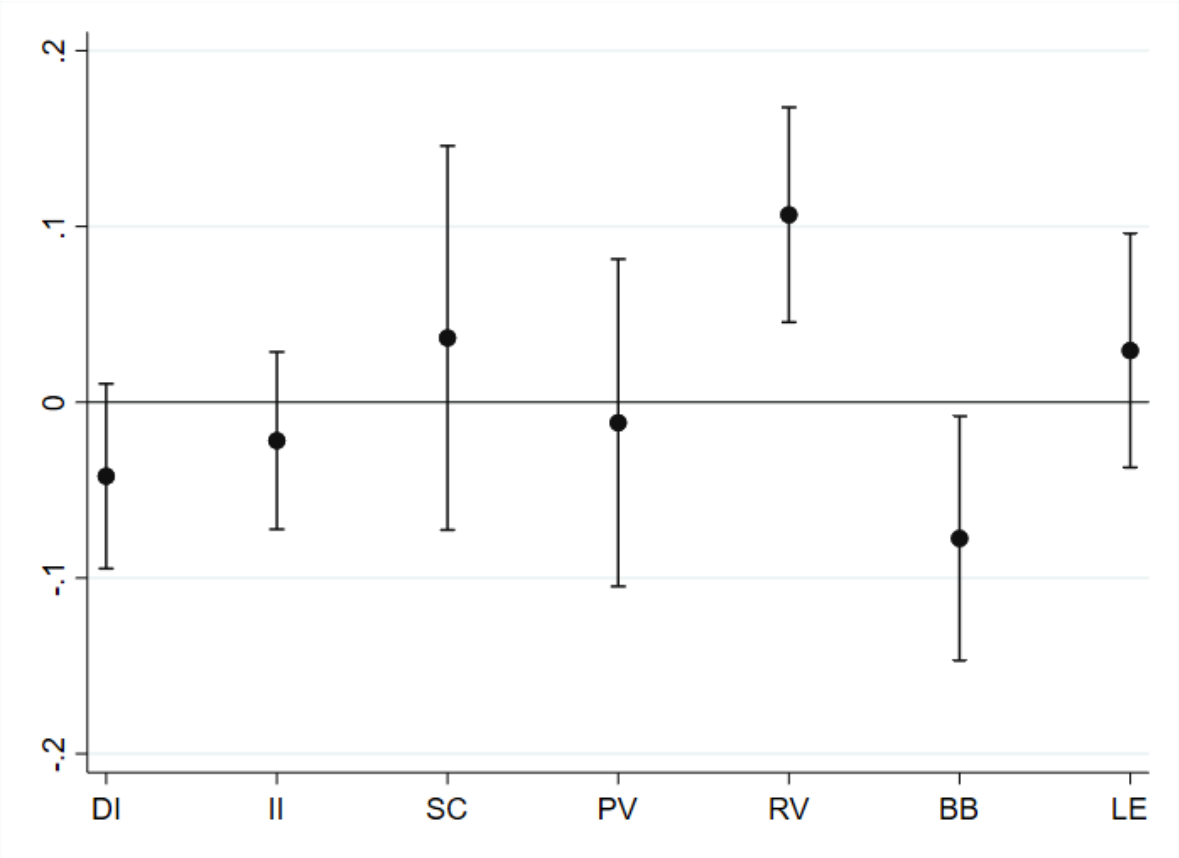
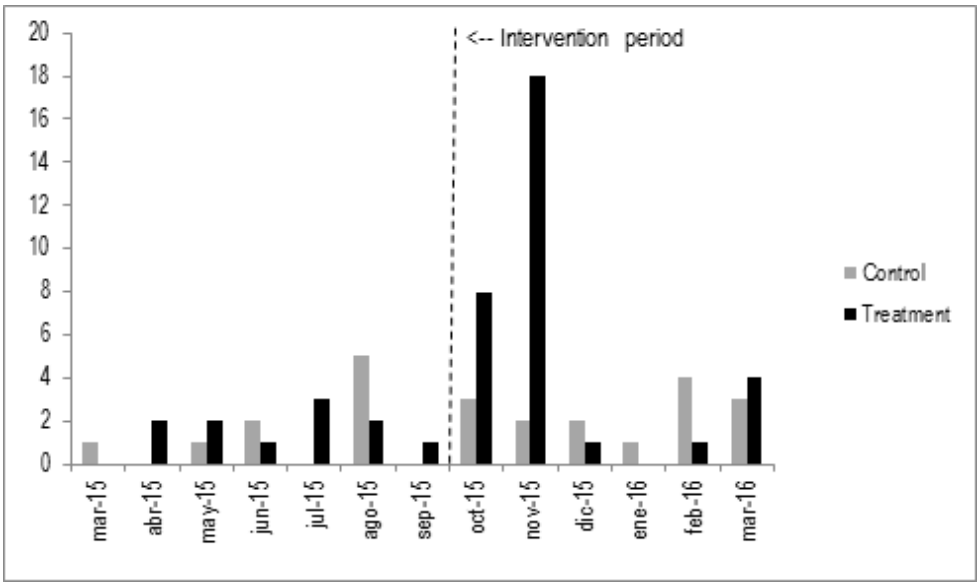


Figure 4: Overall impact of the intervention over constructed indexes



Notes: Point represent point estimates of α_2 in Equation 1 and bars represent 95% confidence intervals. All outcomes are standardized. Indexes measuring emotional well-being: Depression Index (DI) and Isolation Index (II). Indexes measuring child attitudes and perceptions: School Climate (SC), In-school Violence Perception (PV), Report of violence Incidents (RV), Bystander Behavior (BB), and Learning Expectations (LE).

Figure 5: Number of cases reported in the SiSeVe platform in the schools of the sample (by month and treatment status)



Appendix

Annex 1: Intervention Scheme

Component	Activities	Implementation by	Initiatives	Aimed at
1. Increasing awareness about the negative consequences of bullying	1.1 Workshops and discussions	Intervention team	Anti-bullying sessions	Students, teachers and administrative staff
	1.2 Development of visual displays or role plays (interactive activities)	School community (with guidance of the intervention team)	▪ Posters ▪ Bulletin boards ▪ Slogans ▪ In-school parades ▪ Role plays	Students, teachers, and parents
	1.3 Development and delivery of informative material about school violence	School community (with guidance of the intervention team)	Simple slides or presentations Informative brochures	Students, teachers, and parents
2. Increasing awareness about the SiSeVe platform	2.1 Sign up schools with SiSeVe	Intervention team	-	Students and teachers
	2.2 Training on how to use the SiSeVe platform	Intervention team	-	Students, teachers, and parents
	2.3 Launch an awareness campaign about the SiSeVe platform	Intervention team	-	Students, teachers, and parents

Annex 2: Construction of scales

All indexes were constructed by adding scores of a specific set of questions or statements. Each response to every statement has a specific punctuation. It is important to notice that every index is defined as negative or positive, therefore, all statements that conform each index must have the same direction (negative or positive). If any statement has a different direction, the punctuation is changed so it can be interpreted correctly. The questionnaire (baseline and follow-up surveys) is based on tests developed by Andresen et al. (1994), Bradley et al. (2010), Hughes et al. (2004), CUBE ("Cuestionario de Bienestar Escolar" instrument for *Escuela Amiga*), Espelage and Holt (2001), Williams and Guerra (2007), and Cornell (2013).

- **Depression:** The depression index is the sum of ratings of 10 items of depressive symptoms. The responses scale range from 0 (hardly ever or never) to 3 (often or almost every time). The depression index is based on the Center for Epidemiologic Depression Scale (CES-D), specifically on the short version of the CED-D scale (Andresen et al., 1994). The scale included questions about feelings of helplessness, feelings of hopelessness, loss of interest in activities, and happiness. The total score ranges from 0 to 30. Higher scores are indicative of more severe depression.

- **Isolation:** The isolation index is based on the short form for the full 20-item Revised UCLA Loneliness Scale (Hughes et al., 2004). This short scale is comprised of three questions: "How often do you feel left out / feel isolated from others / that you lack companionship?" with response ranges of 1 (hardly ever or never) to 3 (often or almost every time). The loneliness scale deliberately does not include the term "lonely" as it has been shown to be subject to significant response bias and under-reporting (Luo et al. 2012). The total score of the scale is calculated by finding the sum of the three items, so it ranges from 3 to 9. Higher scores indicate higher levels of isolation.

- **School climate:** The school climate index provides a measure of student's school climate perception. The scale contains statements about school environment, the relationship between students and teachers, violence around school area, and school safety. Students were asked if they agree or not with 18 different statements with responses ranges 0 (Disagree) to 4 (Agree strongly). The total score is the sum of the 13 items, so it ranges from 0 to 52. Higher scores indicate of a better school climate perception.

- **In-school violence perception:** The school violence perception scale provides a measure of student's perception about in-school violence episodes such as verbal abuse, physical harassment, cyberbullying, and treats. Students were asked if they agree or not with 6 different statements. These statements included questions about the presence of different types of bullying at school and how their peers behave when witnessing different acts of bullying. The responses scale range from 0 (Disagree) to 4 (Agree strongly), and the total score range from 0 to 24. Higher scores indicate of a worse school violence perception.

- **Report of violence episodes (Seeking for help):** The report of violence episodes scale measures student's likelihood to seek help from someone at school and student's likelihood to report bullying episodes to school authorities and teachers. Students were asked if they agree or not with 4 different statements. The responses scale range from 0 (Disagree) to 4 (Agree strongly), and the total score range from 0 to 16. Higher scores are indicative of higher willingness to report bullying episodes.

- **Bystander behavior:** The bystander behavior index measured student's behavior when witnessing different acts of bullying. Witnesses of bullying at school can reinforce bullying by encouraging the actions of the bully or can discourage it by helping the victim. The total score is the sum of the four items, and each item ranges from 0 (never) to 2 (2 more than once).

The total score ranges from 0 to 8. Higher scores indicate higher levels of bullying reinforcement.

- **Learning expectations:** The learning expectations index is comprised of 2 questions: "Do you think that your learning process will improve if there were less school violence incidents at school / if teachers can help prevent in-school violence?" The responses scale range from 0 (Disagree) to 4 (Agree strongly), and the total score is the sum of the 2 items, so it ranges from 0 to 8. Higher scores are indicative of a better understanding of school violence consequences on school performance.

SiSeVe Questionnaire

Indicators	Statements
Depression	1. I have been bothered by things that didn't use to 2. I have trouble concentrating on a specific subject 3. I felt depressed 4. Everything takes a lot of effort 5. I felt optimist about the future 6. I felt scared 7. I couldn't sleep well 8. I was happy 9. I felt lonely 10. I didn't feel like doing anything
Isolation	1. How frequently did you feel left out 2. How frequently did you feel isolated from others 3. How frequently did you feel that you lack companionship?
School climate	1. In my school teachers and students respect each other 2. I enjoy being at school 3. Students at school get involved in fights 4. Students at school stole things from other students 5. In my school, students treat other students 6. Students at school carry weapons 7. In my school, adults get involved when they witness violence acts 8. My teachers treat me with respect 9. Even when breaking the rules, students are treated fairly 10. I didn't go to school because I was afraid of being hurt at school 11. Walking to school or home, I feel afraid that someone would hurt me 12. Students are members of gangs 13. Crime and violence are affecting my school
In-school Violence perception	1. Do you agree with … Students bother other students in front of everybody 2. Do you agree with … Students bother other students through social media 3. Do you agree with … Students hit, push or kick other students 4. Do you agree with … Students enjoy watching how other students hit their peers 5. Do you agree with … Students do nothing when they witness in-school violence 6. Do you agree with … Students report violence acts to teachers
Report of violence incidents (Seeking help index)	1. There are people at school who I can talk to when I have problems 2. If I tell a teacher that other students are bothering me, he would help me 3. If any student say something about hurting another student, I would tell a teacher 4. If any student brings a gun to school, I would tell a teacher
Bystander behavior	1. I celebrated when someone was being beaten by other students 2. I celebrated when someone was being pushed by other students 3. I tried to help a student that was being bullied 4. I told an adult that a student was being bullied at school
Learning expectations	1. Do you think that your learning process will improve if …there were less school violence incidents at school 2. Do you think that your learning process will improve if …teachers can help prevent in-school violence

Annex 3: Cronbach's Alpha reliability

Scale	# questions	Cronbach's Alpha	Reliability
Depression	10	0.84	High
Isolation	3	0.72	Acceptable
School climate	13	0.81	High
In-school violence perception	6	0.83	High
Report of violence incidents	4	0.68	Acceptable
Bystander behavior	4	0.84	High
Learning expectations	2	0.57	Poor

Note: Poor reliability ($\alpha < 0.6$), acceptable reliability ($0.6 \leq \alpha < 0.8$), good or high reliability ($\alpha \geq 0.8$).