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KEYWORDS

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It starts early! Male-dominated classes and girls' bullying.*

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Abstract

Bullying emerges early in childhood and is prevalent in schools. Using Italian INVALSI data on primary students, we document gender differences in self-reported bullying victimization and perpetration across multiple dimensions. Boys show higher prevalence on both fronts. Exploiting quasi-random student allocation to classes within schools, we find that higher male shares increase girls' reported victimization—particularly mockery and verbal insults—and reduce their well-being. These findings reveal spillover effects of violence from boys to girls as male peer share rises, highlighting classroom gender composition's role in shaping early peer interactions and the need for caution when managing gender imbalances in elementary education.

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1 Introduction

Bullying is a widespread and persistent issue that affects a significant share of school-aged children across countries. According to PISA 2022, one in five students in OECD countries reports being bullied at least a few times a month, with 8% experiencing bullying on a regular basis. In Italy, the situation is particularly alarming. In 2023, nearly 46% of male students and 34% of female students aged 15 to 19 reported being involved in fights or physical disputes—a figure that has remained relatively stable since 2018 (Espad Italia 2023, CNR-IFC). Worryingly, the age at which bullying occurs appears to be decreasing. Data from the Health Behaviour in School-aged Children (HBSC Italia 2022) survey show that bullying is no longer confined to late adolescence but increasingly affects younger students, particularly those aged 11 to 13. At the same time, the rise of digital communication and the widespread use of social media have expanded the forms that aggression can take, while also making such episodes harder for adults to detect and intervene in. These trends are particularly troubling given the well-documented negative effects of bullying on students' academic achievement, labor market outcomes, and mental health (Yu and Zhao, 2021; Ponzo, 2013; Brown and Taylor, 2008; Le et al., 2005). Understanding the dynamics of bullying is therefore essential. When and where do these behaviors emerge? What circumstances foster them? What are the characteristics of victims and perpetrators? And under what conditions does violence spread within the peer environment? This paper investigates these questions, with a focus on gender and its role in early adolescence—a formative stage in children's social development. In particular, we examine whether peer violence emerges at a young age, whether it is gendered in nature, and whether it spills over from one peer gender group to another. By addressing these issues, we aim to provide evidence that can help design more effective policies to mitigate a phenomenon with profound and lasting consequences.

We use Italian data from the National Institute for the Evaluation of Education and Training (INVALSI) to document the dynamics of bullying in Italian elementary schools. Specifically, for 2014 fifth-grade students, the INVALSI student questionnaire records self-reported experiences of both passive and active aggressive behavior across four dimensions: mockery, social exclusion, verbal insults, and physical aggression.

We begin by showing that boys are more likely than girls to report both perpetrating and experiencing bullying across all dimensions, and particularly in mocking and insulting.

Building on this, we exploit the quasi-random assignment of students to classes within the same school to examine how the gender composition of peers—specifically, exposure to a higher number of boys—affects the incidence of bullying among girls and boys separately. Our findings reveal a clear asymmetry: while boys' reports of bullying are unaffected, girls are significantly more likely to report victimization in response to an increased share of male peers. This effect is concentrated in two forms of bullying, particularly mockery and verbal insults. These results, which are robust to a range of sensitivity checks, appear to be driven by classes where boys make up more than 50% of the students. We also show that a higher share of boys in the classroom negatively affects girls' well-being, and that this effect is partially mediated by their increased exposure to bullying. While we cannot identify the directionality of specific bullying interactions (i.e., who targets whom), the evidence is consistent with a scenario in which boys are primarily responsible for the observed rise in violence against girls. These findings have important policy implications. It is well established that women are disproportionately exposed to aggression later in life—whether in intimate relationships or in male-dominated environments such as the workplace. Understanding when this pattern of exposure begins, how it may be shaped by early peer environments, and the responses it triggers is essential for developing effective strategies to prevent and reduce gender-based violence. The rest of the paper is structured as follows. Section 2 reviews the related literature; Section 3 describes the sample; Section 4 outlines the empirical strategy; Section 5 presents the results; Section 6 discusses potential mechanisms; and Section 7 concludes.

2 Literature Review

Our paper contributes to three distinct strands of literature. First, it adds to the growing body of research investigating the determinants of violent behavior in schools (Mühlenweg, 2010; Persson and Svensson, 2010; Vignoles and Meschi, 2010). Previous studies have linked the likelihood of engaging in violence to individual traits such as narcissism and impulsivity (Fanti and Kimonis, 2013). Other contributing factors include age (Mühlenweg, 2010), physical appearance, and ethnicity (see Kljakovic and Hunt, 2016 for a review).

A central debate in this literature concerns whether violent behavior is more prevalent among boys. The evidence is mixed. Some studies do not find a significant association between gender and bullying behavior (Barboza et al., 2009; Goldstein, Young, and Boyd, 2008), while

others identify clear gendered patterns, with boys more often acting as perpetrators and girls more often as victims. For instance, Espelage et al. (2000) documents that male students reported higher rates of bullying than females. Craig et al. (2009) shows that across 40 countries, boys reported higher levels of bullying, while girls reported higher victimization rates in 29 of those countries. Similarly, Li et al., 2019 and Messias et al., 2014, using data from the 2011–2019 U.S. Youth Risk Behavior Survey (YRBS), finds that female students reported higher rates of both traditional and cybervictimization compared to their male peers. Pateraki and Houndoumadi (2001) also conclude that more boys identified as bullies or bully-victims. Wolke et al, 2009 show that direct victimization is more persistent among girls, with poor peer relationships predicting continued exposure.

However, other studies challenge these gender-based distinctions (Dunne et al., 2013; Dytham, 2018; Kessel et al., 2015; Nikolaou, 2017), suggesting that girls also engage in violent behavior. The emerging consensus is that boys are more likely to engage in direct physical bullying, while girls tend to use more indirect forms of aggression (Pateraki and Houndoumadi, 2001). Accordingly, boys are more often victims of direct bullying, whereas girls are more frequently subjected to indirect forms (Olweus, 1994; Varjas, Henrich, and Meyers, 2009). Our study contributes to this literature by showing that male students are more likely than female students to be both perpetrators and victims of bullying, even at early ages. Specifically, we find that: (i) the probability of being a bully is significantly higher among boys, and (ii) the probability of being a victim is also higher among boys. Moreover, we document that although the overall prevalence of victimization among boys is relatively consistent across different forms of bullying, it is particularly pronounced in certain forms such as mockery and insulting, and less so in cases of social isolation and physical fighting. Another strand of the literature focuses on contextual factors, such as the family environment (Barker et al., 2008; Nation et al., 2008; Schwartz et al., 2000) and school climate (Guerra et al., 2011), which may also play a significant role in triggering bullying behaviors. Research shows that having peers who come from abusive or unsupportive home environments degrades the environment in the classroom (Carrell and Hoekstra, 2010). Moreover, factors such as class rank and school quality influence both the likelihood and frequency of violent behavior (Comi et al., 2021), and the gender composition of a class can amplify the spread of aggression. Indeed, Lavy and Schlosser (2011) show that increasing the share of male peers in the classroom increases

the reporting of classroom disruption and violence among Israeli primary and middle school students. In the same direction, using data on 13 to 16-year-old Swedish students, Getik and Meier (2022) find that exposure to more male peers increases the probability of being diagnosed with physical injury, although the authors argue that female-dominated environments could also facilitate psychological acts of aggression between students. We contribute to this literature by showing that in classes with a higher share of boys, girls experience more frequent episodes of aggression, particularly in the forms of mockery and insulting. We also find that the increase in victimization is driven by girls who become net victims—that is, they are not simultaneously perpetrators—offset by a corresponding decline in the share of girls who report no active nor passive exposure to violence.

Finally, a growing body of literature has examined the consequences of youth violence, particularly its impact on learning and well-being. Bullying has been shown to significantly hinder academic performance. Using data from 210,523 students across 51 countries, Yu and Zhao (2021) estimate the causal effect of bullying victimization on adolescents' academic literacy and social integration. Ponzo (2013) analyzes the impact of school bullying on educational achievement among Italian students. The detrimental effects of school violence also extend to longer-term outcomes, including labor market performance. Brown and Taylor, 2008 find that school bullying in Britain negatively affects both educational attainment and wages in adulthood. Similarly, Le et al., (2005) document that bullying among Australian twins reduces educational and labor market outcomes, and Ammermüller (2007) reports consistent findings using European data. Waddell (2006) shows that low self-esteem and poor attitudes—often shaped by bullying—negatively affect academic performance and future earnings in the U.S. Beyond academic and economic outcomes, bullying has profound and lasting effects on mental and physical health. Gini and Pozzoli (2009) show that bully-victims, victims, and bullies face significantly higher risks of psychosomatic problems compared to uninvolved peers. More recent studies, such as Mendolia (2021) and Sarzosa and Urzua (2020), further document the long-term impacts of victimization on mental health, physical well-being, and risky behaviors. In particular, cyberbullying has been shown to have severe long-term consequences: Nikolaou (2017) finds that it significantly increases suicidal thoughts and attempts among high school students. We contribute to this literature by showing that in classes with a higher share of boys, female students report lower levels of well-being. This result is partially mediated by

increased exposure to bullying-related aggression. At first glance, these findings appear to be at odds with those of Getik and Meier (2022), who document fewer mental health diagnoses among students exposed to a higher share of male peers. It is important to note, however, that, by focusing on diagnoses, Getik and Meier (2022) are considering more severe mental health outcomes than those examined here– self-reported frequencies of feeling well, calm, content, and happy. As a result, our findings are not necessarily contradictory.

3 Data

3.1 Construction of the sample

To investigate how exposure to male peers affects bullying—both in terms of victimization and perpetration—we use administrative data from the Italian National Institute for the Evaluation of Education and Training (INVALSI). These data stem from nationwide standardized tests administered in grades 2, 5, 8, 10, and 13, primarily in Italian and mathematics. Test scores obtained by students are linked to rich background information, including school and class identifiers, gender, date of birth, and socioeconomic variables such as parental education, occupation, and migration status. We exploit these data to construct a measure of peer gender composition. Specifically, we compute the share of male classmates in each student's second-grade classroom—the earliest grade for which data are available. While first-grade peer composition would be ideal (as class assignment typically occurs then and remains stable through grade 5), the first INVALSI test is administered in grade 2, making this our most feasible baseline. In addition to test scores, INVALSI administers student surveys in grades 5 and 10, capturing self-reported school experiences.

In the 2013–14 and 2014–15 academic years, these surveys included questions on the frequency of bullying, both as victims and perpetrators, across four dimensions: mockery, insults, isolation, and physical aggression. Students report whether each occurred daily, weekly, occasionally, or never. We use this information to dichotomize each bullying dimension (equal to 1 if any bullying is reported). Given that students transition into middle school in grade 8, potentially endogenizing peer composition, we restrict our analysis to grade 5 (i.e., we do not analyse bullying later on, in grade 10). Among these two cohorts (2013-14, and 2014-15), we focus on the 2014–15 cohort due to data availability: longitudinal student identifiers were introduced only in 2010–11, making it impossible to link second-grade data (from 2009–10)

to fifth-grade survey responses in 2013–14.

In Table A.1 in the Appendix, we report the sample size and the procedure used to obtain the final sample. Our initial sample begins with 522,693 second-grade students in 2011–12. However, since longitudinal identifiers were optional in that year, many students cannot be tracked. To ensure reliable tracking, we retain only schools with below-median rates of missing identifiers (so-called "untrackable" students), resulting in 260,892 observations [1]. We further exclude students in same-sex schools (569 observations) and those in schools without gender variation across classes (4,294 observations), arriving at a working sample of 187,535 second graders. Among these, 174,087 students (93%) can be successfully tracked to grade 5. We then exclude 30,827 students lacking responses to the bullying questions, yielding a final sample of 143,260 students. One potential concern is that attrition might be systematically related to our dependent variable (share of male peers), potentially biasing estimates. In Section 4, we address this concern by testing for selective attrition and excluding its impact on our results.

3.2 Descriptive statistics

Table 1 presents descriptive statistics, distinguishing between variables that measure outcomes and those used as controls. Following Bracco et al. (2022) in considering bullying a repeated behavior, we create a binary variable equal to 1 if any form of bullying occurs at least weekly. We consider this the most reliable measure, as it best captures the persistent nature of bullying. According to this definition, 21% of students report being regularly victimized, while 7% report engaging in bullying behavior. We then adopt a more stringent definition, coding a dummy equal to 1 if bullying occurs at least daily. Under this threshold, the share of victims drops to 11% and that of perpetrators to 3%. Moreover, 76% of students report no involvement in (weekly) bullying, 16% are net victims, 2% are net perpetrators, and the remaining 4% identify as both victims and perpetrators.[2] In addition, separate binary indicators for specific types of bullying (mocking, insulting, isolating, and fighting) are built. We also consider student well-being as an additional outcome, measured through four self-

[1] The choice to focus on schools where almost all students have a longitudinal identifiers is also necessary for another reason. Class identifiers, although available in INVALSI data, are not longitudinal for this cohort. Therefore, in schools where almost all students are trackable over the two grades (those where missing student identifiers are below the median - 3%), we were able to build ad hoc longitudinal id for the class. More precisely, if the majority of the kids a given class x in grade 2 are found in class z in grade 5, we assume that x and z are the same class. On the contrary, in schools where students' longitudinal id are available for few students, we were not able to reconstruct classes' longitudinal identifiers, which are essential for the correct development of our identification strategy.

[2] Considering the preferred definition of bullying – i.e., an event occurring at least weakly.

reported indicators: whether the student feels well (84%), calm (74%), content (79%), and happy (81%).[3] Turning to control variables, female and male students are equally represented. In grade 2, students are on average 6 years old and are predominantly Italian. First - and second -generation migrants represent 2.5% and 7% of the sample, respectively. Most children attended kindergarten (86%), while only one in five attended daycare. On average, 15% of mothers and 12% of fathers hold a college degree. The average class size is 20 students.

4 Empirical Strategy

The goal of this paper is to estimate how exposure to a higher share of male peers affects students propensity to engage in violent behavior. Ideally, we would like to compare female and male students randomly allocated to classes with a higher share of male peers.
Even if, in Italy, primary schools generally aim to achieve balanced classes in terms of students' socio-demographic characteristics, including gender, not all classes within a school will have an equal composition (see Figure 1, displaying the distribution of share of boys (panel A), and regress it on school fixed effect (Panel B))

Figure 1 here.

For example, in a school with 17 boys and 13 girls, it is not possible to split students into two equally sized classes with the same share of boys. In this case, to achieve the most equitable distribution of students according to gender, one class will have 9 boys and 6 girls– class A – and the other will have 8 boys and 7 girls – class B. Thus, when sorting two girls with the same socio-demographic characteristics to either class, the one allocated to class A will be randomly exposed to more male peers – 64% – than in class B – 54%. We leverage such quasi-random variation in the gender composition of peers – within schools and across classes – to identify its impact on victimization and perpetration of physical and psychological bullying. Formally, we estimate the model below:

$$\begin{aligned} Bullying_{i,c,s} &= \alpha + \theta MalePeers_{c,s} + \delta Boy_{i,c,s} + \mathbf{X_{i,c,s}}\kappa + \mathbf{X_{i,c,s}} * Boy_{i,c,s}\zeta \\ &\quad + CS_c + \phi_s + CS_c * Boy_{i,c,s} + \phi_s * Boy_{i,c,s} + \epsilon_{i,c,s} \end{aligned} \tag{1}$$

[3]We define dummy variables that take the value 1 if a student reports experiencing a given dimension of well-being frequently or very frequently, and 0 if they report experiencing it never or sometimes.

Where $Bullying_{i,c,s}$ is an outcome related to victimization or perpetration of bullying reported by student i, in class c, of school s; $\%MalePeers_{i,c,s}$ refers to the share of peers in the class who are male; Boy is a dummy for male students; $\mathbf{X_{i,c,s}}$ is a vector of individual-level socio-economic characteristics of i including age in years, nursery and kindergarten attendance, migrant status, and parental education; CS_c refers to class size fixed effects, and ϕ_s to school fixed effects.

When comparing the effect of an increase in the share of boys for boys and girls, we estimate this modified equation.

$$\begin{aligned} Bullying_{i,c,s} &= \alpha + \beta(\%MalePeers_{c,s} \times Girl_{i,c,s}) + \gamma(\%MalePeers_{c,s} \times Boy_{i,c,s}) + \delta Boy_{i,c,s} \\ &+ \mathbf{X_{i,c,s}}\kappa + \mathbf{X_{i,c,s}} * Boy_{i,c,s}\zeta + CS_c + \phi_s + CS_c * Boy_{i,c,s} + \phi_s * Boy_{i,c,s} \\ &+ \epsilon_{i,c,s} \end{aligned} \tag{2}$$

Here, we add an interaction term between the share of male peers and the dummy for being a boy (Boy_{ics}), and the share of male peers and the dummy for being a girl ($Girl_{ics}$). Note that both in model 1 and 2, the term Boy is also interacted with all other individual characteristics.

In order to be sure that our results are interpretable in a causal manner, two identifications should hold, namely i) there should not be sample selection of students that is induced by a different share of boys, and ii) students' exposure to different peer gender compositions should be quasi-random within schools[4], conditional on their own gender.

To test the first assumption, we analyze to which extent sample attrition from grade 2 to 5 correlates with our independent variable, i.e. the share of boys in grade 2. Crucially, we want to test whether students who drop out of the sample are exposed to different shares of male peers than the in-sample students. Hence, we regress a dummy indicating whether students still belong to the sample in grade 5 on the share of male peers, together with the set of controls and fixed effects described in equation 1. Reassuringly, in Table 2, we find no statistically significant relationship between the share of male peers and the probability to be tracked from grade 2 to grade 5 – for both girls and boys (columns 1 and 2). Moreover, we test

[4]The requirement is that the share of male peers should not be correlated with other students characteristics, for female and male pupils.

that the likelihood that a student present in grade 2 doesn't reply to the bullying questions is not predicted by the share of boys, for both girls and boys (columns 3 and 4). Finally, we verify that the probability that a student switches either class or school from grade 2 to 5 is not predicted by the share of boys, nor for girls or for boys (columns 5 and 6).

Table 2 here.

In order to test our second assumption -i.e. random assignment of students conditioned on gender - we estimate a model where we interact the gender of student i with all control variables and school fixed effects. This is crucial since we do not claim that students are unconditionally randomized within schools and across classes. In fact, although the criteria for the distribution of students across classes is not defined by law, schools generally abide by the principle of equal heterogeneity – i.e., within schools, classes are equally heterogeneous in terms of their students' socio-demographic characteristics. For example, if the random allocation of students across classes resulted in gender-imbalanced across equally sized classes – such as a share of boys in class A and B of 30% and 70%, respectively –, the school principal would probably redistribute students to balance these classes. Yet, once we condition on own-gender, exposure to different shares of male peers is plausibly as good as random, since principals are unlikely to consider girls (or boys) individual characteristics – besides gender – when allocating them to classes with different gender class compositions.

To assess the degree to which the share of male peers is arguably random within schools, Figure 2 displays the school-level standard deviation in the share of male students of its classes.

Figure 2 here.

Most schools have relatively little variation in the gender composition of classes. This is in line with the type of randomization that we leverage for identification, which should only marginally and arbitrarily increment the share of male peers to which students are exposed. To further assess our identifying assumption, we examine the balancing of our sample by regressing – separately for girls and boys – the share of male peers on pre-determined characteristics of students, including age (in months), nursery and kindergarten attendance, parental education, and migration status. As Table 3 shows, when we regress the share of male peers on either each individual-level characteristic separately (columns 1 and 2), or on

all regressors simultaneously (columns 3 and 4), the only coefficients that are statistically significant across both specifications are relative to father's college degree for boys. However, we include this and all the other controls in our regressions.

Table 3 here.

We also perform a similar check, in the spirit of Aizer and Doyle (2015) by comparing the level of covariates characteristics for boys and girls separately, across terciles of the distribution of the share of boys (Table 4).

Table 4 here.

As displayed in the table, when regressing each covariate related to girl or boy's characteristics on dummies corresponding to the second and third terciles of the distribution of the share of boys – controlling for school fixed effects and clustering standard errors at the classroom level –, few of the p-values are larger than zero for both boys and girls. Moreover, even when there are statistically significant differences between terciles - probably due to the large sample size - these are negligible in size. In conclusion, given that students' characteristics are similar across the distribution of the share of male peers, we believe that in grade 2 classes, conditioning on own-gender, exposure to different shares of male peers is as good as random.

5 Results

5.1 Correlation between gender and bullying

We begin by examining the relationship between students' gender and aggression from both the victim's and the perpetrator's perspectives. Table 6 shows that, even after controlling for individual-level characteristics, boys are more likely than girls to be both perpetrators and victims of bullying.

Table 6 here.

We use as outcome a dummy equal to one when a student reported having suffered any type of bullying in the past 12 months. We find that being a boy increases the probability of reporting to be a victim at least weekly by 7 percentage points (pp) (column 1) and at least daily by 3pp. Gender differences in bullying are confirmed when considering perpetrators. Boys are

6pp more likely to report committing an act of aggression at least weekly and 3 percentage points more likely to do so daily. Across both victims and perpetrators, gender emerges as the strongest predictor of bullying behavior compared to other individual characteristics (see Table A.2). Arguably, girls and boys may differ not only in the extent of their involvement in bullying, but also in the forms it takes—both in how they bully others and how they are bullied. In Table 7, we examine the correlation between gender and reports of different types of bullying: mocking, social exclusion, verbal insults, and physical fighting.

Table 7 here.

We find that boys are more likely than girls to report being both victims and perpetrators across all forms of bullying. However, the gender gap is considerably larger for mocking and insulting—roughly two and three times greater, respectively, than for social exclusion and physical fighting.

5.2 Effect of the share of boys on bullying

Knowing that boys are more prone to engage in violent behavior, we investigate the spillover effects of increasing the number of male peers on students' reports of bullying. The results, presented in Table 8, are shown separately for victims (Panel A) and perpetrators (Panel B).

Columns 1 and 2 examine the probability of having been a victim of any form of bullying occurring at least weekly over the past 12 months. We consider this our preferred definition of bullying, as it captures the repetitive nature of the phenomenon. Only girls appear to respond to an increase in the share of male classmates: a one standard deviation increase raises their likelihood of victimization by 0.8 percentage points, corresponding to 4.7%. In Columns 5 and 6, we adopt an even stricter definition of aggressive behavior, focusing on students who report experiencing aggression on a daily basis. Under this definition, a one standard deviation increase in the share of male peers leads to a 6.7% increase in the probability that girls become frequent victims. Turning to perpetrators (Panel B), we find that boys' and girls' behavior is unaffected by a higher share of male peers.

Table 8 here.

Our main findings are confirmed if we drop all the observations with missing covariates (see Table 9). Moreover, we check that the results are robust in schools with limited variation in

the share of boys, to ideally restrict unobserved heterogeneity between classes with a high and a low share of boys. In Table 10, we limit the analysis to schools in which the within-school standard deviation of the independent variable across classes is below the median.

Tables 9 and 10 here

An important consideration is whether the causal evidence might be threatened by differential reporting by gender. Although there are no documented gender differences in tendency to talk, at least in the age range of this study (Mehl et al. 2007), it could be argued that boys are not more likely to be bullied or to bully, but are simply more likely to talk about both active and passive behaviors than girls. However, even in this scenario, if the boys are more numerous, it becomes difficult to explain why girls, who under-report under this hypothesis, would suddenly begin to report more than boys for reasons not related to an actual increase in violence, or at the very least an increase in the perceived threat of violence. For these reasons, we believe that our causal estimates are unlikely to be invalidated by gender differences in bullying reporting.

To better contextualize the magnitude of our findings, we compare our estimates of Table 8 to those of Bracco et al. (2022), who—using the same dataset—analyze how bullying of migrant fifth graders responds to anti-migrant political discourse. They find that migrant students living in municipalities where the nationalist party Lega is politically active are 11% more likely to become victims of bullying. In comparison, the effect of a one standard deviation increase in the share of male peers—which corresponds to approximately a 10 percentage point increase, or moving from a peer group of 10 girls and 10 boys to one of 8 girls and 12 boys—raises the probability that girls are frequently victimized by about half as much as the effect experienced by migrant students exposed to anti-immigration campaigns.

We next investigate which dimensions of bullying are affected by an increase in the exposure to the share of male peers in the class. In Table 11, we extend our analysis to each of the four dimensions of bullying at our disposal: mockery, insulting, isolating, and fighting.

Table 11

We find that the increase in victims among girls is more pronounced for the categories of mocking and insulting (see Panel A). Specifically, a 1 s.d. increase in the share of male peers increases the probability of a girl to report being mocked at least weekly by 1 pp (an increase

by 6.9%) and the probability of a girl to report being insulted at least weekly by 0.6 pp (translating into a 7.5% increase). However, an increase in the share of boys does not affect the reported probability of being a perpetrator, neither for boys nor for girls, for any of the bullying categories. Since an increase in the number of boys leads to greater victimization among girls, it is important to examine whether this rise primarily affects girls who are also perpetrators or those who are purely victims. Table 12 presents the impact of an increase in the share of boys on four distinct outcomes: being only a victim, only a perpetrator, both a victim and a perpetrator, or neither.

Table 12 here.

Interestingly, an increase in the number of boys reduces the likelihood that a girl remains uninvolved in bullying (column 4) and increases the probability that she is a victim only (column 2). Note that the coefficient of column 2 -0.008- is exactly the same as the one estimated in the main results (Table 5). In addition, the increase in the share of "net victims" among girls fully offsets the decrease in the size of the "none" group.

6 Heterogeneity

We explore several sources of heterogeneity to assess the robustness of the effect of male peer exposure on girls' victimization.[5] First, we examine whether the results are driven by classrooms in which girls are in the minority relative to boys. In Figure 3, we present regression coefficients where the dependent variable is a victimization dummy, and the key independent variable is the interaction between the share of male peers and a binary indicator for whether the class is male-dominated. The results indicate that the effect of an increase in the share of boys on girls' victimization is primarily concentrated in classes where girls are in the minority, although even within this subgroup the coefficient is only significant at the 10,% level. For boys, we consistently find no significant effects. Furthermore, the effect on girls remains robust

[5]The key variable of the hetherogeneity analysis is the triple interaction term between boys (or girls) share of male peers, and the hetherogenity dimenion of interest. In general terms we estimate:

$$\begin{aligned} Victim_{i,c,s} = \alpha &+ \beta_1 Boy_{i,c,s} + \beta_2(\%MalePeers_{c,s} \times Girl_{i,c,s}) + \beta_3(\%MalePeers_{c,s} \times Boy_{i,c,s}) \\ &+ \beta_4 H_{i,c,s} + \beta_7(Boy_{i,c,s} \times H_{i,c,s}) \\ &+ \beta_{\mathbf{5}}(\%\mathbf{MalePeers_{c,s}} \times \mathbf{Girl_{i,c,s}} \times \mathbf{H_{i,c,s}}) \\ &+ \beta_{\mathbf{6}}(\%\mathbf{MalePeers_{c,s}} \times \mathbf{Boy_{i,c,s}} \times \mathbf{H_{i,c,s}}) \\ &+ \mu_{c,s} + \varepsilon_{i,c,s}, \end{aligned}$$

and of similar magnitude across different class sizes (Figure 4), and migrant status (Figure 5). We also examine whether the effect varies across regions with differing levels of gender equality and across schools with varying socio-economic backgrounds (Figure 6). To capture regional gender norms, we use a gender equality indicator developed by Amici and Stefani (2013), which covers the time span of our study. This index adapts the Gender Equality Index introduced by Plantenga et al. (2009) for 25 European countries and encompasses four key dimensions: employment, income, political representation, and time use.[6] For the heterogeneity analysis, we split regions into two groups based on whether they fall above or below the median value of the index. To proxy socio-economic background, we use the socio-economic index constructed and provided by INVALSI, [7] we compute the average of this index at the school level and distinguish between schools above and below the median.[8] As shown in Panel A of Figure 6, the effect on girls appears to be driven by regions below the median value of the gender equality index. In more progressive regions, the effect is not robust. Similarly, Panel B of Figure 6 shows that the effect is significant only for schools characterized by lower socio-economic background.

Figures 3, 4, 5, and 6 here.

6.1 Effects of the share of boys on well-being

We also investigate whether the share of boys in the classroom affects girls' well-being, and whether this effect is mediated by bullying victimization. To explore this, we analyze responses to a question from the INVALSI student survey, in which students report how often they felt well, calm, content, or happy, choosing from the options: "never," "sometimes," "frequently," or "very frequently." We construct four binary variables equal to one if the student responds "frequently" or "very frequently," and estimate a regression model analogous to equation 1. We also construct an index using Principal Component Analysis (PCA), combining discrete variables that capture bullying episodes in mocking, isolation, insulting, and fighting, each rated on a scale from 1 to 4, to build a standardized bullying victimization index with a mean of zero and a standard deviation of one. Table 13 shows that a higher share of male peers is

[6] For Italy, the index has a mean of 0.14 and a median of 0.38, with a minimum of 0.14 in Calabria and a maximum of 0.47 in Piedmont.

[7] The INVALSI socioeconomic and cultural index is constructed using parental education and occupation, as well as from measures of material possessions of the household. For further information on the estimation of ESCS, please see Campodifiori et al. (2010).

[8] See table 1 for the distribution of this index across the selected sample.

associated with lower levels of well-being for both girls and boys, with the effect being more pronounced and statistically robust for girls. Moreover, Table 14 indicates that the interaction coefficient between the share of boys and the female indicator decreases in magnitude, once the victimization index is included in the model. This attenuation is particularly strong for the outcome "feeling well," though smaller declines are also observed for the other well-being indicators.

Table 13 and 14 here.

7 Potential Mechanisms

In this paper, we document that classes with an higher share of male peers—who, on average, are more familiar with violent behaviors than their female counterparts— are characterized by higher victimization rates among girls. What mechanisms might explain this finding? Several scenarios are possible. One plausible explanation is that the increase in victimization among girls reflects aggression initiated by boys. In this case, the rise in female victims would stem from cross-gender violent dynamics.[9] Alternatively, a larger number of boys—who tend to be more involved in bullying, both as perpetrators and victims—could trigger a contagion effect among girls. Here, girls may begin to emulate their male peers, adopting similar bullying behaviors within their own peer groups (emulation mechanism). A third explanation relates to changes in female group composition. As the number of boys in a class increase, female-peer groups shrink, potentially worsening assortative matching among girls. This, in turn, may increase conflict and bullying within female peer groups.[10] Unfortunately, our data do not allow us to identify whether victims are targeted by same- or opposite-gender peers. Nonetheless, the evidence appears more consistent with boys targeting girls than with a dynamic of violence within female peer groups—though this interpretation should be treated with caution. We believe the following consideration lends support to this argument. First, we observe no increase in active repeated episodes of violence among girls. That is, there is no rise in the share of girls identified as perpetrators or as both perpetrators and victims; the increase is confined to net victims (Table 12). This evidence should make the emulation and

[9] A similar mechanism could be at play if greater exposure to boys does not directly increase violence within girls' groups but instead heightens reporting, as girls may feel more threatened by the increased presence of boys, who tend to exhibit higher levels of violence.

[10] Unlike the first mechanism, both the emulation and assortative matching mechanisms imply within-gender dynamics.

the within girls' violent channel less likely. Second, as the share of boys rises, the increase in victimization among girls is concentrated in bullying dimensions—specifically mockery and isolation—where boys themselves report higher victimization rates. In contrast, we find no increase in dimensions where the gender gap is smaller, such as fighting and insulting (Table 11). This pattern suggests that boys may be targeting girls using forms of aggression with which they are more familiar. Third, the effect is more pronounced in schools with lower socio-economic background, and in less gender-egualitarian regions. This pattern may be more compatible with a cross-gender violence mechanism, compared to a within-gender violence mechanism. Indeed, contrary to the common wisdom, same-sex friendship was shown to be less segregated in contexts with less gender equality, increasing the likelihood of cross-gender interactions. The hypothesis that gender segregation in childhood friendships is exacerbated in richer and more progressive areas - leading to a Gender-Equality Paradox - was verified by Baugues and Zinovyeva (2025) for 37 countries (using HBSC[11] data) and more specifically for the British setting (using MCS[12] data). Building on their hypothesis, we assume more gender segregated friendships in more gender equalitarian Italian regions and in wealthier schools. By further documenting that girls ' victimization only arises in settings with lower gender equality and with lower socio-economic status (Figure 6) - typically less gender segregated in child friendship - we show suggestive evidence against the within-gender mechanism of violence.

8 Discussion and Conclusions

This study provides new evidence on the early emergence and gendered dynamics of bullying in Italian elementary schools. Using detailed INVALSI data for fifth-grade students, we document that boys are more likely than girls to engage in and experience bullying across multiple dimensions, including mockery, verbal insults, social exclusion, and physical aggression. Importantly, our analysis reveals a clear asymmetry in peer effects: while the gender composition of the classroom does not significantly affect boys' involvement in bullying, girls are disproportionately affected by an increased share of male peers. This effect is particularly pronounced for verbal forms of bullying, such as mockery and insults, and is concentrated in classes where boys constitute more than half of the students.

[11]Health Behavior in School-Aged Children (HBSC)
[12]Millennium Cohort Study (MCS)

We also show that a higher share of boys in the classroom negatively impacts girls' overall well-being, with increased exposure to bullying acting as a partial mediator. These results suggest that the seeds of gendered vulnerability to aggression—well documented in adulthood—are sown early in the peer environment, highlighting the importance of classroom composition and social dynamics in shaping experiences of violence.

From a policy perspective, our findings underscore the need for early interventions that account for gendered patterns of bullying. Strategies aimed at promoting respectful peer interactions, reducing aggressive behaviors, and fostering inclusive classroom climates may be particularly beneficial for protecting girls in male-dominated settings. More broadly, understanding the role of early peer environments can inform efforts to prevent the escalation of gender-based violence across the life course.

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9 Tables and Figures

Table 1: **Descriptive Statistics**

	Mean	SD	Min	Max
Outcomes				
Bullying				
Victim of bullying (at least weekly)	0.21	0.41	0.00	1.00
Victim of bullying (daily)	0.11	0.31	0.00	1.00
Perpetrator of bullying (at least weekly)	0.07	0.26	0.00	1.00
Perpetrator of bullying (daily)	0.03	0.18	0.00	1.00
Net victim (victim only, not perpetrator)†	0.17	0.37	0.00	1.00
Net perpetrator (perpetrator only, not victim)†	0.03	0.17	0.00	1.00
Both victim and perpetrator†	0.04	0.20	0.00	1.00
None (neither victim nor perpetrator)†	0.76	0.43	0.00	1.00
Victimization Index	-0.00	1.00	-1.30	3.25
Well-being				
Feels well	0.84	0.37	0.00	1.00
Feels calm	0.74	0.44	0.00	1.00
Feels content	0.79	0.41	0.00	1.00
Feels happy	0.81	0.39	0.00	1.00
Controls				
Gender				
Boy	0.50	0.50	0.00	1.00
Share of Boys in the class (Male Peers)	0.506	0.103	0.00	1.00
Standardized Share of Boys in the class (Male Peers)	0.00	1	-4.93	4.81
Citizenship				
Italian	0.90	0.30	0.00	1.00
First-generation immigrant	0.03	0.16	0.00	1.00
Second-generation immigrant	0.07	0.26	0.00	1.00
Age				
Student's age	5.98	1.00	5.00	8.00
Early Education				
Attended kindergarten (Scuola Materna)	0.86	0.34	0.00	1.00
Attended daycare (Asilo Nido)	0.27	0.45	0.00	1.00
Mother's Education				
Primary school certificate	0.02	0.14	0.00	1.00
Middle school	0.23	0.42	0.00	1.00
Vocational school	0.09	0.29	0.00	1.00
High school	0.35	0.48	0.00	1.00
Other qualification above high school	0.03	0.16	0.00	1.00
College degree or higher	0.16	0.37	0.00	1.00
Missing	0.12	0.33	0.00	1.00
Father's Education				
Primary school certificate	0.02	0.15	0.00	1.00
Middle school	0.30	0.46	0.00	1.00
Vocational school	0.09	0.29	0.00	1.00
High school	0.31	0.46	0.00	1.00
Other qualification above high school	0.02	0.13	0.00	1.00
College degree or higher	0.13	0.33	0.00	1.00
Missing	0.13	0.34	0.00	1.00
Number of children in class				
Number of children in class	20.22	3.54	2.00	35.00
INVALSI socio-esonomic index				
Student's index	0.10	0.93	-2.84	2.27
School-level variable				
Number of classes per school	2.50	0.98	1	9
Mean socio-economic index of students at the school-level	0.08	0.47	-2.28	2.18

Notes: The table reports summary statistics of outcomes and control variables, namely mean, standard deviation, minimum and maximum value for all the students of our sample (N=143,260).
† The definitions of victims and perpetrators follow the preferred definition of bullying – i.e., an event occurring at least once a week over the past 12 months.

Table 2: **Attrition tests**

	Available student id		Outcome not available		Movers across classes or schools	
	(1)	(2)	(3)	(4)	(5)	(6)
Class % Boys	-0.001	-0.001	0.001	0.001	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Boy × Class % Boys		0.001		0.000		0.001
		(0.001)		(0.001)		(0.001)
Dep. var. mean	0.93		0.18		0.02	
Dep. var. mean (Girls)		0.93		0.17		0.02
Dep. var. mean (Boys)		0.92		0.18		0.02
Observations	187534	187534	174086	174086	143260	143260

Notes: The table reports three tests examining the correlation between attrition and the share of boys in grade 2—overall, and separately for boys and girls. Columns 1–2 test whether the share of boys in grade 2 predicts the probability that a student can be tracked in grade 5. Columns 3–4 assess whether the share of boys predicts the likelihood that a student responds to the bullying survey questions in grade 5. Columns 5–6 examine whether the likelihood of switching classes between grade 2 and grade 5 is correlated with the share of boys. We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 3: **Balance check (I): share of male peers as predictors of other covariates within schools**

Dep. var:	Separate Regressions		Single Regressions	
% male peers	Girls	Boys	Girls	Boys
Age in months at assessment	-0.001	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Attended preschool (asilo)	0.029	-0.003	0.027	0.005
	(0.019)	(0.019)	(0.020)	(0.019)
Attended daycare (nido)	0.001	-0.004	0.001	-0.004
	(0.007)	(0.006)	(0.007)	(0.006)
Italian citizen	-0.006	-0.018**	-0.020	0.029
	(0.008)	(0.008)	(0.088)	(0.077)
1st generation immigrant	-0.026*	0.048***	-0.035	0.079
	(0.015)	(0.015)	(0.089)	(0.078)
2nd generation immigrant	0.018**	0.006	0.000	0.038
	(0.009)	(0.009)	(0.088)	(0.077)
Mother: high school	-0.004	0.004	-0.003	0.004
	(0.005)	(0.005)	(0.006)	(0.006)
Father: high school	-0.008	-0.003	-0.008	0.002
	(0.005)	(0.005)	(0.005)	(0.006)
Mother: college	0.001	-0.004	-0.001	-0.007
	(0.007)	(0.007)	(0.008)	(0.009)
Father: college	0.002	0.014*	-0.003	0.020**
	(0.007)	(0.008)	(0.009)	(0.009)
Italian test score	0.001	-0.004	0.002	-0.002
	(0.006)	(0.005)	(0.007)	(0.006)
Math test score	-0.001	-0.004	-0.001	-0.003
	(0.005)	(0.005)	(0.007)	(0.006)
p-value of F-test			0.08	0.07
Observations			71386	71614

Notes: The table reports regressions of the share of male peers in a class on students' characteristics, separately for boys and girls. It presents both separate regressions—where the share of boys is regressed on each covariate individually—and joint regressions, where the share of boys is regressed on all covariates simultaneously. School fixed effects are included in the regression. Standard errors in parenthesis clustered at the classroom level. The P-Value of the F joint test is reported at the bottom of the table. *p<0.10, **p<0.05, ***p<0.01.

Table 4: **Balance check (II): share of male peers as predictors of covariates along the distribution**

	Share of male peers distribution			*p-values*	
	Bottom tercile	Middle tercile	Top tercile	Middle vs. bottom	Top vs. bottom
Panel a: Girls					
Age in months at assessment	94.653	94.698	94.663	(0.678)	(0.279)
Attended preschool (asilo)	0.860	0.859	0.870	(0.030)	(0.054)
Attended daycare (nido)	0.264	0.263	0.267	(0.312)	(0.281)
Italian citizen	0.905	0.905	0.902	(0.475)	(0.788)
1st generation immigrant	0.025	0.024	0.024	(0.626)	(0.089)
2nd generation immigrant	0.069	0.070	0.073	(0.632)	(0.186)
Mother: $\geq$ high school	0.382	0.377	0.375	(0.556)	(0.848)
Father: $\geq$ high school	0.324	0.321	0.320	(0.356)	(0.948)
Mother: $\geq$ college	0.159	0.158	0.155	(0.141)	(0.962)
Father: $\geq$ college	0.126	0.129	0.122	(0.355)	(0.418)
Italian test score	0.078	0.092	0.100	(0.660)	(0.957)
Math test score	0.017	0.005	0.025	(0.891)	(0.852)
Observations	24403	23849	23263		
Panel b: Boys					
Age in months at assessment	94.928	94.852	94.901	(0.734)	(0.824)
Attended preschool (asilo)	0.860	0.855	0.874	(0.649)	(0.564)
Attended daycare (nido)	0.276	0.277	0.284	(0.969)	(0.352)
Italian citizen	0.901	0.906	0.903	(0.667)	(0.021)
1st generation immigrant	0.024	0.024	0.026	(0.004)	(0.000)
2nd generation immigrant	0.073	0.068	0.069	(0.072)	(0.816)
Mother: $\geq$ high school	0.377	0.381	0.374	(0.007)	(0.223)
Father: $\geq$ high school	0.333	0.321	0.322	(0.137)	(0.905)
Mother: $\geq$ college	0.163	0.158	0.160	(0.460)	(0.240)
Father: $\geq$ college	0.125	0.130	0.126	(0.001)	(0.188)
Italian test score	0.050	0.066	0.040	(0.341)	(0.132)
Math test score	0.108	0.119	0.097	(0.527)	(0.192)
Observations	24160	23787	23798		

Notes: The table reports regressions of the share of male peers in a class on students' characteristics, separately for boys and girls. The first three columns provide the mean of each of the individual characteristics within each tercile of the distribution of the share of male peers - for girls and boys separately. We then regress each of the student's individual characteristic, on two dummies: one for belonging to the middle tercile and another for belonging to the top tercile. The bottom tercile is the category of reference. We report P-Values associated to comparisons of middle and top terciles with the bottom tercile in the last three columns. These P-Values are obtained from separate regressions, in which each socioeconomic characteristic is regressed on a dummy variable equal to one if the student is exposed to a share

Table 5: **External validity: descriptive statistics of students from dropped and kept schools**

			p-values
	Students from dropped schools	Students from kept schools	Dropped vs. kept
Age in months at assessment	85.687	94.687	(0.000)
Attended preschool (asilo)	0.623	0.858	(0.000)
Attended daycare (nido)	0.169	0.253	(0.000)
Italian citizen	0.818	0.892	(0.000)
1st generation immigrant	0.028	0.030	(0.000)
2nd generation immigrant	0.063	0.076	(0.000)
Mother: high school	0.265	0.370	(0.000)
Father: high school	0.229	0.312	(0.000)
Mother: college	0.101	0.148	(0.000)
Father: college	0.082	0.118	(0.000)
Italian test score	-0.082	0.082	(0.000)
Math test score	-0.058	0.058	(0.000)
Observations	261801	260892	

Notes: The table describes the sample of students from schools that were kept, comparing it to those from schools that were dropped from the sample. The first two columns provide the mean of each of the individual characteristics for the students who were from schools that were kept and dropped. We then regress each of the student's individual characteristics on a dummy equal to 1 if the student belongs to a school that was kept in the sample and 0 otherwise. We report P-Values associated with comparisons between the students from schools that were kept and those in schools that were dropped.

Table 6: **Correlation between being a boy and bullying**

	Victim		Perpetrator	
	At least weekly	At least daily	At least weekly	At least daily
	(1)	(2)	(3)	(4)
Boy	0.075***	0.029***	0.067***	0.031***
	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.230***	0.084	0.011	0.028
	(0.095)	(0.056)	(0.044)	(0.042)
Dep. var. mean	0.21	0.11	0.07	0.03
Observations	143260	143260	143260	143260

Notes: The table displays OLS regressions of bullying on a dummy equal to one for boys and to zero for girls. We focus on passive bullying (reported by victims) in columns 1-2, and in active bullying (reported by perpetrators) in columns 3-4. We rely on different measures of bullying. In columns 1 and 3, we define bullying with a dummy equal to one if reported aggressions occurred at least weekly, and zero otherwise. In columns 2 and 4, we define bullying with a dummy equal to one if reported aggressions occurred at least daily, and zero otherwise. We control for the student's age in years, nursery and kindergarten attendance, migrant status, parental education. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 7: **Gender and dimensions of bullying, experienced at least weekly**

	Mock	Isolate	Insult	Fight
	(1)	(2)	(3)	(4)
Panel a: Victim				
Boy	0.057***	0.020***	0.057***	0.035***
	(0.002)	(0.002)	(0.002)	(0.001)
Constant	0.130***	0.077***	0.085***	0.019***
	(0.001)	(0.001)	(0.001)	(0.001)
Dep. var. mean	0.16	0.09	0.11	0.04
Observations	143260	143260	143260	143260
Panel b: Perpetrator				
Boy	0.033***	0.030***	0.030***	0.024***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.014***	0.018***	0.013***	0.013***
	(0.000)	(0.001)	(0.000)	(0.000)
Dep. var. mean	0.03	0.03	0.03	0.02
Observations	143260	143260	143260	143260

Notes: The table presents OLS regressions of bullying on a gender dummy equal to one for boys and zero for girls. The outcome variables are four binary indicators capturing whether aggressive episodes occurred at least weekly, across four dimensions of bullying: mocking, social exclusion, insults, and physical aggression. Panel A focuses on passive bullying (as reported by victims), while Panel B focuses on active bullying (as reported by perpetrators). Controls include the student's age in years, attendance in nursery and kindergarten, migrant background, and parental education. We also include indicator variables for missing covariates. Class size and school fixed effects are included. Standard errors, clustered at the classroom level, are reported in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 8: **Share of male peers and bullying**

	At least weekly		At least daily	
	(1)	(2)	(3)	(4)
Panel a: Victim				
Class % Boys	0.004***		0.003**	
	(0.002)		(0.001)	
Girl X Class % Boys (1)		0.008***		0.006***
		(0.002)		(0.001)
Boy X Class % Boys (2)		0.000		-0.001
		(0.002)		(0.002)
P-value of (1)=(2)		0.00		0.00
Dep. var. mean	0.21		0.11	
Dep. var. mean (Girls)		0.17		0.09
Dep. var. mean (Boys)		0.25		0.12
Observations	143260	143260	143260	143260
Panel b: Perpetrator				
Class % Boys	0.001		0.000	
	(0.001)		(0.001)	
Girl X Class % Boys (1)		0.001		0.001
		(0.001)		(0.001)
Boy X Class % Boys (2)		0.001		-0.000
		(0.002)		(0.001)
P-value of (1)=(2)		0.77		0.31
Dep. var. mean	0.07		0.03	
Dep. var. mean (Girls)		0.04		0.02
Dep. var. mean (Boys)		0.11		0.05
Observations	143260	143260	143260	143260

Notes: The table displays OLS regressions of bullying on the share of male peers in the class (odd-numbered columns), and separately for boys and girls (even-numbered columns). We focus on passive bullying (reported by victims) in Panel A, and on active bullying (reported by perpetrators) in Panel B. We rely on different measures of bullying. In columns 1 and 2, we define bullying with a dummy equal to one if reported aggressions occurred at least weekly, and zero otherwise. In columns 3 and 4, we define bullying with a dummy equal to one if reported aggressions occurred at least daily, and zero otherwise. We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 9: **Robustness check: only keeping students without missing covariates**

	At least weekly		At least daily	
	(1)	(2)	(3)	(4)
Panel a: Victim				
Class % Boys	0.003		0.002	
	(0.002)		(0.001)	
Girl X Class % Boys (1)		0.008***		0.006***
		(0.002)		(0.002)
Boy X Class % Boys (2)		-0.002		-0.002
		(0.003)		(0.002)
P-value of (1)=(2)		0.00		0.00
Dep. var. mean	0.21		0.10	
Dep. var. mean (Girls)		0.17		0.09
Dep. var. mean (Boys)		0.24		0.12
Observations	104988	104988	104988	104988
Panel b: Perpetrator				
Class % Boys	0.001		0.001	
	(0.001)		(0.001)	
Girl X Class % Boys (1)		0.001		0.001
		(0.001)		(0.001)
Boy X Class % Boys (2)		0.000		-0.000
		(0.002)		(0.001)
P-value of (1)=(2)		0.78		0.34
Dep. var. mean	0.07		0.03	
Dep. var. mean (Girls)		0.04		0.02
Dep. var. mean (Boys)		0.10		0.05
Observations	104988	104988	104988	104988

Notes: The table displays OLS regressions of bullying on the share of male peers in the class (odd-numbered columns), and separately for boys and girls (even-numbered columns). We restrict the analysis to students without missing covariates. We focus on passive bullying (reported by victims) in Panel A, and on active bullying (reported by perpetrators) in Panel B. We rely on different measures of bullying. In columns 1 and 2, we define bullying with a dummy equal to one if reported aggressions occurred at least weekly, and zero otherwise. In columns 3 and 4, we define bullying with a dummy equal to one if reported aggressions occurred at least daily, and zero otherwise. We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 10: **Robustness check: bottom half of the distribution of the within-school s.d. of the share of boys**

	At least weekly		At least daily	
	(1)	(2)	(3)	(4)
Panel a: Victim				
Class % Boys	0.011***		0.006**	
	(0.004)		(0.003)	
Girl X Class % Boys (1)		0.011**		0.010**
		(0.005)		(0.004)
Boy X Class % Boys (2)		0.011**		0.002
		(0.005)		(0.004)
P-value of (1)=(2)		0.99		0.16
Dep. var. mean	0.21		0.10	
Dep. var. mean (Girls)		0.17		0.09
Dep. var. mean (Boys)		0.25		0.12
Observations	71565	71565	71565	71565
Panel b: Perpetrator				
Class % Boys	0.002		-0.000	
	(0.003)		(0.002)	
Girl X Class % Boys (1)		0.002		0.001
		(0.003)		(0.002)
Boy X Class % Boys (2)		0.002		-0.001
		(0.004)		(0.003)
P-value of (1)=(2)		0.99		0.61
Dep. var. mean	0.07		0.03	
Dep. var. mean (Girls)		0.04		0.02
Dep. var. mean (Boys)		0.10		0.05
Observations	71565	71565	71565	71565

Notes: The table displays OLS regressions of bullying on the share of male peers in the class (odd-numbered columns), and separately for boys and girls (even-numbered columns). We restrict the analysis to schools with limited variation in the share of boys, namely those with a standard deviation below the median (i.e., 0.539). We focus on passive bullying (reported by victims) in Panel A, and on active bullying (reported by perpetrators) in Panel B. We rely on different measures of bullying. In columns 1 and 2, we define bullying with a dummy equal to one if reported aggressions occurred at least weekly, and zero otherwise. In columns 3 and 4, we define bullying with a dummy equal to one if reported aggressions occurred at least daily, and zero otherwise. We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 11: **Share of male peers and dimensions of bullying experienced at least weekly**

	Mock		Isolate		Insult		Fight	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel a: Victim								
Class % Boys	0.004***		0.001		0.004***		0.001	
	(0.001)		(0.001)		(0.001)		(0.001)	
Girl X Class % Boys (1)		0.009***		0.002		0.006***		0.001
		(0.002)		(0.001)		(0.001)		(0.001)
Boy X Class % Boys (2)		0.000		-0.000		0.002		0.001
		(0.002)		(0.001)		(0.002)		(0.001)
P-value of (1)=(2)		0.00		0.26		0.03		0.83
Dep. var. mean	0.16		0.09		0.11		0.04	
Dep. var. mean (Girls)		0.13		0.08		0.08		0.02
Dep. var. mean (Boys)		0.19		0.10		0.14		0.05
Observations	143260	143260	143260	143260	143260	143260	143260	143260
Panel b: Perpetrator								
Class % Boys	0.001		0.000		0.000		0.001	
	(0.001)		(0.001)		(0.001)		(0.001)	
Girl X Class % Boys (1)		0.001		0.001		0.001		-0.000
		(0.001)		(0.001)		(0.001)		(0.001)
Boy X Class % Boys (2)		0.000		-0.000		-0.000		0.001
		(0.001)		(0.001)		(0.001)		(0.001)
P-value of (1)=(2)		0.79		0.24		0.44		0.10
Dep. var. mean	0.50		0.41		0.32		0.18	
Dep. var. mean (Girls)		0.01		0.02		0.01		0.01
Dep. var. mean (Boys)		0.05		0.05		0.04		0.04
Observations	143260	143260	143260	143260	143260	143260	143260	143260

Notes: The table displays OLS regressions of bullying on the share of male peers in the class (odd-numbered columns), and separately for boys and girls (even-numbered columns). The outcome variables are four binary indicators capturing whether aggressive episodes occurred at least weekly, across four dimensions of bullying: mocking, social exclusion, insults, and physical aggression. Panel A focuses on passive bullying (as reported by victims), while Panel B focuses on active bullying (as reported by perpetrators). We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender.. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 12: **Share of male peers: net victims, bullies, both or neither**

	Net Victim		Net Perpetrator		Both		None	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Class % Boys	0.004***		0.001		0.000		-0.005***	
	(0.001)		(0.001)		(0.001)		(0.002)	
Girl X Class % Boys (1)		0.008***		0.001		0.001		-0.009***
		(0.002)		(0.001)		(0.001)		(0.002)
Boy X Class % Boys (2)		0.000		0.001		-0.000		-0.001
		(0.002)		(0.001)		(0.001)		(0.002)
P-value of (1)=(2)		0.00		0.79		0.56		0.01
Dep. var. mean	0.17		0.03		0.04		0.76	
Dep. var. mean (Girls)		0.15		0.02		0.02		0.81
Dep. var. mean (Boys)		0.19		0.04		0.06		0.71
Observations	143260	143260	143260	143260	143260	143260	143260	143260

Notes: The Table presents the effect of an increase in the share of boys on four distinct binary outcomes: reporting to be only a victim, only a perpetrator, both a victim and a perpetrator, or neither, in at least one of the dimensions of bullying at least weekly. Estimates are reported also separately for boys and girls (even columns). We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Table 13: **Share of male peers and reported well-being**

	Well		Calm		Content		Happy	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Class % Boys	-0.004***		-0.005***		-0.006***		-0.006***	
	(0.001)		(0.002)		(0.001)		(0.001)	
Girl X Class % Boys (1)		-0.004**		-0.009***		-0.009***		-0.008***
		(0.002)		(0.002)		(0.002)		(0.002)
Boy X Class % Boys (2)		-0.003*		-0.002		-0.004*		-0.003*
		(0.002)		(0.002)		(0.002)		(0.002)
P-value of (1)=(2)		0.72		0.02		0.08		0.08
Dep. var. mean	0.84		0.74		0.79		0.81	
Dep. var. mean (Girls)		0.85		0.74		0.81		0.84
Dep. var. mean (Boys)		0.82		0.74		0.77		0.79
Observations	143260	143260	143260	143260	143260	143260	143260	143260

Notes: The Table presents the effect of an increase in the share of boys on four distinct dimensions of well-being: reporting to be well, calm, content, and happy. For each dimension, we construct a binary variable equal to 1 if students report experiencing that dimension frequently or very frequently, and 0 if they report experiencing it never or sometimes. Estimates are also reported separately for boys and girls (even columns). We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate. Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

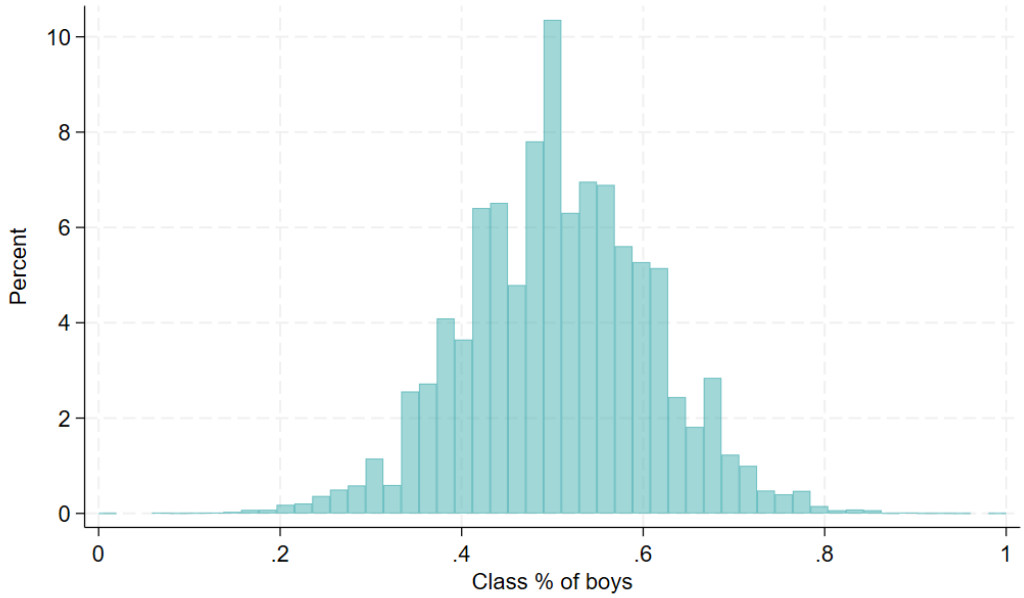
Table 14: **Share of male peers and reported mental health - Mediation analysis**

	Well		Calm		Content		Happy	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Class % Boys	-0.002*		-0.004***		-0.006***		-0.005***	
	(0.001)		(0.002)		(0.001)		(0.001)	
Girl X Class % Boys (1)		-0.002		-0.007***		-0.007***		-0.006***
		(0.002)		(0.002)		(0.002)		(0.002)
Boy X Class % Boys (2)		-0.003*		-0.002		-0.004*		-0.003*
		(0.002)		(0.002)		(0.002)		(0.002)
Victim index	-0.082***	-0.082***	-0.078***	-0.078***	-0.062***	-0.062***	-0.061***	-0.061***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
P-value of (1)=(2)		0.62		0.09		0.24		0.25
Dep. var. mean	0.84		0.74		0.79		0.81	
Dep. var. mean (Girls)		0.85		0.74		0.81		0.84
Dep. var. mean (Boys)		0.82		0.74		0.77		0.79
Observations	143260	143260	143260	143260	143260	143260	143260	143260

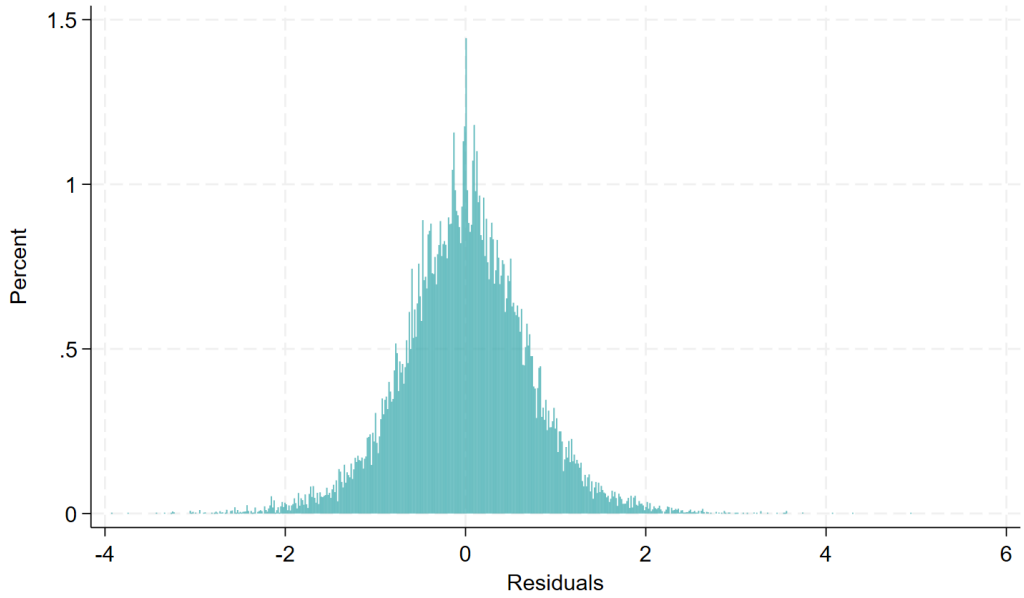
Notes: The Table presents the effect of an increase in the share of boys on four distinct dimensions of well-being: reporting to be well, calm, content, and happy. For each dimension, we construct a binary variable equal to 1 if students report experiencing that dimension frequently or very frequently, and 0 if they report experiencing it never or sometimes. We control for the victim index to verify whether it absorbs the *Class%Boys* coefficient. Estimates are also reported separately for boys and girls (even columns). We control for a dummy equal to one for boys and equal to zero for girls, the student's age in years, nursery and kindergarten attendance, migrant status, parental education. Each control variable is also interacted with the dummy boy. We also control for dummies equal to one for each missing covariate.Class size and school fixed effects are included in the model and are also interacted with gender. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.

Figure 1: **Share of boys's distribution**

(a) Distribution of the share of boys

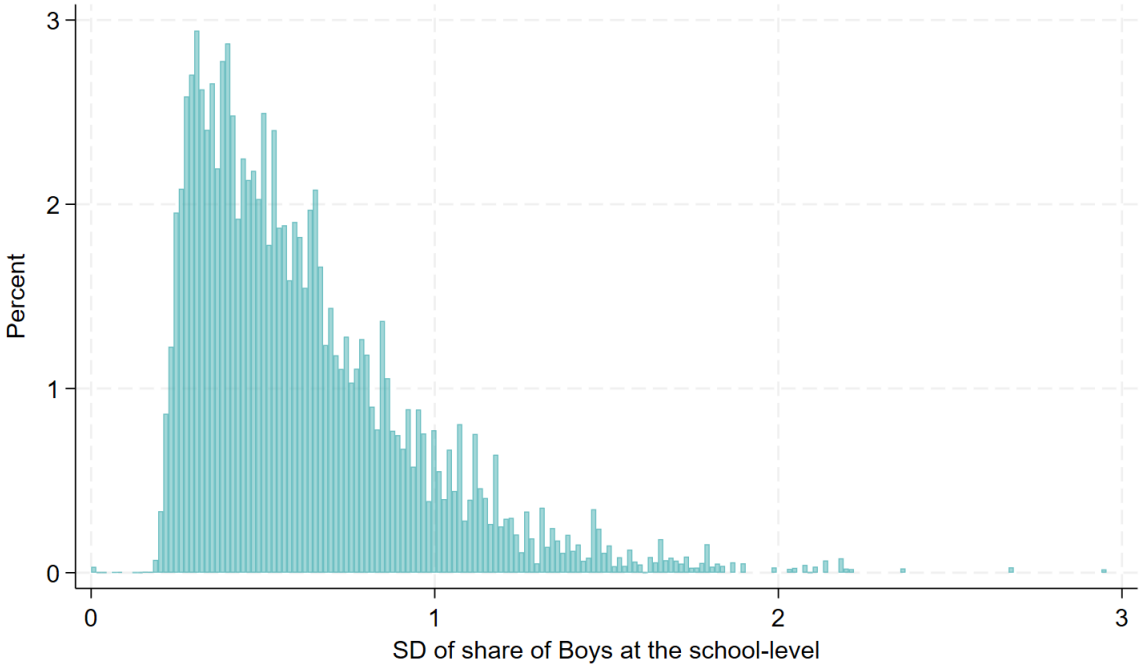


(b) Distribution of residuals



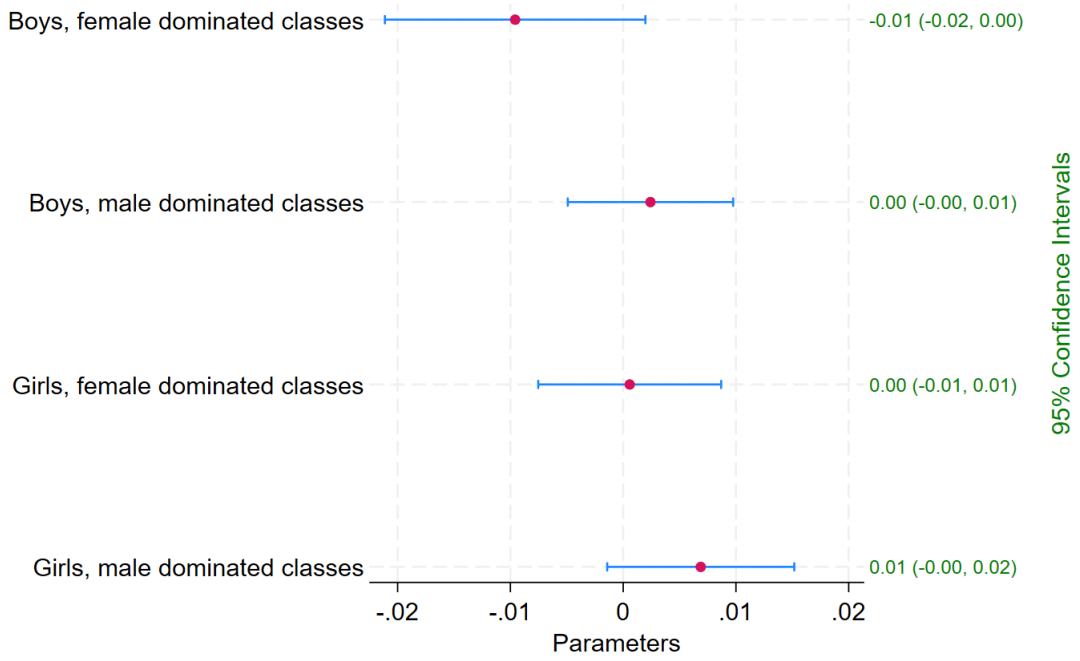
Notes: The figure illustrates the variation in the share of male peers used in the analysis. Panel A shows the distribution of the share of male peers, while Panel B presents the distribution of the residuals from a regression of the share of male peers on school fixed effects.

Figure 2: **Distribution of share of male peers's standard deviation**



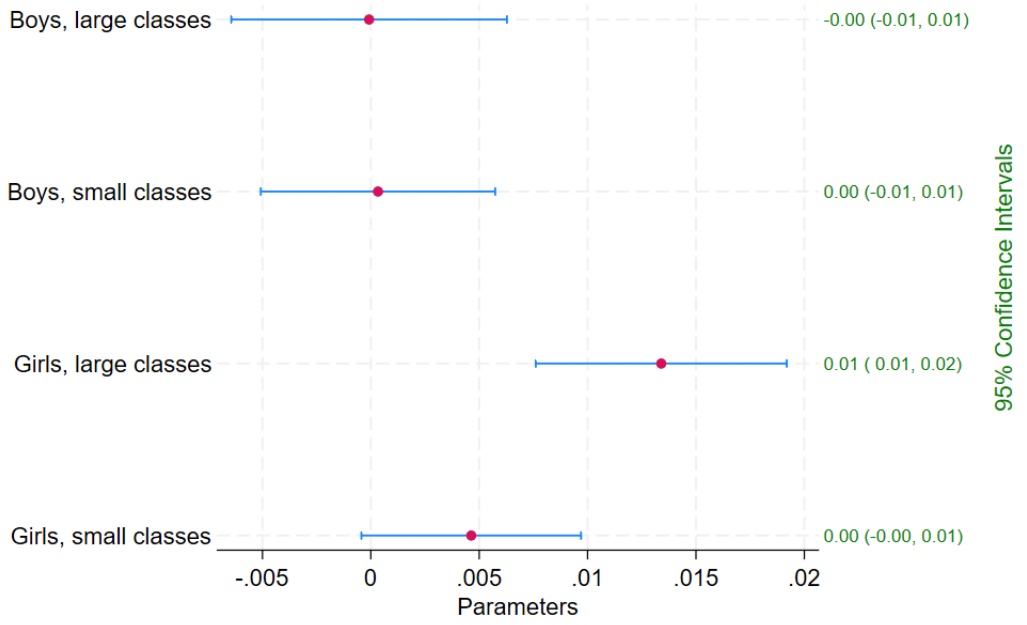
Notes: The figure displays the distribution of the standard deviation in the share of male peers within schools.

Figure 3: **Heterogeneity analysis: classes female vs male dominated**



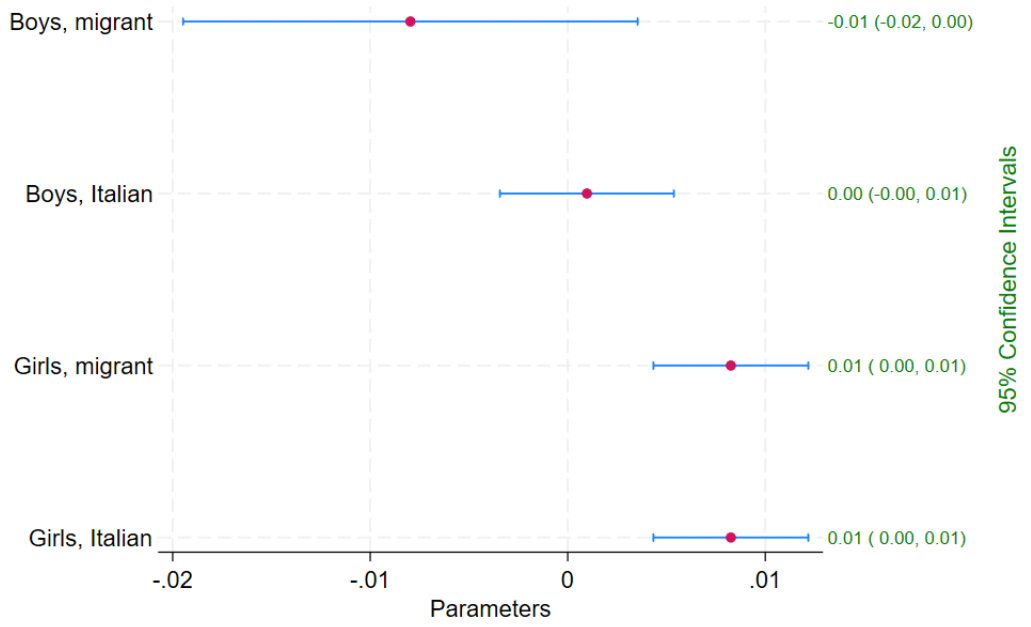
Notes: The figure plots coefficients from a triple interaction regression model. Bullying (a dummy 1 if experienced as a victim at least weekly) is regressed on the share of male peers, interacted with a binary indicator for classes female dominated (with share of boys below 50%). In the regressions we control for the student's age in years, nursery and kindergarten attendance, migrant status, parental education, class size, and school fixed effects. We interact all controls and fixed effects with students' gender. Standard errors are clustered at the classroom level.

Figure 4: **Heterogeneity analysis: class size.**



Notes: The figure displays coefficients from a regression model with a triple interaction. Bullying (a dummy 1 if experienced as a victim at least weekly) is regressed on the share of male peers, interacted with student gender and a binary indicator for classes with students' numerosity above the median value (i.e., 20 students per class). The regressions control for age in years, nursery and kindergarten attendance, migrant status, parental education, class size, and school fixed effects. All controls and fixed effects are interacted with student gender. Standard errors are clustered at the classroom level.

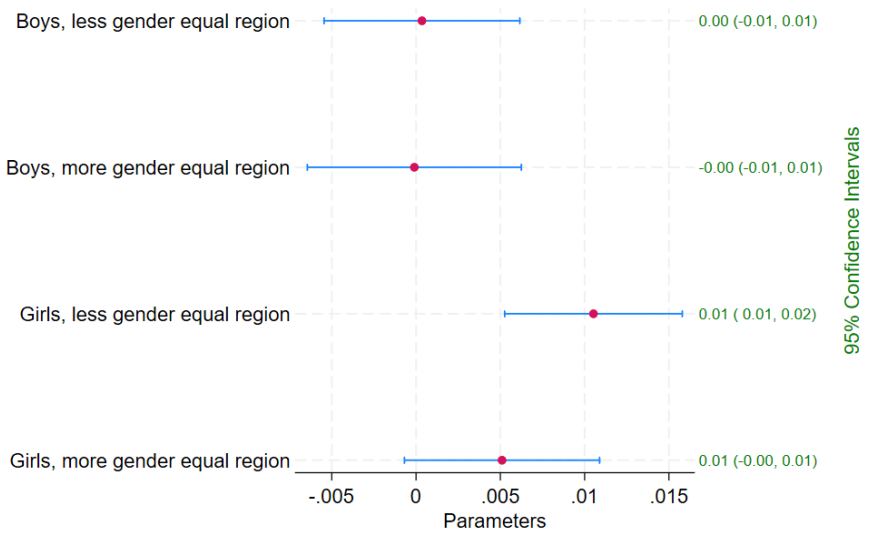
Figure 5: **Heterogeneity analysis: migrant status**



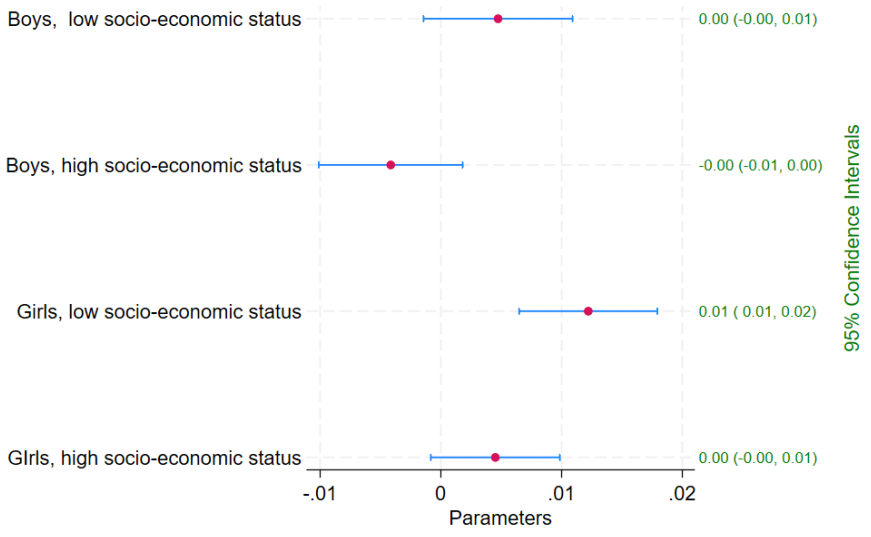
Notes: The figure displays coefficients from a regression model with a triple interaction. Bullying (a dummy 1 if experienced as a victim at least weekly) is regressed on the share of male peers, interacted with student gender and the migrant status. The regressions control for age in years, nursery and kindergarten attendance, migrant status, parental education, class size, and school fixed effects. All controls and fixed effects are interacted with student gender. Standard errors are clustered at the classroom level.

Figure 6: **Heterogeneity analysis: gender equality and socio-economic background**

(a) Gender Equality at regional level



(b) Socio-economic background at school level



Notes: The figure displays coefficients from two regression models with triple interactions. In Panel A, bullying (a dummy 1 if experienced as a victim at least weekly) is regressed on the share of male peers, interacted with student gender and a binary indicator for Italian regions with a gender equality index below the median. In Panel B, bullying is regressed on the share of male peers, interacted with student gender and a binary indicator for schools where the average parental socio-economic background is below the median (i.e., a socio-economic index of less than .0469). All regressions control for age in years, nursery and kindergarten attendance, migrant status, parental education, class size, and school fixed effects. All controls and fixed effects are interacted with student gender. Standard errors are clustered at the classroom level.

A Online Appendix

Table A.1: Construction of the sample

Step	Sample	N.Obs.
Step 1	Original population of students in INVALSI (grade 2, 2011-12)	522.693
Step 2	Removal of all schools with poor student longitudinal id	260.892
Step 3	Removal of schools with no variation in the share of boys	187.535
Step 4	Selection of trackable students from grade 2 to grade 5	174.087
Step 5	Selection of students who replied to the bullying questions	143.260

Notes. The table reports the the steps that lead to the selection of the sample used in the analysis, and the numerosity of the sample in each step.

Table A.2: **Correlation between being a boy, bullying and the other controls**

	Victim		Perpetrator	
	At least weekly	At least daily	At least weekly	At least daily
	(1)	(2)	(3)	(4)
Boy	0.076***	0.030***	0.068***	0.032***
	(0.002)	(0.002)	(0.002)	(0.001)
Mother: Primary school	0.045***	0.048***	0.039***	0.027***
	(0.011)	(0.009)	(0.008)	(0.006)
Mother: Middle school	0.030***	0.028***	0.017***	0.013***
	(0.005)	(0.003)	(0.003)	(0.002)
Mother: Vocational school	0.019***	0.015***	0.007**	0.006***
	(0.005)	(0.004)	(0.003)	(0.002)
Mother: High-school	0.006	0.005*	0.003	0.003**
	(0.004)	(0.003)	(0.002)	(0.002)
Mother: other above high school	0.024***	0.014**	0.003	0.004
	(0.008)	(0.006)	(0.005)	(0.003)
Father: Primary school	0.032***	0.054***	0.037***	0.024***
	(0.010)	(0.008)	(0.007)	(0.005)
Father: Midlle school	0.004	0.016***	0.008***	0.007***
	(0.005)	(0.003)	(0.003)	(0.002)
Father: Vocational school	0.003	0.015***	0.003	0.004*
	(0.006)	(0.004)	(0.003)	(0.002)
Father: High-school	-0.008**	0.004	-0.003	0.000
	(0.004)	(0.003)	(0.003)	(0.002)
Father: other above high school	0.012	0.011	0.006	0.005
	(0.010)	(0.007)	(0.006)	(0.004)
1st generation immigrant	0.048***	0.041***	0.021***	0.015***
	(0.009)	(0.007)	(0.006)	(0.004)
2nd generation immigrant	0.039***	0.031***	0.015***	0.009***
	(0.005)	(0.004)	(0.003)	(0.002)
Class size	-0.005*	-0.002	-0.003	-0.003**
	(0.003)	(0.002)	(0.002)	(0.001)
Age	-0.004*	-0.004***	0.001	0.001
	(0.002)	(0.001)	(0.001)	(0.001)
Attended pre-school	-0.015	-0.016**	0.003	0.001
	(0.010)	(0.008)	(0.006)	(0.005)
Attended daycare	0.023***	0.012***	0.008***	0.003***
	(0.003)	(0.002)	(0.002)	(0.001)
Missing citizenship	0.064*	0.071**	0.005	0.025
	(0.035)	(0.030)	(0.026)	(0.023)
Missing mother's education	0.011	0.011	0.010	0.008*
	(0.010)	(0.007)	(0.006)	(0.005)
Missing father's education	0.034***	0.037***	0.021***	0.017***
	(0.009)	(0.007)	(0.006)	(0.004)
Missing daycare info	0.014*	0.001	-0.002	-0.001
	(0.007)	(0.006)	(0.004)	(0.003)
Missing preschool info	0.003	-0.009	0.009	-0.001
	(0.014)	(0.011)	(0.009)	(0.006)
Constant	0.201***	0.106***	0.028**	0.007
	(0.021)	(0.014)	(0.013)	(0.010)
Dep. var. mean	0.21	0.11	0.07	0.03
Observations	122063	122063	122063	122063

Notes: The table display OLS regressions of bullying on control variables. From column 1 to 2, we focus on passive bullying (reported by victims). From column 3 to 4, we focus on active bullying (reported by perpetrators). We rely on different measures of bullying. In column 1 and 3, we define bullying with a dummy equal to one if reported aggressions occurred at least weekly, and zero otherwise. In column 2 and 4, we define bullying with a dummy equal to one if reported aggressions occurred at least daily, and zero otherwise. All the control variables are displayed. We also control for a dummy missing for each covariate. Class size and school fixed effects are included in the model. Standard errors in parenthesis clustered at the classroom level. *p<0.10, **p<0.05, ***p<0.01.