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ABSTRACT

# Combating LGBTphobia in Schools: Evidence from a Field Experiment in France*

This paper presents the first rigorous evaluation of school-based interventions aimed at reducing LGBTphobia. We focus on a classroom intervention that addresses the issue of LGBT harassment through perspective-taking and narrative exchange. Using a field experiment in France with more than 10,000 middle and high school students, we find robust evidence of strong positive effects, with variations across gender, age, and socio-economic status. We argue that changing perceptions of group norms is a key channel driving these heterogeneous effects.

**JEL Classification:** C93, J15, J16, J71
**Keywords:** LGBT, discrimination, social norms

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# 1 Introduction

Anti-LGBT harassment in schools is a global problem (UNESCO, 2016). In 2019, 60% of LGBT people surveyed in the EU said they had hidden their LGBT identity at school, and 4 out of 10 said they had been assaulted, threatened, or harassed at school because of their identity (European Union Agency for Fundamental Rights, 2020). Harassment and violence have pervasive effects on students. It poses a direct threat to the physical and mental health of the victim. In particular, bullying and violence can lead to higher rates of depression and suicidality among LGBT students (Denny et al., 2016; Humphries et al., 2021; Johns et al., 2020; Zaza et al., 2016). In particular, Marcotte and Hansen (2023) suggest that higher rates of victimization among LGBT people, explain some of the resurgence of the suicide crisis in the US. LGBTphobia and harassment in schools also harm educational outcomes: victimization and feelings of insecurity can affect grades, assiduity, orientation choices, and even lead to dropping out of school (Kosciw et al., 2013; McGuire et al., 2010). Bullying and harassment thus prevent LGBT students from optimally investing in human capital and getting high-skilled jobs, leading to a misallocation of talent and low productivity where LGBTphobia is more prevalent (Badgett et al., 2019; Badgett, 2020). In addition, the formation of beliefs and preferences at a very early age in school fosters conscious or unconscious biases against LGBT people in some students, which manifest as discrimination in many areas of social life, from the labor market to the housing market (Badgett et al., 2021). Achieving LGBTIQ+ equality would likely have important effects on macroeconomic performance. The OECD (2024), estimates that achieving full LGBTI+ equality in the US in 2024 would yield at least an immediate gain of 1% of the US GDP, that is, more than 250 billion dollars.

Several countries support civil society organizations working directly with students to raise awareness about LGBT inclusion in classroom sessions lasting a few hours (IGLYO, 2018). However, none of these interventions have been subject to a rigorous impact assessment. We ignore to what extent they contribute to reducing anti-LGBT harassment – and therefore whether they should be scaled up, given that they are currently only available in a handful of voluntary secondary schools. This paper presents the results of a groundbreaking randomized trial conducted in the Paris region of France from 2018 to 2022 among students aged 13-18 (grades 8 to 12) to measure the impact of sessions by *SOS homophobie*, the main French NGO fighting anti-LGBT discrimination and violence. Their interventions consist of two-hour sessions aimed at increasing the understanding of what being LGBT means, the

awareness of anti-LGBT harassment and its consequences, as well as strengthening students' willingness to provide the right kind of help to victims. The discussion with students is based on two main methods. First, it uses "counter-stereotypic imaging": participants are encouraged to reflect on members of both their group and the LGBT group who defy prevalent prejudice and stereotypes. Second, it puts the stress on "perspective taking" to foster empathy by prompting participants to walk a mile in the shoes of outgroup members. In doing so, the NGO strives to create a space where all students can express themselves freely.

Randomization is carried out among schools that call on *SOS homophobie* to intervene in their classes, and accept that students answer a short anonymous questionnaire on their perception of LGBT people – which is the case for more than two thirds of them. In the control group, the questionnaire is administered a few weeks *before* the *SOS homophobie* intervention, while in the treatment group, it is administered *after* either one month or three months after the intervention. These time frames are determined at random to verify if the impact of the intervention is lasting. Overall, more than 10,000 students in 510 classes from 75 schools participated in the trial.

First, in the absence of intervention, students' receptiveness to LGBT inclusion appears to be rather limited. Girls are more receptive, as are students from "privileged" schools, i.e., where the average social background is higher than the national average. The age of the students has no bearing on receptiveness. Moreover, there is less acceptance of transgender people than LGB people. On average, students perceive LGBT people assigned male at birth (AMAB, either gay or trans-women) more negatively than people assigned female (AFAB, either lesbian or trans-men). These results confirm previous standardized facts about LGBT+phobia.

Second, we find that the *SOS homophobie*'s intervention is transformative: it positively alters students' receptiveness to LGBT inclusion (+0.16sd), and this impact persists for at least three months after the session. Concerning its three main objectives (lifting taboos, raising awareness, and changing attitudes), the session has a positive effect on the first two and a null effect on the last. In particular, in middle schools (*collèges*), the session increases the level of LGBT awareness, while in high schools (*lycées*), the session is particularly successful in lifting the taboo around LGBT issues. Using data-driven methods (Chernozhukov et al., 2023), we find strong heterogeneity in the treatment effects. In particular, female students and those from "privileged" backgrounds appear more likely to benefit from the intervention. Furthermore, we find that the null effect of the session in changing attitudes is driven by large heterogeneity, as some students are negatively affected by the intervention

while others positively change their attitudes.

By allowing everyone to address a topic that is rarely discussed in the school setting, the sessions also expose students to the prevailing norm in their class. This mechanism can in principle strengthen (if the norm is rather in favor of the inclusion of LGBT individuals) or weaken (if the norm is rather against this inclusion) the impact of the *SOS homophobie*'s intervention, depending on whether the class's receptiveness to LGBT inclusion appears strong or weak to the students. Our study shows that negative group dynamics are less likely in schools where *SOS homophobie* has visited at least once in the last five years, suggesting the importance of repeated exposure of students to preventive activities.

There is s large literature devoted to the study of school-based interventions, most of which focus on bullying. Early meta-analyses did not find any significant impacts of such interventions (Merrell et al., 2008; Smith et al., 2004) on behavior, although they may increase awareness about harassment and its consequences. More recent meta-analyses have found more positive outcomes from anti-bullying interventions, in particular when related to sexual orientation or gender identity (Hall, 2017; Gaffney et al., 2019). Recent evaluation studies have focused deconstructing beliefs about STEM careers amongst female students (Prieto-Rodriguez et al., 2020; Breda et al., 2023; Falco and Summers, 2019), showing positive effects on career paths. The *SOS homophobie*'s intervention is related to anti-bullying and gender-focused programs in that it aims to change knowledge and beliefs. This paper shows that misconceptions can be changed among school-aged youth even on topics as sensitive as sexual orientation and gender identity.

This paper adds to the literature evaluating brief school-based interventions against LGBTphobia more specifically. Most of the evaluations of interventions from civil society organizations have focused on small samples and/or used pre-post analyses (Burford et al., 2013; Eick et al., 2016). To the best of our knowledge, this is the first ever large-scale randomized controlled trial to provide novel causal evidence about the benefits of this kind of intervention. We show that brief interventions can be effective in shifting attitudes and perceptions of students about LGBT people. By examining the heterogeneity of treatment effects and possible mechanisms, we also provide a new perspective on how these interventions may affect group dynamics.

Our work also relates to the literature on perspective-taking approaches to shift attitudes and behaviors. Among various techniques, perspective-taking is considered an effective tool for diversity training, promoting tolerance, and combating prejudice. In this type of intervention, the treated individual is not given pure information but participates directly and

indirectly. First, there is a narrative exchange, i.e. a conversation in which the speaker and the receiver share their different experiences. Second, the receiver is commonly asked to compare these experiences and therefore put herself or himself in the speaker's shoes. By relating LGBT experiences to other experiences and putting themselves in "their shoes," the receiver can further empathize and change some prejudiced views (Paluck et al., 2021; Lindsey et al., 2015). This method has proven effective in combating prejudice and attitudes toward LGBT people. Kalla and Broockman (2020, 2016) study the effects of one-on-one conversations between volunteers and American voters. They show that when voters are asked to exchange narratives and, directly or indirectly, put themselves in the shoes of minorities, they are more prone to support legislation in favor of LGBT people. In this paper, we confirm that narrative exchange and perspective-taking are effective methods in the school environment, a place that is fundamental for the development of adolescents, and where LGBTphobia is still extremely pervasive. Other interventions have shown that this approach can also be successful for various groups in the school context. Notably, Alan et al. (2021) show that perspective-taking benefits cohesion between Turkish students and Syrian refugees.

Finally, this experiment refers to brief interventions that attempt to change social norms about gender. In developing countries, researchers have often studied how to change gender norms and perceptions to influence girls' and women's choices about education, employment and contraception to promote gender equality and women's empowerment (Bandiera et al., 2020; Edmonds et al., 2023; Ashraf et al., 2020; Sharma, 2022; Dhar et al., 2022; Bursztyn et al., 2018). Across countries, recent studies have focused on changing perceptions of women in male-dominated fields (Breda et al., 2023; Del Carpio and Guadalupe, 2022; Porter and Serra, 2020). Here we explore other social norms related to gender and also sexual orientation, where there is much room for improvement in both developed and developing countries. Most research on field experiments on social norms focuses on developing countries, where budgetary and legal constraints are less restrictive. We therefore also contribute to this debate by examining a large-scale social norms intervention in a developed country. In explaining our results, we consider the interaction between peer pressure, social norms, and personal views. In doing so, we build on the literature on pro-social behavior and social reputation (Bénabou and Tirole, 2006; Bursztyn et al., 2020; Sharma, 2022). Specifically, we argue that the intervention in the classroom makes the group norm salient, encouraging students to engage in pro-social behavior. This phenomenon may be beneficial if interventions repeat over time. However, in some settings where the group norm is rather LGBTphobic, it could have detrimental effects.

The following section introduces *SOS homophobie* and its school-based interventions. Section 3 describes the conceptual framework. Section 4 presents the randomization procedure and main specification. Section 5 gives stylized facts in the control group. In Section 6, we expose the primary results and treatment effect heterogeneity, and possible mechanisms. Section 7 concludes.

# 2 Background

For almost 20 years, *SOS homophobie* has been going into secondary schools in mainland France that request its services and speaking to students aged 12-18. Over the past five years, an average of 30,000 pupils per year have participated in its preventive activities, which are carried out under an agreement with the French Ministry of Education for "educational associations that complement public education".

*SOS homophobie*'s sessions are based on a universalistic approach, grounded in respect for human rights. The aim is to engage students in the fight against anti-LGBT harassment, i.e., to strengthen their willingness to help victims and to develop their capacity to provide the right kind of help, in particular by making them aware the risks associated with outing victims of harassment and thereby putting them at even greater risk. To encourage this engagement, the sessions use two main methods. First, they create a better understanding of what it means to be LGBT, which involves presenting the different groups designated by this acronym, understanding the difference between sexual orientation and gender identity, and challenging many common misconceptions like (i) being LGBT is not a choice – sexual orientation and gender identity are not chosen by individuals but are imposed on them, and thus attempting to "convert" LGBT people to heterosexuality and/or cisgender identity are not only doomed to failure but also a serious violation of their human rights –, (ii) being LGBT is not an illness – it is not a perverse condition likely to corrupt the moral integrity of people who associate with LGBT people nor is it a psychological disorder – and (iii) the LGBT population is diverse – like non-LGBT people each LGBT person is unique. The typical stereotypes, about the appearance of LGBT people, for example, are therefore unfounded. Second, the intervention aims to raise greater awareness of the consequences of anti-LGBT harassment, by presenting real-life cases of bullying that students can easily identify with and therefore empathize with.

By going into schools, the association aims to combat verbal and physical aggression

against students because of their real or assumed sexual orientation or gender identity. Each session lasts two hours and is facilitated by volunteers who work in pairs after having been trained and certified by the association. The format of the session is designed to create a safe space where students can express themselves freely. The volunteers sit in a circle with the students and all together they define the rules of the discussion, in a process of co-construction that establishes some simple rules (being kind, taking turns to speak, and the need for confidentiality) which allow everyone to express themselves without any fear of being judged. Students can also note any questions and/or reactions anonymously on pieces of paper provided by the volunteers, who read and respond to some of them at the end of the session. Students often take the opportunity to ask the volunteers about their sexual orientation and/or gender identity. As a result, many sessions end with at least one of the volunteers coming out to the students. This is an important moment that allows the students to confront their prejudices and the volunteers to give a moving account of the difficulties they faced in accepting themselves and being accepted by their friends and family.

This process is reinforced by the structure of the session, which opens with a discussion on discrimination during which students realize that anti-LGBT discrimination is no different from discrimination against other groups, in that it is based on prejudices and stereotypes (in this case sexist) that have no other purpose than to demean the targeted group , just like prejudices and stereotypes based on appearance (racism, fatphobia, Islamophobia, etc). This step helps create a sense of empathy for LGBT people, especially among (the many) students who have experienced the same alienation as victims of anti-LGBT harassment. This approach ensures that the narrative exchange and perspective-taking methods described in Section 1 take place.

*SOS homophobie*'s sessions also provide an opportunity to inform victims of anti-LGBT harassment about the support that the association can offer them. At the end of the session, the volunteers distribute the information leaflet "*C'est comme ça*" which includes the helpline number and the e-mail address of the association's online chat service.

# 3 Conceptual Framework

A large body of literature, primarily in social psychology, explains prejudice against outgroups and how to reduce it. In the seminal work on intergroup theory, Sherif and Sherif (1953) analyze prejudice prevalence by focusing on both the ingroup and outgroup bonds.

Pettigrew (1998) reformulates this theory by putting the accent in two main channels for prejudice formation: individual differences and societal norms. They argue that prejudice may be caused, in part, by misinformation and stereotypes, but there are more complicated mechanisms that make it more difficult to resolve than simply providing information. Since perceived individual differences are a crucial component of prejudice, interventions aimed at reducing prejudice may then attempt to narrow these differences between the audience and the outgroup. Some of these interventions are rooted in the contact theory, developed by Allport (1954), which identifies four conditions for successful interventions: equal status between groups, common goals, positive contact, and the support from authorities. Clochard (2024) presents a review of such interventions and an experiment that defies the importance of the common goal condition. Contact interventions between LGBT and cis-hetero students may be costly and cumbersome to implement, so another approach is to use diversity training interventions to address these issues. Paluck (2006) explores how diversity training relates to intergroup contact theory and calls for an experimental approach to studying these interventions. *SOS homophobie*'s interventions fall between intergroup contact and diversity training since the speakers belong to the LGBT community, but only one or a few talk to a large group of students. Moreover, the intervention is primarily focused on LGBT and gender issues, so the common goal and equal status conditions are not met by design. In this context, interventions rely on other theoretical and experimental insights to reduce the difference between the subjects and the outgroup group, which in this case is represented by the speaker.

As noted in Section 1, some interventions use a perspective-taking approach to reduce the gap between the subject and the speaker. Galinsky and Moskowitz (2000) show that by creating an overlap between the self and the other, perspective-taking reduces internal biases and changes attitudes and behaviors that might be consciously or unconsciously biased. Therefore, in diversity training, it is not only the information that can induce prosocial behavior but the process by which the audience relates to the outgroup and compares their experiences. Itzchakov et al. (2017) emphasize the importance of a nonjudgmental approach when exchanging narratives and opinions to reduce prejudice. These two strategies, both advocated by *SOS homophobie*, help to establish some equality of status between the speaker and the subject, which makes the student more receptive to any information and helps combat prejudice against the outgroup. Therefore, we may anticipate positive results from the intervention since it relies on theoretical and empirical work in social psychology about the good practices to reduce prejudice.

It is nonetheless possible that interventions aimed at reducing prejudice may generate some unexpected backlash. Ku et al. (2015) stipulate that whenever the subject highly identifies with the ingroup, perspective-taking interventions may have perverse effects as identification with the outgroup becomes more complicated. Similarly, Legault et al. (2011) show that subjects seeing the intervention and the motivation to reduce prejudice as purely external may increase biased and hostile behavior. These results rest on several theories about prosocial behavior. First, group norms remain crucial to the study of prejudice. Crandall et al. (2002) show that group identification is essential in explaining prejudice. During adolescence, schools are a primary socialization environment, so students tend to identify as part of their class. If LGBTphobia, or prejudice in general, is a fundamental norm within the classroom, interventions may create a backlash that pushes students to further identify with their classmates. Individuals often have biased or inaccurate perceptions of social norms (Bursztyn and Yang, 2022). Changing societal norms to reduce prejudice thus entails shifting the perception of these norms (Tankard and Paluck, 2016). Therefore, interventions may have a perverse effect if the group has strong prejudice against the outgroup and some students are unaware of this norm. In this case, the intervention can make a negative group norm more salient, causing students to adapt their behavior and attitudes correspondingly. In addition, the nonjudgmental approach may provide an environment in which stereotypical and hostile comments are "allowed", thus shifting perceptions about the group norm. Second, it is possible that, regardless of the group norm, students intensify their prejudice if they view the intervention and the speaker as external factors trying to control their attitudes and behaviors. In his seminal work, Brehm (1966) introduces the notion of "psychological reactance", referring to the phenomenon in which an individual experiences a threat to their freedom and acts in a contradictory manner to restore it. Steindl et al. (2015) provide a review of studies on reactance and the different types of threats that individuals may face and their respective responses. In the case of *SOS homophobie*, students may perceive positive LGBT attitudes as an external imposition constraining their freedom, which may lead to further LGBTphobic behavior. Section 6.3 explores the existence of such perverse effects in this intervention.

# 4 Data and Empirical Setup

In the fall of 2018, the OECD and *SOS homophobie*, with the support of the French Ministry of Education and the Interministerial Delegation for the Fight against Racism, Anti-Semitism and Anti-LGBT Hatred (DILCRAH), launched the first large-scale randomized trial to evaluate the impact of school-based interventions aimed at fighting homophobia and transphobia. The trial took place between 2018 and 2022 in middle and high schools (*collèges* and *lycées*) in Paris and the Ile-de-France region (or the "Paris region", home to one-fifth of the French population). The trial took place over the following three academic years: 2018-2019, 2019-2020, and 2021-2022. Due to the COVID-19 pandemic, the trial was suspended from spring 2020 to summer 2021 inclusive. To minimize the cost of conducting the trial, it was decided to focus on one region of mainland France. The Paris region was a natural choice as it has the highest annual number of students attending sessions by *SOS homophobie*. The trial protocol consisted of two stages:

1. Schools that contacted *SOS homophobie* to organize sessions with some of their classes were asked to participate in the trial, which involved giving 30 minutes of class time to students attending the session to answer a short, anonymous questionnaire, administered in the classroom by research assistants about their perception of LGBT people.

2. Schools that agreed to participate in the trial were divided into two groups in a random draw:

    - In the control group, the questionnaire was distributed a few weeks before the *SOS homophobie*'s session.
    - In the treatment group, the questionnaire was distributed after the session, with two time frames tested: one month and three months after the session. These time frames were determined by a random draw.

The schools that contacted SOS homophobie to intervene differ from other schools in the Paris region. On average, they are schools with fewer French students and more vulnerable in terms of the average social position index, hereafter SPI (see Table A.1 in the Appendix).[1]

[1]The SPI, or IPS in French (for *indice de position sociale*) is an index built by the Department of Evaluation, Foresight, and Performance (DEPP in French) using the professional categories of students' parents or guardians. The SPI is mainly used to compare the socioeconomic and cultural backgrounds of different schools. Its values go from 45 to 185.

Furthermore, among those who contacted the organization, schools that agreed to participate in the randomized trial are, on average, more vulnerable, more likely to be middle schools, and have had more interventions in the previous five years (see Table A.2 ). These differences may introduce some bias when generalizing our results. As we show in Section 6, more vulnerable schools as well as middle schools are associated with weaker, and sometimes, negative effects of such interventions. Our estimate may thus provide a lower bound for a generalized intervention, although one should be cautious when inferring over the whole population. In particular, schools with more interventions in the previous years are more likely to have positive results from new interventions, and they are overrepresented among the schools that decide to participate in the trial.

The two timings for the adminsitration of the questionnaire in the treatment group are intended to check whether the results are still valid in the medium term. Schools where sessions with *SOS homophobie* were scheduled after May 15 were automatically assigned to the control group, as it was no longer feasible to organize the administration of the questionnaire after June 15, due to the proximity to the end of the academic year (which, depending on the school and the academic level, is between mid-June and early July). We excluded these schools from the main sample, because they were not randomized. Similarly, some schools that were assigned to the treatment group could not participate due to the COVID-19 pandemic, . We also exclude schools in the control group that if assigned to the treatment group they would have been excluded because of the pandemic. This means that we exclude all schools that responded to the questionnaire between December 16 2019 and March 16, 2020. Schools that are excluded from the final sample are described in Table A.3. They do not have any different characteristics from the schools that were properly randomized. Therefore, we use the full sample as a robustness check.

A high proportion of the schools which contact *SOS homophobie* agreed to participate in the trial (69%). A total of 10 356 students in 510 classes from 75 academic institutions (of these 75 institutions, 62 participated over one year in the trial, 11 over two years, and 2 over three years) completed the questionnaire: 5 794 before *SOS homophobie*'s session (control group) and 4 562 after the session (treatment group). The completion of the questionnaire was achieved in 88% of the classes (totaling 89% of the students participating in the trial). The research assistants responsible for administering the questionnaire did not observe any unruly behavior, such as chattering, giggling, or commenting aloud on certain questions. This attitude was the same in the control group as in the treatment group. Only 18 of the 75 schools were high schools. This underrepresentation is due to two factors: (i) less

than a third (31%) of the schools which contacted *SOS homophobie* were high schools; (ii) the trial participation rate was lower among high schools (55%) than among middle schools (76%), because the preparation of the Baccalauréat exams (the French high-school diploma) in the two upper grades limited the time that high schools could devote to activities that were not strictly academic. When excluding the schools that were not randomly assigned, as well as the control schools that would not have participated if they had been assigned to the treatment because of COVID, our core sample is reduced to 50 schools. Seven of these schools participated in two waves of the experiment, and one school participated in all three waves. When intervening in a school for several years, SOS homophobie always does so in the same grade, so only students who repeat a grade can be exposed to multiple interventions. Our final sample consists of 6,377 students, with 2,490 and 3,887 in the control and treatment groups, respectively. This sample is described in Table A.4 in the Appendix. Balance checks confirm that the random draw standardized the profile of the students, classes, and schools in the control and the treatment groups. The only exception is the proportion of schools in the third wave of the experiment. This figure is higher for the treatment group (55%) than for the control group (26%). This difference is likely driven by chance, since in the third wave of the experiment (after COVID-19), the number of control schools drawn is rather small (5 out of 27). This difference is mainly due to chance, since in that year most schools were assigned to the treatment, and within the control group, a majority of them had their intervention after May 15, so they were excluded from the main analysis.

To further support the interpretation that differences in the questionnaire responses between the control and treatment groups stem from the impact of the *SOS homophobie*'s intervention, measures were taken to ensure that students were not aware that they were participating in a randomized trial, as this information could generate experimenter demand effects. Indeed, if they were aware they might be tempted to deliberately alter their response to the questionnaire, depending on whether they were in the control or treatment group, in order to produce results that confirmed or contradicted what they believed to be the research assumptions of the trial's organizers. Accordingly, the questionnaire was presented as independent of the *SOS homophobie*'s session, regardless of whether it took place before (treatment group) or after (control group) the distribution of the questionnaire. In particular, in a letter to parents distributed by the schools before the administration of the questionnaire (in which parents could fill in and sign a section if they did not want their child to answer the questionnaire), the questionnaire was presented as "a survey on perceptions of discrimination" as part of the "actions carried out by the OECD to prevent

violence at school", but without mentioning the involvement of *SOS homophobie*. The efforts to ensure that students did not make a connection between the questionnaire and the *SOS homophobie*'s session were successful. None of the students in the control group (where the questionnaire was administered before the *SOS homophobie* session) mentioned the questionnaire to the *SOS homophobie* volunteers who conducted the session. This last point also implies that differences in the responses to the questionnaire between the control and treatment groups cannot be attributed to differences in the behavior of the volunteers (e.g., volunteers who engaged more with classes in the treatment group than with classes in the control group) since the volunteers did not know which classes belonged to the control group and which to the treatment group, as they were not given this information by the students or by any other stakeholder in the trial, precisely to avoid any bias. The acceptance rate to the questionnaire further confirms that the students perceived its administration as unrelated to the *SOS homophobie*'s session. Indeed, the proportion of students whose parents did not object to their participation was 98% in the classes in the control group and the treatment group. Finally, students provided their responses anonymously, which allowed us to further mitigate social desirability bias, i.e., responding in a way that conforms to what is expected from them.

To avoid any remaining bias, the results presented in this paper are based on an econometric analysis that eliminates the effect of the characteristics reported in Table A.4, and in particular the effect of differences in these characteristics between the control and the treatment groups.

In particular, we estimate:

$$Y_{itsc} = \delta D_{ts} + X'_{itsc}\beta + \varepsilon_{itsc} \tag{1}$$

where $Y_{itsc}$ is an outcome variable (in general, an index), $X_{itsc}$ is a vector of covariates at the student level (gender, age), class level (proportion of girls, track for high-schools), school-year level (average socio-economic position, wave fixed-effects, number of interventions in the previous 5 years, proportion of French students), and school level (being located in a disadvantaged "QPV", high-school dummy, academy dummies (Paris, Versailles or Créteil), being part of an educational priority network "REP" or "REP+" for middle schools). Errors are clustered at the school-year level, and $D_{ts}$ is equal to 1 if school $s$ was treated in year $t$.

To check the prevalence of lasting impacts we also estimate

$$Y_{itsc} = \delta_1 D_{1month,ts} + \delta_3 D_{3months,ts} + X'_{itsc}\beta + \varepsilon_{itsc} \quad (2)$$

Since the timing of the questionnaire is not exact, we consider $D_{1month,ts} = 1$ if the questionnaire takes place after the intervention, but before one and a half months have passed. If more than one and a half months have passed we consider $D_{3month,ts} = 1$. Moreover, three schools that were assigned to take the questionnaire three months after the intervention, responded before the one-and-a-half-month threshold. We propose, in Table A.10 in the Appendix, a LATE identification strategy, which gives similar results.

We focus on 10 different outcomes of the intervention. These outcomes are created from the students' responses to the questionnaire. Each outcome corresponds to a different objective of *SOS homophobie*. They are grouped into three main categories:

- *Taboo* on LGBT issues, i.e. the ability to discuss (i) within one's closed circle; and (ii) with school staff
- Level of LGBT *awareness* about the facts that (iii) being LGBT is not a choice; (iv) being LGBT is not a pathology; (v) there is diversity among LGBT people; (vi) there are psychological consequences of anti-LGBT harassment for the victims; (vii) there are legal consequences of anti-LGBT harassment for the; (viii) there are good and bad ways to help the victim
- *Attitude* towards LGBT people: (ix) willingness to defend the victim of anti-LGBT harassment; and (x) attitude towards LGBT people one meets or knows.

To estimate the overall effect of the *SOS homophobie* interventions we aggregate the responses to the questions related to each of these ten outcomes using an inverse-covariance weighted index (Anderson, 2008). The questions related to each outcome are presented in Tables 1-3. The questionnaire is provided in the Appendix.

# 5 LGBT-phobia prevalence before the intervention

Whether an intervention against LGBTphobia is necessary in the first place seems a fair question. We thus exploit the data collected in the control group to investigate what is the situation before the intervention. In this section, we focus on specific outcomes: since we are

not looking at the effect of the intervention, we are less concerned by multiple hypothesis testing. However, we organize the discussion around the three broad categories defined above (i) Do students talk about LGBT issues (taboo)? (ii) What is their level of awareness? (iii) What are their attitudes towards LGBT people?

## 5.1 Taboo about LGBT issues

We asked students if they had ever discussed about homosexuality, bisexuality, or trans issues with their families, best friends, classmates, school staff, or other people. These variables allow us to examine the extent to which LGBT issues are taboo or not. Table 1 summarizes the relationship with key dimensions, such as gender, age, and socio-economic status. It turns out that about 40% of the students have discussed homosexuality, bisexuality, or being transgender with a family member, and about half with friends or classmates.[2] Girls are about 50% more likely than boys to discuss this topic with family, friends, other students, and educational staff than boys are. Students in higher-SES schools are also more susceptible to discuss sexual and gender identity issues openly (one-third more likely than students in lower-SES schools). Such openness is also more frequent among students over the age of 15 than among younger students. Across all groups, students are on average 4 to 5 times more likely to talk to family, friends, or fellow students than to school staff, which may have implications on on the nature of information and views conveyed in these conversations.

**Stylized fact 1** *Students are more likely to talk about LGBT issues with people close to them.*

**Stylized fact 2** *Girls, high-SES, and older students are more likely to talk about LGBT issues.*

## 5.2 Awareness

Awareness of LGBT-related issues is measured by several questions that focus on knowledge of the LGBT population, anti-LGBT harassment, and legislation. It is important to consider this category separately because it focuses on questions that are related to knowledge: a

[2]The French counterparts of "homosexuality" and "homosexual", *homosexualité* and *homosexuel*, respectively, are not considered derogative or outdated, as they might be in the English language.

Table 1: Taboo about LGBT issues in the control group

| | Overall Mean | Girls−Boys | Old−Young | High SES−Low SES |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Close circle | | | | |
| *Discusses LGBT issues with ...* | | | | |
| ... *their family* (Q12a) | 0.415 | 0.170*** | 0.124** | 0.167*** |
| | | (0.024) | (0.053) | (0.045) |
| ... *their best friend* (Q12b) | 0.525 | 0.223*** | 0.127** | 0.146*** |
| | | (0.020) | (0.049) | (0.048) |
| ... *a fellow student* (Q12c) | 0.499 | 0.179*** | 0.097* | 0.131*** |
| | | (0.018) | (0.047) | (0.044) |
| School staff | | | | |
| *Discusses LGBT issues with ...* | | | | |
| ... *school staff* (Q12d) | 0.107 | 0.032** | −0.023 | −0.032* |
| | | (0.014) | (0.020) | (0.016) |

*Notes:* This table reports descriptive statistics about the prevalence of taboos around LGBT issues in the control group. Column 1 gives the overall mean for each variable across 2,490 students in the control group for the fully-randomized sample. Columns 2-4 show results from Student t-tests when comparing answers of students in the control group by gender, age, and SES, respectively. For age and SES, the cutoff used for comparison is the median value in the control group. For Column 3, "old" students are strictly older than 15 years. For Column 4, "High SES" students go to a school with an average SES (ISP index) strictly higher than 92.76. Standard errors clustered at the school×year level in parenthesis.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

change in response does not require a change in actual behavior. We zoom in on the six aspects mentioned above in Table 2.

Knowing that being LGBT is not a choice, is not a given. About 60% of students say so about being lesbian, gay, or bisexual, and 50% about being transgender. Girls tend to be more aware than boys, at least about being LGB. Knowing that being LGBT is not a pathology seems more widespread. 80% of students or more recognize that being gay or lesbian is not something you become by associating with other gays or lesbians; the same goes for knowing that gays, lesbians and bisexuals are no less faithful than straight individuals. Hence, these dimensions have little room for improvement during the intervention.

Knowledge about the diversity of the LGBT population is more heterogeneous. The vast majority of students know that bisexuality is a category of its own, and more than two-thirds recognize that you cannot necessarily tell if a girl is lesbian by the way she looks. However, stereotypes about gay men are stronger with only about 40% saying that you cannot tell a gay man apart by his "style", gestures, behavior, or clothing.

Awareness of the negative consequences of anti-LGBT harassment is strikingly low, with only 16% of students citing all the potential consequences on sadness, self-confidence, isolation and romantic involvement, educational attainment, psychological state and risk of suicide. This is one of the few areas where girls do not fare better than boys. Therefore, there is a large margin for improvement in this dimension. Similarly, only a small minority of students (27%) know the best ways to help an LGBT student who is being bullied (i.e., to talk to the victim, to the classmates who bully, or to the school staff, rather than talking to the family or friends).

About half of the students (55%) know that the law severely condemns anti-LGBT harassment, and more frequently boys than girls (maybe because they have been told so more often). In general, girls seem to be more aware than boys of what it means to be LGBT, if we exclude the consequences of LGBT harassment. But neither age nor socioeconomic conditions significantly influence this dimension, as opposed to taboo.

**Stylized fact 3** *Girls are more aware than boys of what being LGBT means, except for the consequences of LGBT harassment.*

**Stylized fact 4** *A large majority of students consider that being LGBT is not pathological.*

**Stylized fact 5** *Only a minority of students understand the full range of consequences of anti-LGBT harassment.*

Table 2: Level of LGBT awareness in the control group

| | Overall Mean (1) | Girls−Boys (2) | Old−Young (3) | High SES−Low SES (4) |
|---|---|---|---|---|
| Choice | | | | |
| *Says that it is not a choice ...* | | | | |
| *... to be LGB* (Q3) | 0.588 | 0.162*** | 0.009 | 0.062 |
| | | (0.024) | (0.045) | (0.041) |
| *... to be transgender* (Q9) | 0.496 | 0.063** | 0.020 | 0.052* |
| | | (0.024) | (0.027) | (0.027) |
| Pathology | | | | |
| *Says that being LG is not contagious* (Q4) | 0.857 | 0.130*** | −0.013 | 0.042* |
| | | (0.018) | (0.024) | (0.022) |
| *Says that straight people are not...* | | | | |
| *... more faithful than LG* (Q6) | 0.927 | 0.039*** | 0.009 | 0.013 |
| | | (0.013) | (0.018) | (0.019) |
| *... more faithful than B* (Q7) | 0.801 | 0.081*** | −0.026 | 0.023 |
| | | (0.022) | (0.031) | (0.029) |
| Diversity | | | | |
| *Says that one cannot recognize...* | | | | |
| *... a L by her style* (Q5a) | 0.684 | 0.112*** | −0.019 | 0.017 |
| | | (0.029) | (0.028) | (0.031) |
| *... a G by his style* (Q5b) | 0.424 | 0.104*** | −0.106** | 0.047 |
| | | (0.026) | (0.039) | (0.060) |
| *Says that a B is not a closeted LG* (Q8) | 0.803 | 0.106*** | 0.027 | 0.084*** |
| | | (0.020) | (0.034) | (0.028) |
| Negative consequences of anti-LGBT harassment | | | | |
| *Says that sadness, lack of self-confidence, self-isolation, romantic breakup, school failure, risky behaviors, depression, and suicide are **all** possible issues of anti-LGBT harassment* (Q19) | 0.160 | 0.011 | 0.057** | 0.014 |
| | | (0.013) | (0.023) | (0.026) |
| Legal consequences of anti-LGBT harassment | | | | |
| *Says that the law severely condemns anti-LGBT harassment* (Q21) | 0.553 | −0.146*** | 0.043 | 0.018 |
| | | (0.025) | (0.035) | (0.033) |
| How to aid a victim | | | | |
| *Percentage of good ways to help selected rather than those outing the victim* (Q18) | 0.269 | 0.112*** | 0.010 | 0.032 |
| | | (0.018) | (0.020) | (0.019) |

*Notes:* This table reports descriptive statistics on the awareness level about LGBT issues in the control group. Column 1 gives the overall mean for each variable across 2,490 students in the control group for the fully-randomized sample. Columns 2-4 show results from Student t-tests when comparing answers of students in the control group by gender, age, and SES, respectively. For age and SES, the cutoff used for comparison is the median value in the control group. For Column 3, "old" students are strictly older than 15 years. For Column 4, "High SES" students go to a school with an average SPI strictly higher than 92.76. Standard errors clustered at the school×year level in parenthesis.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

## 5.3 Attitude

Questions related to attitudes refer to reactions and the willingness to act in situations involving LGBT individuals. In particular, students were asked if they would be willing to defend a person in their class who is rejected, under five different modes: that person is mocked, insulted in the schoolyard, insulted on social media, ostracized, or beaten up. Students mentioned their willingness to help in 85% of these situations on average, with girls being slightly more prone to intervene than boys. The willingness to defend was stronger in the case of physical violence, but somewhat weaker in the case of ostracism. Overall, the willingness to defend LGBT students is another dimension where the room for improvement is rather limited.

Reactions during interactions with LGBT individuals in daily life are more heterogeneous. About two-thirds of students think that one should help a transgender person in an effort to be recognized as a man or woman, again with girls slightly more prone to help than boys. In addition, only half of the students have the same reaction to a lesbian or gay couple kissing in the street as they would to a heterosexual couple, with girls more likely than boys to feel comfortable, especially when it comes to a gay couple. About two-thirds of students feel just as comfortable sitting next to an LGB classmate in the cafeteria as next to a straight classmate, again with girls being 50% more likely to feel as comfortable when sitting next to gay or bisexual male classmates than their straight counterparts.

Attitudes towards the people in one's immediate circle are more positive. Three-quarters of students would keep their best friend if she came out as lesbian, and two-thirds if the best friend is a male coming out as gay. But again the difference in the latter case between girls and boys is striking: only half of the boys would keep a gay as their best friend compared to 88% of the girls. This is in line with findings from earlier work (Valfort, 2017; OECD, 2019).

Strikingly, age does not significantly influence responses to questions related to attitudes towards LGBT people, whereas the socio-economic situation does (although usually to a lesser extent than gender). Students from higher SES schools tend to be less sensitive to the sexual orientation of their classmates than those from lower SES schools.

**Stylized fact 6** *A large majority of students report a willingness to defend classmates who are rejected.*

**Stylized fact 7** *Attitudes toward AMAB LGBT people are more often negative than toward AFAB, mostly due tothe reaction of male students.*

**Stylized fact 8** *Girls, and to a lesser extent students from higher-SES schools, show more positive attitudes toward LGBT people.*

# 6 Effect of the intervention

The overall impact of the intervention on the treatment group is measured by constructing a synthetic index from the responses to the questions on the ten dimensions mentioned above, using the *swindex* command in Stata from Anderson (2008). More precisely, for each dimension, we first ensure that a positive increase in the response to the question always indicates a "better outcome" in the sense of less taboo, more awareness, and more positive attitude toward LGBT people. The command then normalizes this indicator by subtracting the mean observed in the control group and by dividing each indicator by its standard deviation. This rescaling results in an "effect size" interpretation where the index is distributed around a zero mean with a standard deviation of one within the control group. The command also creates weights based on the inverse of the covariance matrix of the normalized indicators for each of the ten dimensions, so that highly correlated dimensions are assigned small or offsetting weights, while less correlated dimensions receive larger weights. The command then computes the weighted average of the dimensions to obtain the overall index. We perform this procedure for the 10 dimensions separately or regrouped around the three broad categories of *taboo*, *awareness*, and *attitude*.

## 6.1 Overall impact

Table 4 shows the results of the intervention on our composite index, which corresponds to the coefficient $\delta$ in equation (1) and the coefficients $\delta_1$ and $\delta_2$ in equation (2). The impact of the intervention is positive and lasts for at least three months. Overall, the intervention has a significant impact of 0.16 standard deviations. This magnitude is often considered small, but it is still considerable for an intervention that lasts only 2 hours. This confirms the advantage of the perspective-taking approach. This result is robust to alternative estimation techniques, such as double lasso to avoid over-selecting potentially spurious covariance in the set of controls (see Table A.7), or randomized inference and multiple-hypothesis testing (see Table A.8). All results are also robust when using the complete sample of schools, including those that could not be randomized into treatment because it was too late in the school year

Table 3: Attitude towards LGBT people in the control group

| | Overall Mean (1) | Girls−Boys (2) | Old−Young (3) | High SES−Low SES (4) |
|---|---|---|---|---|
| Willingness to defend | | | | |
| *Percentage of cases in which defending is chosen* (Q17) | 0.851 | 0.130*** | 0.019 | 0.065** |
| | | (0.016) | (0.029) | (0.026) |
| Positive attitude towards LGBT | | | | |
| *Says that one should help recognize...* | | | | |
| *... an FtM as a man* (Q10) | 0.653 | 0.118*** | −0.067 | 0.062 |
| | | (0.031) | (0.057) | (0.053) |
| *... an MtF as a woman* (Q11) | 0.648 | 0.129*** | −0.081 | 0.067 |
| | | (0.032) | (0.061) | (0.056) |
| *Same reaction when seeing kissing in the street...* | | | | |
| *... a lesbian couple and a straight couple* (Q13) | 0.537 | 0.080*** | 0.047 | 0.090* |
| | | (0.023) | (0.055) | (0.047) |
| *... a gay couple and a straight couple* (Q13) | 0.477 | 0.136*** | −0.006 | 0.092** |
| | | (0.030) | (0.050) | (0.041) |
| *Same reaction when eating in the cafeteria with...* | | | | |
| *... a lesbian girl or a straight girl* (Q14) | 0.671 | 0.059** | 0.033 | 0.116** |
| | | (0.025) | (0.051) | (0.044) |
| *... a gay boy or a straight boy* (Q14) | 0.627 | 0.271*** | −0.003 | 0.112** |
| | | (0.021) | (0.050) | (0.042) |
| *... a bisexual girl or a straight girl* (Q14) | 0.679 | 0.086*** | 0.024 | 0.108** |
| | | (0.025) | (0.049) | (0.043) |
| *... a bisexual boy or a straight boy* (Q14) | 0.641 | 0.207*** | −0.014 | 0.106** |
| | | (0.018) | (0.047) | (0.041) |
| *... a trans girl or a cisgender girl* (Q14) | 0.568 | 0.225*** | −0.027 | 0.074 |
| | | (0.028) | (0.048) | (0.047) |
| *... a trans boy or a cisgender boy* (Q14) | 0.577 | 0.202*** | −0.012 | 0.088** |
| | | (0.026) | (0.045) | (0.042) |
| *Keeping their best friend if...* | | | | |
| *... she comes out as lesbian* (Q15) | 0.744 | 0.030 | 0.018 | 0.125*** |
| | | (0.029) | (0.052) | (0.037) |
| *... he comes out as gay* (Q16) | 0.672 | 0.339*** | −0.030 | 0.125** |
| | | (0.028) | (0.058) | (0.046) |

*Notes:* This table reports descriptive statistics about the attitude towards LGBT people in the control group. Column 1 gives the overall mean for each variable across 2,490 students in the control group for the fully-randomized sample. Columns 2-4 show results from Student t-tests when comparing answers of students in the control group by gender, age, and SES, respectively. For age and SES, the cutoff used for comparison is the median value in the control group. For Column 3, "old" students are strictly older than 15 years. For Column 4, "High SES" students go to a school with an average SPI strictly higher than 92.76. Standard errors clustered at the school×year level in parenthesis.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Effect of the intervention

| | ATE | 1-month ATE | 3-month ATE |
|---|---|---|---|
| Composite Index | 0.161*** | 0.159*** | 0.163*** |
| | (0.051) | (0.058) | (0.057) |
| | [0.050] | [0.056] | [0.058] |
| Taboo | 0.166*** | 0.198*** | 0.134*** |
| | (0.052) | (0.064) | (0.049) |
| | [0.051] | [0.066] | [0.042] |
| Awareness | 0.116** | 0.098* | 0.133** |
| | (0.048) | (0.054) | (0.058) |
| | [0.048] | [0.053] | [0.059] |
| Attitude | −0.006 | −0.055 | 0.041 |
| | (0.052) | (0.059) | (0.063) |
| | [0.051] | [0.055] | [0.066] |

*Notes:* This Table shows the ATE of the intervention on the three weighted subindices. Standard errors clustered at the school×year level are in parenthesis. Standard errors clustered at the school level are in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Effect of the intervention on 10 objectives

| | ATE | 1-month ATE | 3-month ATE |
|---|---|---|---|
| | (1) | (2) | (3) |
| Taboo | | | |
| Closed circle | 0.002 | 0.010 | −0.005 |
| | (0.021) | (0.027) | (0.019) |
| | [0.021] | [0.027] | [0.017] |
| School staff | 0.103*** | 0.115*** | 0.092*** |
| | (0.014) | (0.016) | (0.015) |
| | [0.014] | [0.016] | [0.015] |
| Awareness | | | |
| Choice | 0.039* | 0.040* | 0.038* |
| | (0.020) | (0.021) | (0.022) |
| | [0.020] | [0.021] | [0.022] |
| Pathology | −0.007 | −0.019 | 0.005 |
| | (0.012) | (0.014) | (0.015) |
| | [0.012] | [0.014] | [0.015] |
| Diversity | −0.028 | −0.036 | −0.020 |
| | (0.020) | (0.024) | (0.023) |
| | [0.022] | [0.026] | [0.024] |
| Negative consequences of anti-LGBT harassment | 0.039** | 0.044** | 0.033* |
| | (0.015) | (0.017) | (0.017) |
| | [0.015] | [0.016] | [0.017] |
| Legal consequences of anti-LGBT harassment | 0.082*** | 0.084*** | 0.079*** |
| | (0.019) | (0.021) | (0.022) |
| | [0.019] | [0.021] | [0.023] |
| How to aid a victim | 0.019 | 0.014 | 0.022 |
| | (0.012) | (0.013) | (0.014) |
| | [0.012] | [0.013] | [0.014] |
| Attitude | | | |
| Willingness to defend | −0.013 | −0.025* | −0.001 |
| | (0.011) | (0.014) | (0.013) |
| | [0.011] | [0.013] | [0.014] |
| Positive attitude towards LGBT people | 0.009 | −0.007 | 0.024 |
| | (0.021) | (0.023) | (0.025) |
| | [0.021] | [0.021] | [0.026] |

*Notes:* This Table shows the ATE of the intervention on the ten objectives of *SOS homophobie*. Standard errors are clustered at the school×year level in parenthesis. Standard errors are clustered at the school level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

(see Table A.9, which is based on 10,356 students instead of 6,377 students in the reference sample).

Interestingly, the impact of the intervention is driven by the questions related to taboo and awareness, while those related to attitude are not significantly altered. This suggests that this type of intervention is more effective in combating stereotypes and reducing information gaps than in changing behaviors. Besides, as shown in Table A.5, the impact of the intervention is twice as large in high schools than in middle schools, suggesting that perspective-taking is easier to implement at an older age, rather than in middle school when group norms tend to be more pervasive.

Tables 5 and A.6 provide detailed results for each of the 10 components of our index. *SOS homophobie*'s involvement improves receptiveness to LGBT inclusion in both middle and high schools. In middle schools, it increases the proportion of students who are aware of the full consequences of anti-LGBT harassment by 4pp. Furthermore, although it is not a measure of receptivity to LGBT inclusion in the strict sense, the proportion of middle school students who consider that the law is tough on anti-LGBT violence is also positively affected by the session (it increases by 8pp). In high schools, the positive impact of the session is more systematic. Specifically, the session improves the following four aspects: (i) in the "attitude" category, the share of students who are willing to help a bullied LGBT student, and the share of students who are just as comfortable sitting next to an LGBT student as a non-LGBT student in the canteen; (ii) in the "awareness" category, the share of students who understand that being LGBT is not a choice; (iii) in the "awareness" category, the share of students who are aware of the full consequences of anti-LGBT harassment. This can be seen in the larger effect we find among high schools for our index (see Table A.5). This result is also confirmed in our heterogeneity analysis. The interventions do not have any impact on the understanding that being LGBT is not a pathology, probably because, as seen in Table 2, the proportion of students thinking the contrary is already very high in the control group. The same is true for the willingness to defend, even though we detect positive effects in high school that are offset by negative ones in middle school.

## 6.2 Heterogeneity Analysis

We explore heterogeneity in treatment effects using two different methods. We first perform a subgroup analysis to examine differences in treatment effects along gender, age and socioeconomic status. We then perform a more sophisticated analysis using the recent data-driven

approaches of Chernozhukov et al. (2023).

### *6.2.1 Subgroup analysis: Gender, Age and Socioeconomic status*

To look at heterogeneity of treatment effects, we first run the regressions specified in (1) for different subgroups. We examine whether there are differences across gender, age, and socioeconomic status, proxied by the average school SPI. For age and socioeconomic status, we divide the sample into two by using the sample medians as thresholds. We focus here on the overall effect of the intervention, rather than the medium-run impact, to avoid further splitting of the sample.

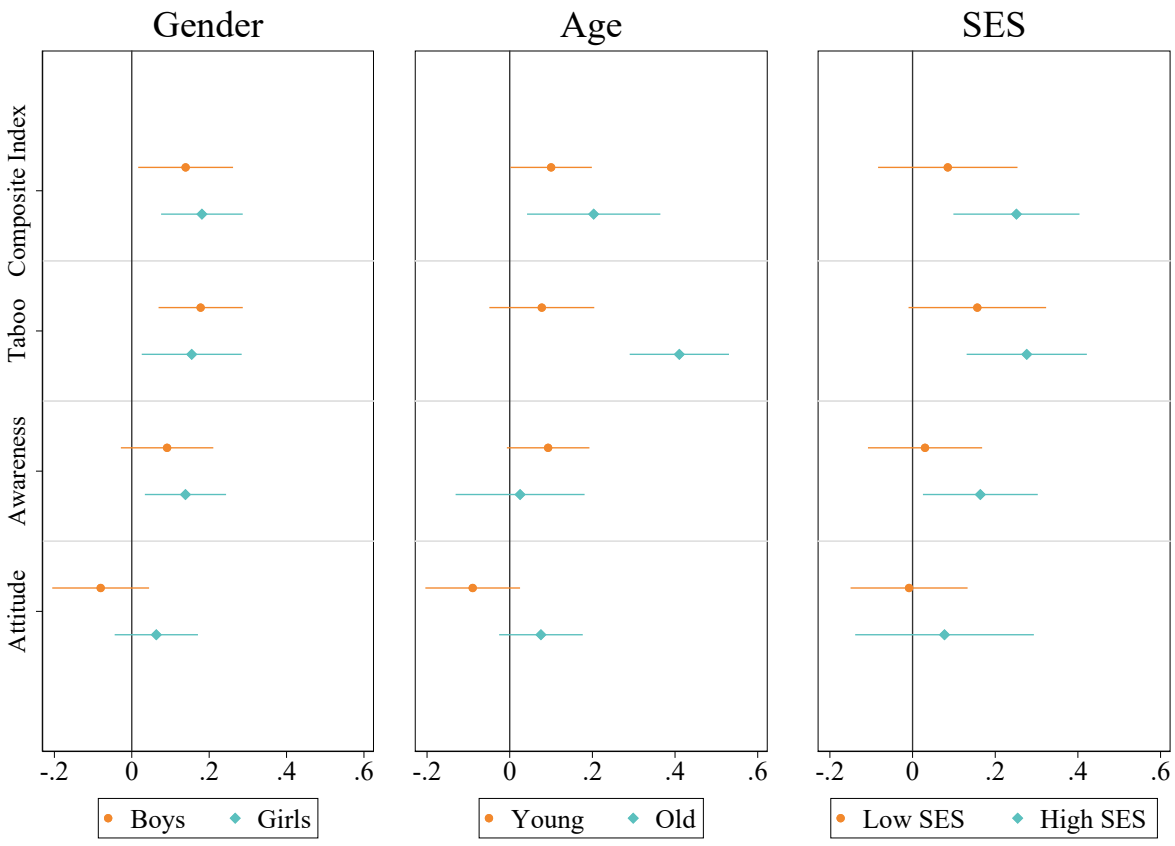
In general, we do not find much heterogeneity for the composite index. However, we show that there is more heterogeneity in the results, when looking at the subindices separately. Figure 1 shows the results of this analysis. Regarding gender, the subgroup analysis shows that the intervention is, in general, similarly effective for boys and girls. However, regarding the attitude component, we see a negative effect for boys and a positive effect for girls. This difference suggests that the null effect on attitudes and hypothetical behavior in Table 4 could be due to different effects in different subpopulations. Regarding age, we see that the effect of the overall effect of the intervention, as indicated by the composite index, is similar between the younger and older individuals. Nonetheless, the intervention has a greater effect on lifting taboos and changing attitudes among older students, whereas it has a greater effect on raising awareness among the younger. Finally, the intervention appears to have similar effects for students in schools with low or high SES, with a slightly higher effect for those in higher SPI schools. However, as we control for variables that may potentially correlate with the average SPI of the school, such as the academic region, one should be careful of the interpretation of such results.

Subgroup analysis is useful for exploring the potential heterogeneity of treatment effects, but it has some drawbacks. In particular, it may not be as informative if covariates are highly correlated, it does not identify non-linearities and leads to power losses due to sample splitting.

### *6.2.2 Generic Machine Learning (GML)*

To test for further heterogeneity, we use the GML approach by Chernozhukov et al. (2023). This method allows us to first check for the existence of heterogeneity, and then determine what are the characteristics of the most and least affected groups. By using this method we avoid dividing our sample into subgroups or assuming linear interactions between covariates

Figure 1: Treatment Heterogeneity – Subgroup Analysis




This Figure depicts the average treatment effects for different subgroups of the fully-randomized sample. This graph shows the effects of the intervention for the composite index, and the three subindices (i.e., taboo, awareness, and attitude). We explore heterogeneity according to three dimensions: gender, age, and average school SPI. For age, and SPI, the sample is split in two using median values as thresholds. Bars represent 95%-confidence intervals using standard errors clustered at the school×year level.

and potential outcomes. We perform 100 random splits and use five different ML techniques: elastic net, support vector machine, random forest, extreme gradient boosting, and K-nearest neighbor. The algorithm consists of splitting the population into two random samples: an auxiliary sample and a main one. Let $Z$ be a vector of baseline covariates, and $Y(1)$ and $Y(0)$ be the potential outcomes when treated and untreated, respectively. Then, using the ML techniques one can construct predictors $B(\zeta)$ and $S(\zeta)$ for the baseline conditional average (BCA) $b_0(Z) = \mathbb{E}[Y(0)|Z]$ and for the conditional average treatment effect (CATE) $s_0(Z) = \mathbb{E}[Y(1) - Y(0)|Z]$. These estimators can be biased and inconsistent. However, one can study key features of the CATE, to check for heterogeneity. The first feature is the best linear predictor (BLP) of the CATE. The BLP of the CATE can be written as

$$\text{BLP}[s_0(Z)|S(Z)] \coloneqq \beta_1 + \beta_2(S(Z) - \mathbb{E}S(Z)).$$

We can use the main data to get the estimators $\widehat{\beta}_1$ and $\widehat{\beta}_2$, and compute their median value over the 100 splits. The former estimator gives the ATE, and the latter is used to check for heterogeneity. Indeed if we reject $\beta_2 = 0$, there is treatment effect heterogeneity, and $S(Z)$ is a good predictor of $s_0(Z)$. The second feature we study is the Sorted Grouped Average Treatment Effects (GATES). Let $(G_k)_1^K$ be $K$ groups of the same size, that were sorted according to the average treatment effect, to explain the most variation of the CATE. Using the predictors obtained in the auxiliary sample, one can use them to estimate $\gamma_k = E[s_0(Z)|G_k]$. $(\widehat{\gamma}_k)_1^K$ gives an idea of how the CATE varies across the population and $\widehat{\gamma}_K - \widehat{\gamma}_1$ gives another estimation of heterogeneity in treatment effects. We here consider four groups, i.e., $K = 4$. If for an outcome variable, we have a very large difference in average treatment effects between the most affected and the least affected groups (i.e., $\widehat{\gamma}_4 - \widehat{\gamma}_1$ is large and statistically significant) we can say there is large heterogeneity in treatment effects. Finally, when there is evidence of strong heterogeneity, one can report the average characteristics of the units in $G_1, \ldots, G_4$. This method, classification analysis (CLAN), presents some of the factors explaining heterogeneous results. All of this analysis is performed using the R package "GenericML."

Table 6 reports the best ML method for each feature (BLP and GATES) and outcome variable, as well as the estimates $\widehat{\beta}_2$ and $\widehat{\gamma}_4 - \widehat{\gamma}_1$ and corresponding $p$-values, indicating the presence of heterogeneity in treatment effects. For the composite index, we see that only $\widehat{\beta}_2$ is significantly different from zero, suggesting the presence of only mild heterogeneity, confirming the results discussed in Section 6.2.1. Indeed, we see in general positive results from the intervention when every dimension is considered, no matter who is the audience. However, when we look more closely at the three dimensions that the intervention affects,

Table 6: Treatment Heterogeneity – BLP and GATES

| | BLP | | GATES | |
|---|---|---|---|---|
| | Best method | $\widehat{\beta}_2$ | Best method | $\widehat{\gamma}_4$-$\widehat{\gamma}_1$ |
| | (1) | (2) | (3) | (4) |
| Composite Index | Boosting | 1.018*** | SVM | 0.179 |
| | | [0.003] | | [0.131] |
| Taboo | Boosting | 1.123*** | Boosting | 0.412*** |
| | | [0.000] | | [0.002] |
| Awareness | Boosting | 1.036*** | Boosting | 0.362*** |
| | | [0.002] | | [0.005] |
| Attittude | Boosting | 1.440*** | Boosting | 0.511*** |
| | | [0.000] | | [0.000] |

*Notes:* This table shows the best methods and some estimates for the BLP and GATES described in (Chernozhukov et al., 2023). The best method in columns (1) and (3) gives the ML algorithm that is the best in predicting each feature for each outcome variable. The five algorithms tested are: elastic net, gradient-boosted trees (boosting), support vector machine, K-nearest neighbor, and random forest. Columns (2) and (4) give the estimates of $\beta_2$ and $\gamma_4 - \gamma_1$, for the BLP and GATES, respectively. When both of these coefficients are significantly different than zero, we confirm the presence of heterogeneity. $p$-values are reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

we see a large presence of heterogeneity. Since $\widehat{\beta}_2$ and $\widehat{\gamma}_4 - \widehat{\gamma}_1$ are significantly different from zero for each variable, we confirm the presence of heterogeneous treatment effects. We find the most heterogeneity in the subindex for attitude. Table 7 shows that, for this variable, in the most affected group ($G_4$), we estimate an ATE of $\hat{\gamma}_4 = 0.23\,\text{sd}$, whereas for the least affected group ($G_1$) we estimate an ATE of $\hat{\gamma}_1 = -0.29\,\text{sd}$ meaning that the intervention has a significant negative effect for some students regarding their attitudes towards LGBT people. This result explains the average null effects on attitudes reported in Table 4. We also see that we have strong heterogeneity across the other sub-indices, but there are no other significant negative results.

Table 7: Treatment Heterogeneity – GATES

| | $\hat{\gamma}_1$ | $\hat{\gamma}_2$ | $\hat{\gamma}_3$ | $\hat{\gamma}_4$ |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Composite Index | 0.094 | 0.182** | 0.240*** | 0.284*** |
| | [0.264] | [0.034] | [0.003] | [0.000] |
| Taboo | −0.005 | 0.095 | 0.213** | 0.407*** |
| | [0.954] | [0.296] | [0.029] | [0.000] |
| Awareness | −0.104 | 0.017 | 0.097 | 0.260*** |
| | [0.290] | [0.840] | [0.228] | [0.003] |
| Attittude | −0.292*** | −0.140 | −0.011 | 0.227*** |
| | [0.004] | [0.116] | [0.903] | [0.007] |

*Notes:* This table shows the estimates for the GATES described in (Chernozhukov et al., 2023) for the composite index and all of the three subindexes. Column (1) gives the estimate of $\gamma_1$, the ATE for the least-affected individuals, whereas Column (4) presents the estimate of $\gamma_4$, the ATE for the most-affected ones. For example, for the least-affected group in the attitude dimension, $G_1$, we estimate a negative effect of $-0.292sd$. For each variable, this table reports the results when using the best method to predict the GATES as given in Table 6. $p$-values are reported in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Since we found large heterogeneity in the impact of the intervention, we conducted the CLAN to identify the composition of each group displayed in the GATES. We focus on four main variables explaining treatment heterogeneity: gender, age, and socioeconomic status (proxied here by the school average SPI), and the number of interventions by SOS homo-

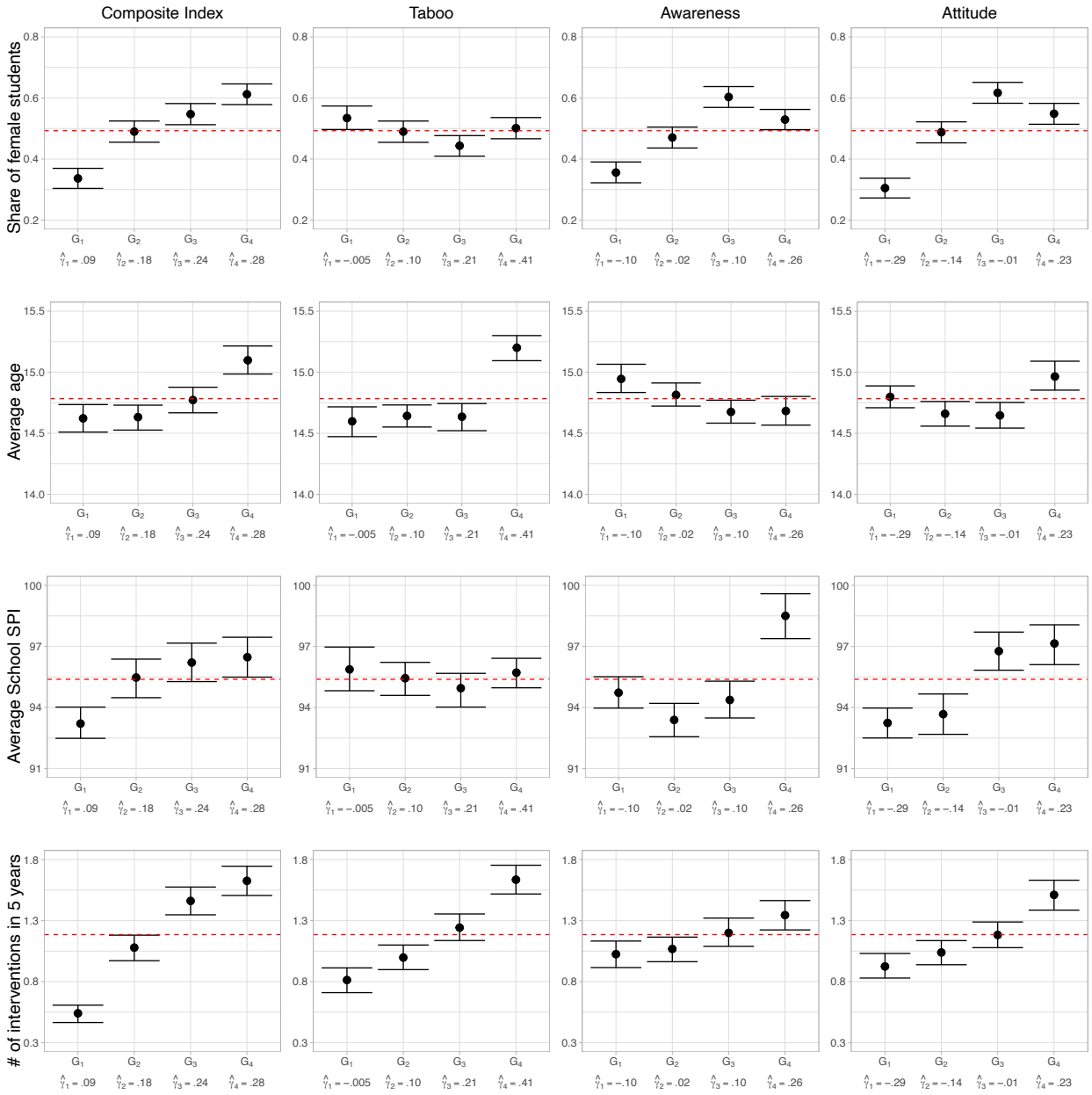
phobie in the previous 5 years. Figure 2 shows the results of the CLAN. The rows show dimensions of heterogeneity and the columns the outcome variables. The first row of Figure 2 shows that, for each variable, the share of female students is higher in the groups that are more affected by the intervention ($G_4$ and $G_3$), except for lifting taboos, where there is not much heterogeneity with respect to gender. Regarding the attitude dimension, for example, girls represent about 55% of the students most positively affected by the intervention, with an average effect of $\widehat{\gamma}_4 = 0.23$ sd), however they are only 30% of the group least positively affected ($\widehat{\gamma}_1 = 0.29$ sd). Interestingly, this approach allows us to identify some non-linearities in the composition of groups, as $G_3$ is composed of a higher number of girls than $G_4$, for both the awareness and attitude dimensions. These non-linearities could explain the lower heterogeneity found when performing the subgroup analysis. In the second row of Figure 2, we see that age impacts the treatment effects less consistently. In general, the intervention seems to affect older students more. However, this effect is driven by the taboo dimension which affects much older students, since for the attitude component we see some non-linearities as both the most and least affected students ($G_4$ and $G_1$) seem to be older than those slightly affected ($G_2$ and $G_3$). For the awareness dimension, the intervention is most effective for younger students. The third row in Figure 2 shows that the intervention has a greater impact on students in schools with a higher average SPI with one exception, the taboo dimension. Indeed, for this variable, we see that the average SPI is similar across groups. Finally, we find a very strong heterogeneity in the number of interventions that schools had in the previous five years. This is true for every variable, as we see that the number of past interventions in the school is always higher among the most affected students. We further discuss these results further when analyzing the potential mechanisms through which the intervention works.

This analysis further shows that the intervention does not affect the same students for every dimension. Notably, the intervention is more successful in overcoming taboos for female, old, and low-SES students, raising awareness for female, young, and high-SES students, and changing attitudes towards LGBT people for female, old, and high-SES students. Tables A.11-A.14 provide a more detailed description of groups $G_1$ to $G_4$ for more variables.

## 6.3 Possible Mechanisms: Group Norms and Reactance

As we discussed in Section 3, we expected to find positive results from the intervention since it mobilizes techniques based on perspective-taking and non-judgemental approaches.

Figure 2: Heterogeneity Analysis – CLAN




This figure depicts the CLAN for the composite index, and the three subindices, for gender, age, SPI, and number of interventions in the school during the past five years. We present the estimated average of these four latter variables for the groups $G_1$, $G_2$, $G_3$, and $G_4$ in each outcome variable. For each group, the corresponding GATES ($\widehat{\gamma_1}, \ldots \widehat{\gamma_4}$ as given in Table 7) are indicated in the horizontal axis. 90% confidence intervals are shown in brackets. The red dashed line represents the mean value of the variable in the whole sample. For instance, the least-impacted group ($G_1$) in their attitudes had 30% of female students, compared to a sample average of 49%. The ML methods used for each graph are the same as in Column (3) of Table 6.

Table 8: Treatment Heterogeneity – BLP and GATES

| | BLP | | GATES | |
|---|---|---|---|---|
| | Best method | $\widehat{\beta}_2$ | Best method | $\widehat{\gamma}_4$-$\widehat{\gamma}_1$ |
| | (1) | (2) | (3) | (4) |
| Positive classroom perception | Boosting | 1.412*** | Boosting | 0.263*** |
| | | [0.000] | | [0.000] |
| Knowledge of law severity | k-NN | 0.106 | SVM | 0.073 |
| | | [0.105] | | [0.235] |

*Notes:* This Table shows the estimates for the BLP and GATES described in (Chernozhukov et al., 2023). The best method in columns (1) and (3) gives the algorithm that is the best in predicting each feature. The five algorithms tested are: elastic net, gradient-boosted trees (boosting), support vector networks, K-nearest neighbor, and random forest. Columns (2) and (4) give the estimates of $\beta_2$ and $\gamma_4 - \gamma_1$, for the BLP and GATES, respectively. When both coefficients are significantly different than zero, we confirm the presence of heterogeneity. $p$-values are reported in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

However, we also discussed the potential backlash that these interventions may have. We focus on the attitude component because, as shown in Table 7, there is a subset of the sample that is negatively affected by the intervention and another group that is affected positively. As shown in the previous section, negatively impacted students are, on average, boys from low-SES backgrounds, and in schools that have rarely been exposed to *SOS homophobie*'s interventions in the previous years. In sharp contrast, the group that is positively affected by the intervention consists mainly of older girls from high-SES backgrounds, and from schools with an above-average number of interventions in the previous 5 years.

To explain these different effects across different students, we explore two mechanisms that may also be intertwined: group norms and reactance. Because it allows everyone to talk openly about an issue that is rarely discussed in schools (beyond the routine use of homophobic and transphobic slurs), *SOS homophobie*'s session is likely to reveal to students the prevailing norm in their class, at least based on what their classmates say during the session. This information may strongly influence their receptiveness to LGBT inclusion in a situation where individuals, especially young people, are subject to conformity bias. In other words, the discovery of the class norm may strengthen or weaken the positive impact of *SOS homophobie*'s intervention, depending on whether students perceive the class as being receptive to LGBT inclusion or not.

To test this hypothesis we look at the effect of the intervention on students' perception of classroom norms. In question 20 of the survey, we ask students if they think that an LGBT classmate might be rejected by their class. We look at the effect of *SOS homophobie*'s session on the probability that a student thinks that an LGBT classmate will not be rejected. The intervention has, on average, a null effect on this variable. However, as shown in Tables 8 and 9 we find strong heterogeneity, with a negative impact for the least treated (−10pp.) and a positive impact for the most treated (+16pp.). Moreover, among the most treated we find an overrepresentation of female, older, and high-SES students from schools with multiple interventions in the previous years. These subgroups are also overrepresented among the most affected in the attitude dimension. This finding suggests a correlation between change in group norm perception and attitudes towards LGBT people. Similarly, the composition of the group that has a worse perception of the classroom norm is similar to the group that has a worse attitude towards LGBT people after the intervention. The positive effect for girls on attitudes and group norm perception is consistent with the fact that women are more likely to adopt LGBT-friendly behaviors when they get positive feedback on the group norm (Aksoy et al., 2023). As group norms are difficult to change, schools that have had several interventions in the previous years are more likely to have changed school norms. Table 9 shows that the groups where the classroom norm perception is easily shifted have had 0.6 more interventions than the sample average of 1.2. This can be interpreted as the power of having multiple interventions in the same school. It is worth noting that by design, no student is exposed to the intervention more than once unless they have repeated a grade, entailing that changing the overall school norm could be sufficient to change attitudes towards LGBT people. Figure 2 shows that, for every outcome variable, we have more interventions in groups with higher treatment effects. However, one should be cautious about this mechanism, as the number of interventions could be endogenous to other characteristics causing higher treatment effects.

Another possible mechanism explaining the backlash among certain students is reactance. Students who were originally anti-LGBT may react negatively to the intervention if they believe that their freedom is being jeopardized. Students may believe that they are being forced to change their opinions. The nonjudgmental approach is used to avoid this kind of reaction. However, it is still possible for students to feel that their freedom is threatened during the interventions. In the case of *SOS homophobie*'s interventions, one aspect that is susceptible to making these feelings emerge is the presentation of the severity of the French law regarding LGBTphobic violence and bullying. Table 5 shows that the intervention has a

Table 9: GATES and CLAN : Positive classroom perception

| | Average | $G_1$ | $G_2$ | $G_3$ | $G_4$ | $G_4 - G_1$ | $G_4 - G_2$ | $G_4 - G_3$ |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| GATES | 0.013 | -0.101* | -0.043 | 0.014 | 0.161*** | 0.263*** | 0.200*** | 0.136** |
| | [0.595] | [0.052] | [0.368] | [0.721] | [0.001] | [0.000] | [0.003] | [0.034] |
| Female | 0.493 | 0.461 | 0.463 | 0.519 | 0.552 | 0.085*** | 0.093*** | 0.024 |
| | (0.483;0.503) | (0.421;0.500) | (0.425;0.502) | (0.481;0.555) | (0.514;0.589) | [0.002] | [0.001] | [0.342] |
| Age | 14.783 | 14.818 | 14.573 | 14.558 | 15.221 | 0.375*** | 0.672*** | 0.666*** |
| | (14.751;14.815) | (14.696;14.943) | (14.456;14.677) | (14.459;14.660) | (15.113;15.349) | [0.000] | [0.000] | [0.000] |
| Average SPI | 95.386 | 93.785 | 92.819 | 94.470 | 99.624 | 6.003*** | 7.310*** | 5.826*** |
| | (95.108;95.663) | (92.738;94.833) | (91.719;93.847) | (93.566;95.491) | (98.687;100.549) | [0.000] | [0.000] | [0.000] |
| # Interventions in past 5 years | 1.185 | 0.910 | 0.929 | 1.118 | 1.743 | 0.818*** | 0.861*** | 0.591*** |
| | (1.153;1.218) | (0.798;1.025) | (0.810;1.047) | (1.014;1.215) | (1.602;1.875) | [0.000] | [0.000] | [0.000] |

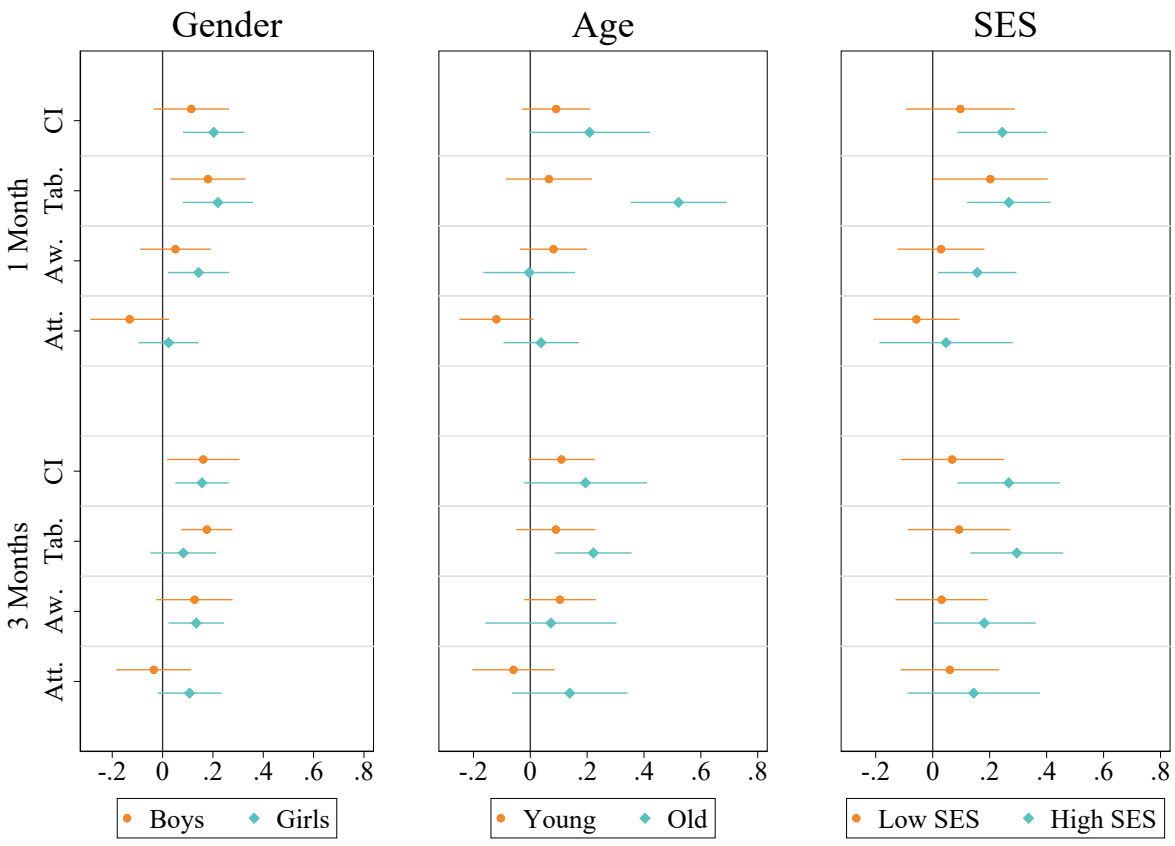
*Notes:* This Table shows the estimates for the GATES and CLAN described in (Chernozhukov et al., 2023) for the perceived probability of rejection of an LGBT classmate. Column (1) gives the average values for the fully-randomized sample. For the GATES, the average corresponds to the ATE estimate $\widehat{\beta}_1$ in the BLP. Column (2) gives the estimates for the least-affected individuals, whereas Column (5) presents the estimates for the most-affected ones. In Columns (6)-(8), we provide estimates for the differences between groups. For this variable, the best ML algorithm was boosting. One can read the results as it follows: for the least-affected group ($G_1$), the intervention reduced the probability of saying someone would not be rejected by their class for being LGBT by 10pp. We estimate that 46% of individuals in this group are girls, which is lower than the 49% for the whole sample. $p$-values are reported in brackets. 90% confidence intervals are reported in parenthesis.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

strong positive effect in making students more aware of the legal consequences of anti-LGBT harassment. Table 8 further shows that this effect is rather homogeneous across students, as we do not find any heterogeneity for this dimension. Since, as shown in Table 3, boys and low-SES students have worse initial attitudes towards LGBT people, we can expect higher reactance from these students. This mechanism is also suggested by the fact that the negative effect on attitudes seems, on average, to vanish after three months. Indeed, Figure 3 shows that the negative impact on attitudes tends to be smaller after three months. This is true for boys, low-SES schools, and particularly younger students. Negative attitudes toward LGBT people may therefore be just a short-term reaction to the intervention and not a prevalent change in behavior. Since the intervention poses no real threat to students, reactance theory would predict this kind of result.

# 7 Conclusion

This paper conducted a comprehensive analysis of school-based interventions targeting anti-LGBT harassment, shedding light on the pervasive issue of LGBTphobia in educational settings. Through a groundbreaking randomized controlled trial conducted in the Paris region of France, the paper evaluated the impact of interventions by *SOS homophobie* among students aged 13-18. The findings underscored the transformative potential of these inter-

Figure 3: Treatment Heterogeneity – Subgroup Analysis




This Figure depicts the average treatment effects for different subgroups of the fully-randomized sample, depending on the timing of the questionnaire. This graph shows the effects of the intervention for the composite index, and the three subindices (i.e., taboo, awareness, and attitude). We explore heterogeneity according to three dimensions: gender, age, and average school SPI. For age, and SPI, the sample is split in two using median values as thresholds. Bars represent 95%-confidence intervals using standard errors clustered at the school×year level.

ventions, revealing significant improvements in students' receptiveness to LGBT inclusion.

Notably, the study revealed that *SOS homophobie*'s sessions positively altered students' perceptions and awareness of LGBT issues, effectively lifting taboos and raising awareness about the consequences of anti-LGBT harassment. In addition, the analysis highlighted the heterogeneity of treatment effects, indicating that female students and those from "privileged" backgrounds were more likely to benefit from the intervention.

The paper's contribution extends beyond the realm of education, resonating with broader discussions on social norms, diversity training, and prejudice reduction. By using narrative exchanges and perspective-taking approaches, the interventions aimed not only to shift attitudes but also to foster empathy and understanding among students. The results underscore the potential of such interventions to combat prejudice and promote social cohesion, not only in educational settings but also in broader societal contexts. The study also highlights the importance of changing social norms through repeated interventions.

In conclusion, the study provides compelling evidence for the effectiveness of brief, school-based interventions in addressing anti-LGBT harassment and promoting inclusivity. Going forward, policymakers and educators can draw upon these findings to design targeted interventions aimed at fostering more tolerant and inclusive school environments, ultimately contributing to the creation of a more equitable and accepting society.

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# Questionnaires

**OECD survey about youth perception on discrimination**

This questionnaire was made by the Organization for Economic Cooperation and Development (OECD) which is an organization between 36 countries, including France. The OECD commonly take surveys about very diverse subjects, such as environmental protection, sport practice, or eating habits. Thousands of students have responded to surveys like this before you.

It is asked that you read carefully each question in this survey and to answer, **in silence. There is no good or bad answer. It is important that you answer in complete honesty.** To let you **answer exactly what you think**, this survey is **strictly anonymous.** You do not not have to write your name and no collected information in thus survey could identify who you are. Furthermore, once you have completed the survey, it is asked for you to put in the envelope that was given to you with the survey and **close** it. **Nobody in your school would know about your answers.** The surveys will be immediately sent to the OECD to be analyzed.

Questions are presented in three ways:

- sometimes, it is asked that you check the box that corresponds to your answers, as in the two examples below:

Do you think the weather is nice today? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

How do you feel when …? *(check the box corresponding to your answer)*

| | You feel in a really bad mood | You feel mostly in a bad mood | You do not feel anything in particular | You feel mostly in a good mood | You feel in a very good mood | You do not know |
|---|---|---|---|---|---|---|
| **a.** … it rains ? | | | | | | |
| **b.** … it is sunny ? | | | | | | |

- in other cases, you are asked to circle the proposition that corresponds to your answer, as in the example below:

Dou you think the weather is nice today? *(circle the proposition corresponding to your answer)*

**a.** Yes, absolutely
**b.** Yes, mostly
**c.** No, not really
**d.** No, not at all
**e.** You do not know

- in other cases, you are asked to directly write your answer, like in the example below:

What is your date of birth? _____

With this survey, the OECD wishes to better understand the way in which homosexual, bisexual, and transgender people are perceived by the youth.

To allow you to answer this questionnaire, it is important for you to know what means "to be heterosexual", "to be homosexual", "to be bisexual", and "to be transgender". Here are thus four definitions that we invite you to look at carefully:

- **« to be heterosexual»:** a person is heterosexual when they are attracted by people of their same sex. A man is said to be « heterosexual » if he is attracted to women. A woman is said to be « heterosexual » if she is attracted to men.
- **« to be homosexual »:** a person is homosexual when they are attracted to people of their same sex. A man is said to be « homosexual » when he is attracted to men. A woman is said to be « homosexual » when she is attracted to women.
- **« to be bisexual »:** a person is bisexual when they are attracted to both men and women. A man is said to be « bisexual » if he is attracted to men and women. A woman is said to be « bisexual » if she is attracted to men and women.
- **« to be transgender »:** a person is transgender when they are born when they are born with as a boy but feel like a girl and want to live like a girl, or when they are born with the as a girl but feel like a boy and want to live as a boy.

Do not doubt to read again these definitions whenever you want.

Be careful, this questionnaire is printed in both sides of the paper. Do not forget to answer the questions in the back of each page

1. In a couple made of a man and a woman, do you think that the man should spend the same time as the woman to domestic chores and nursing their children. *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

2. In a couple made of a man and a woman, do you think that the woman should spend the same time as the man to earn money? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

3. Do you think one chooses to be heterosexual, homosexual, or bisexual? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

4. Do you think one becomes homosexual by frequenting homosexual people? *(check the box corresponding to your answers)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

5.

   a. Do you think that a homosexual woman can be tell apart by her « style », that is her gestures, her behavior, or her clothing? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

   b. Do you think that a homosexual man can be tell apart by her « style », that is her gestures, her behavior, or her clothing? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

6. Do you think a homosexual person is less faithful to their partner than a heterosexual person? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

7. Do you think a bisexual person is less faithful to their partner than a heterosexual person? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

8. Do you think a bisexual person is a closeted homosexual, so a homosexual person involved with people of the other sex to hide their homosexuality? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

9. Do you think that one chooses to be transgender? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

**10.** Do you think it is desirable to help a transgender person born with the female sex in their effort to be recognized as a man? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

**11.** Do you think it is desirable to help a transgender person born with the male sex in their effort to be recognized as a woman? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do not know |
|---|---|---|---|---|
| | | | | |

**12.**

**a.** Have you ever talked about homosexuality, bisexuality, or about the fact of being transgender with a member from your family? *(check the box corresponding to your answer)*

| Yes | No | You do not have any family |
|---|---|---|
| | | |

**b.** Have you ever talked about homosexuality, bisexuality, or about the fact of being transgender with a your best friend? *(check the box corresponding to your answer)*

| Yes | No | You do not have a best friend |
|---|---|---|
| | | |

**c.** Have you ever talked about homosexuality, bisexuality, or about the fact of being transgender with a student from your school? *(check the box corresponding to your answer)*

| Yes | No |
|---|---|
| | |

**d.** Have you ever talked about homosexuality, bisexuality, or about the fact of being transgender with someone from the school staff (education assistant, school counselor, nurse, teacher)? *(check the box corresponding to your answer)*

| Yes | No |
|---|---|
| | |

**e.** Have you ever talked about homosexuality, bisexuality, or about the fact of being transgender with someone else? *(check the box corresponding to your answer)*

| Yes | No |
|---|---|
| | |

**13.** Imagine that you cross two people in the street and they kiss. How do you react in each of the following cases? *(for each proposition, check the box corresponding to your answer)*

| | You are happy for these people | You do not feel anything in particular | You feel awkward | You feel worse than awkward: you are shocked | You feel worse than shocked you would like this behavior to be forbidden | You do not know |
|---|---|---|---|---|---|---|
| **a.** These people kissing on the lips are **a woman and a man** | | | | | | |
| **b.** These people kissing on the lips are **two women** | | | | | | |
| **c.** These people kissing on the lips are **two men** | | | | | | |

**14.** Imagine that you have lunch at your school cafeteria and that a student sits close to you. Does this student's presence bother you if they are… *(for each proposition, check the box corresponding to your answer)*

| | Yes, this presence bothers you a lot | Yes , this presence bothers you a little | No, this presence does not really bother you | No, this presence does not bother you at all | You do not know |
|---|---|---|---|---|---|
| **a.** … a heterosexual girl? | | | | | |
| **b.** … a heterosexual boy? | | | | | |
| **c.** … a homosexual girl? | | | | | |
| **d.** … a homosexual boy? | | | | | |
| **e.** … a bisexual girl? | | | | | |
| **f.** … a bisexual boy? | | | | | |
| **g.** … a transgender boy, that is a person born with a female sex but that feels like a boy? | | | | | |
| **h.** …a transgender girl, that is a person born with a male sex but that feels like a girl? | | | | | |

**15.** Imagine that your best friend, a girl, tells you she is homosexual. How do you react? *(circle the proposition corresponding to your answer)*

- **a.** She still is your best friend
- **b.** She still is your friend, but you keep some distance
- **c.** You do not talk to her
- **d.** You do not know

**16.** Imagine that your best friend, a boy, tells you he is homosexual. How do you react? *(circle the proposition corresponding to your answer)*

- **a.** He still is your best friend
- **b.** He still is your friend, but you keep some distance
- **c.** You do not talk to her
- **d.** You do not know

**17.** Imagine that a person in your class is rejected because they are homosexual, bisexual, or transgender. Do you think you should defend them… *(for each proposition, check the box corresponding to your answer)*

| | Yes | No | You do not know |
|---|---|---|---|
| **a.** … if they are mocked at? | | | |
| **b.** … if they are insulted at the courtyard? | | | |
| **c.** … if they are insulted on social media (snapchat, instagram, etc.…)? | | | |
| **d.** … if nobody talks to them anymore? | | | |
| **e.** … if they are hit? | | | |

**18.** Which do you think is the best way to help a person who is being rejected in their class for being homosexual, bisexual, or transgender *(you can circle many propositions in the following list):*

- **a.** Talk to them
- **b.** Talk to their family
- **c.** Talk to their friends
- **d.** Talk to their classmates to convince them to stop
- **e.** Talk to one or many members of the school staff (education assistant, school counselor, nurse, teacher)
- **f.** You do not think this person should be helped
- **g.** You do not know

**19.** Imagine a person is being rejected in their class because they are homosexual, bisexual, or transgender. By your opinion, this rejection can generate in this person *(you can circle many propositions in the following list):*

- **a.** Sadness
- **b.** A lack of self-confidence
- **c.** Self-isolation
- **d.** A romantic breakup
- **e.** Risky behaviors (alcohol, drugs, self-harm until bleeding, etc.)
- **f.** School failure
- **g.** Depression
- **h.** Suicide
- **i.** None of the above
- **j.** You do not know

**20.** Do you think a homosexual, bisexual, or transgender person could be victim of rejection in your class? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do |
|---|---|---|---|---|
| | | | | |

**21.** Do you think that French law severly condams violence against homosexual, bisexual, and transgender people? *(check the box corresponding to your answer)*

| Yes, absolutely | Yes, mostly | No, not really | No, not at all | You do |
|---|---|---|---|---|
| | | | | |

**22.** What is your sex? *(circle the proposition corresponding to your answer)* :

- **a.** Female
- **b.** Male

**23.** What is your date of birth ? _____

# Appendix

Figure A.1: Participating schools in the Paris region

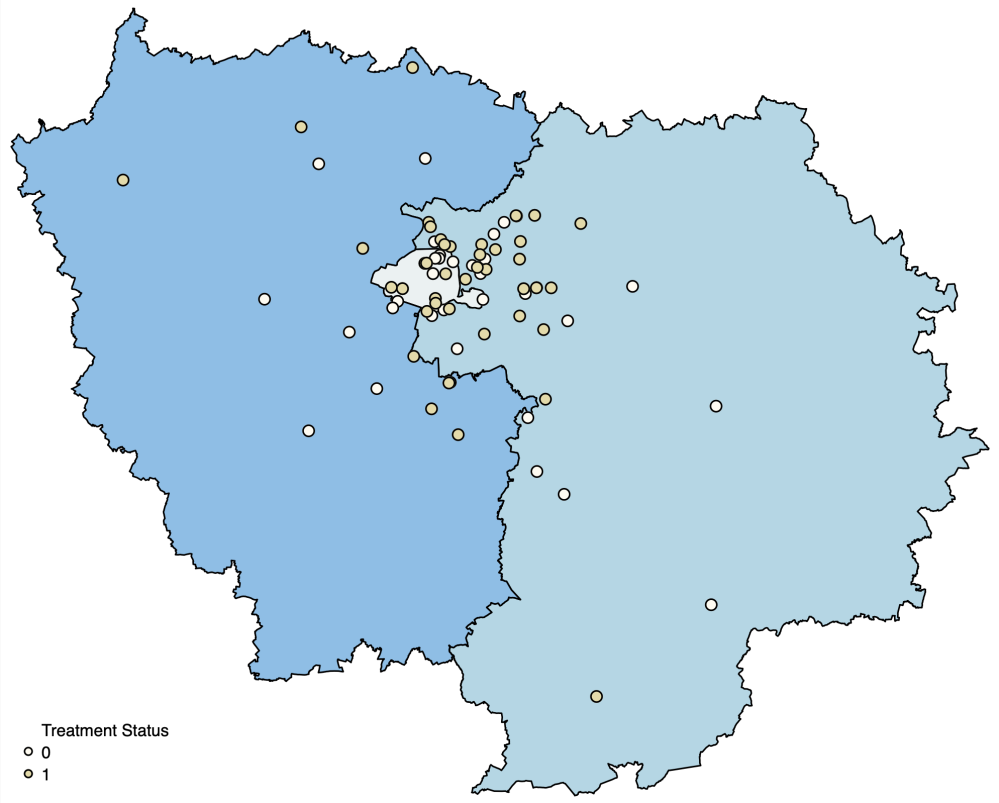

Table A.1: Schools with SOS homophobie's Intervention

| | No Intervention (NI) | | Intervention (I) | | |
|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | Difference I − NI |
| Share of female students | 0.482 | 0.110 | 0.481 | 0.093 | 0.000 |
| | | | | | (0.009) |
| Share of students in general track (only HS) | 0.396 | 0.341 | 0.493 | 0.334 | 0.097 |
| | | | | | (0.060) |
| High school | 0.342 | 0.475 | 0.306 | 0.463 | −0.037 |
| | | | | | (0.046) |
| Share of French students | 0.865 | 0.084 | 0.834 | 0.096 | −0.031*** |
| | | | | | (0.010) |
| Average SPI | 101.223 | 16.032 | 95.972 | 14.318 | −5.252*** |
| | | | | | (1.445) |
| Paris | 0.158 | 0.365 | 0.176 | 0.383 | 0.018 |
| | | | | | (0.038) |
| Number of Schools | 1253 | | 108 | | |

*Notes:* This Table reports summary statistics for the schools in the Paris region that had an SOS homophobie intervention between 2018 and 2019 against those who did not. Schools that have several interventions in this period are counted once. Robust standard errors in parentheses. All statistics are computed using the data from the year 2008. "Paris" means the school is located in Paris, as opposed to the larger Paris region. "General track" means the class belong to the main track of studies, as opposed to the technological track.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.2: Schools Participating in the Experiment

| | Opt-Out | | Opt-In | | |
|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | Difference In − Out |
| Share of female students | 0.469 | 0.125 | 0.486 | 0.075 | 0.017 |
| | | | | | (0.023) |
| Share of students in general track (only HS) | 0.515 | 0.332 | 0.475 | 0.343 | −0.040 |
| | | | | | (0.118) |
| High school | 0.455 | 0.506 | 0.240 | 0.430 | −0.215** |
| | | | | | (0.101) |
| Share of French students | 0.851 | 0.086 | 0.827 | 0.100 | −0.025 |
| | | | | | (0.019) |
| Average SPI | 99.506 | 14.042 | 94.417 | 14.253 | −5.088* |
| | | | | | (2.937) |
| > 500m from QPV | 0.545 | 0.506 | 0.400 | 0.493 | −0.145 |
| | | | | | (0.104) |
| Paris | 0.182 | 0.392 | 0.173 | 0.381 | −0.008 |
| | | | | | (0.081) |
| Average # of past interventions | 0.707 | 0.908 | 1.222 | 1.487 | 0.515** |
| | | | | | (0.233) |
| Number of Schools | 33 | | 75 | | |

*Notes:* This Table reports summary statistics for the schools that had an SOS homophobie intervention between 2018 and 2019 against those who did not. Schools that have several interventions in this period are counted once. Robust standard errors in parentheses. All statistics are computed using the data from the year 2008, except for "Average of # of past interventions" (which is averaged between 2018 and 2021). "Paris" means the school is located in Paris, as opposed to the larger Paris region. "General track" means the class belong to the main track of studies, as opposed to the technological track. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

# Table A.3: Completely Random Sample

| | Non-random Sample (NR) | | Random Sample (R) | | |
|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | Difference R−NR |
| *Student characteristics* | | | | | |
| Female | 0.502 | 0.500 | 0.493 | 0.500 | −0.009 |
| | | | | | (0.017) |
| Age | 14.897 | 1.375 | 14.783 | 1.540 | −0.114 |
| | | | | | (0.283) |
| Number of students | 3979 | | 6377 | | |
| *Class characteristics* | | | | | |
| Share of female students | 0.463 | 0.156 | 0.474 | 0.145 | 0.011 |
| | | | | | (0.026) |
| Number of classes | 193 | | 317 | | |
| *Class characteristics (HS only)* | | | | | |
| General track | 0.491 | 0.505 | 0.548 | 0.500 | 0.058 |
| | | | | | (0.199) |
| Number of classes | 53 | | 93 | | |
| *School× Year characteristics* | | | | | |
| Treated | 0.129 | 0.341 | 0.678 | 0.471 | 0.549*** |
| | | | | | (0.087) |
| High school | 0.194 | 0.402 | 0.237 | 0.429 | 0.044 |
| | | | | | (0.091) |
| Share of French students | 0.843 | 0.108 | 0.824 | 0.087 | −0.019 |
| | | | | | (0.022) |
| Average SPI | 97.997 | 14.260 | 92.968 | 13.279 | −5.029 |
| | | | | | (3.082) |
| > 500m from QPV | 0.419 | 0.502 | 0.373 | 0.488 | −0.046 |
| | | | | | (0.110) |
| # interventions in past 5 years | 1.290 | 1.755 | 0.949 | 1.407 | −0.341 |
| | | | | | (0.363) |
| Wave 1 | 0.452 | 0.506 | 0.356 | 0.483 | −0.096 |
| | | | | | (0.110) |
| Wave 2 | 0.258 | 0.445 | 0.186 | 0.393 | −0.072 |
| | | | | | (0.095) |
| Wave 3 | 0.290 | 0.461 | 0.458 | 0.502 | 0.167 |
| | | | | | (0.105) |
| Créteil | 0.774 | 0.425 | 0.780 | 0.418 | 0.005 |
| | | | | | (0.094) |
| Paris | 0.194 | 0.402 | 0.169 | 0.378 | −0.024 |
| | | | | | (0.087) |
| Versailles | 0.032 | 0.180 | 0.051 | 0.222 | 0.019 |
| | | | | | (0.043) |
| Number of schools | 31 | | 59 | | |
| *Middle school× Year characteristics* | | | | | |
| Not in REP nor REP+ | 0.600 | 0.500 | 0.467 | 0.505 | −0.133 |
| | | | | | (0.125) |
| Number of schools | 25 | | 45 | | |

*Notes:* This Table reports summary statistics for the non-random and the completely-random sample. Standard errors in parentheses. Standard errors are clustered at the school×year level for student and class characteristics. For the school×year characteristics standard errors are robust. "Paris" means the school is located in Paris, as opposed to the larger Paris region. "General track" means the class belong to the main track of studies, as opposed to the technological track. "REP" and "REP+" are acronyms for *réseau d'éducation prioritaire*, i.e. disadvantaged areas that benefit from additional educational resources, with "+" meaning particularly disadvantaged.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

## Table A.4: Summary Statistics in the Final Sample

| | Control Group (C) | | Treatment Group (T) | | |
|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | Difference T−C |
| *Student characteristics* | | | | | |
| Female | 0.495 | 0.500 | 0.492 | 0.500 | −0.003 |
| | | | | | (0.024) |
| Age | 14.967 | 1.430 | 14.665 | 1.596 | −0.302 |
| | | | | | (0.425) |
| Number of students | 2485 | | 3874 | | |
| *Class characteristics* | | | | | |
| Share of female students | 0.484 | 0.147 | 0.469 | 0.143 | −0.016 |
| | | | | | (0.028) |
| Number of classes | 115 | | 199 | | |
| *Class characteristics in (HS only)* | | | | | |
| General track | 0.646 | 0.483 | 0.444 | 0.503 | −0.201 |
| | | | | | (0.201) |
| Number of classes | 48 | | 44 | | |
| *School× Year characteristics* | | | | | |
| High school | 0.316 | 0.478 | 0.200 | 0.405 | −0.116 |
| | | | | | (0.126) |
| Share of French students | 0.828 | 0.081 | 0.821 | 0.090 | −0.007 |
| | | | | | (0.023) |
| Average SPI | 92.858 | 11.689 | 93.021 | 14.113 | 0.163 |
| | | | | | (3.475) |
| > 500m from QPV | 0.421 | 0.507 | 0.350 | 0.483 | −0.071 |
| | | | | | (0.138) |
| # interventions in past 5 years | 0.947 | 1.311 | 0.950 | 1.467 | 0.003 |
| | | | | | (0.378) |
| Wave 1 | 0.421 | 0.507 | 0.325 | 0.474 | −0.096 |
| | | | | | (0.138) |
| Wave 2 | 0.316 | 0.478 | 0.125 | 0.335 | −0.191 |
| | | | | | (0.121) |
| Wave 3 | 0.263 | 0.452 | 0.550 | 0.504 | 0.287** |
| | | | | | (0.130) |
| Créteil | 0.737 | 0.452 | 0.800 | 0.405 | 0.063 |
| | | | | | (0.121) |
| Paris | 0.211 | 0.419 | 0.150 | 0.362 | −0.061 |
| | | | | | (0.111) |
| Versailles | 0.053 | 0.229 | 0.050 | 0.221 | −0.003 |
| | | | | | (0.063) |
| Number of schools | 19 | | 40 | | |
| *Middle school× Year characteristics* | | | | | |
| Not in REP nor REP+ | 0.308 | 0.480 | 0.531 | 0.507 | 0.224 |
| | | | | | (0.159) |
| Number of schools | 13 | | 32 | | |

*Notes:* This Table reports summary statistics for the control and treatment groups. Standard errors in parentheses. For student and class characreristics, standard errors are clustered at the school×year level. For the school×year characteristics standard errors are robust. "Paris" means the school is located in Paris, as opposed to the larger Paris region. "General track" means the class belong to the main track of studies, as opposed to the technological track. "REP" and "REP+" are acronyms for *réseau d'éducation prioritaire*, i.e. disadvantaged areas that benefit from additional educational resources, with "+" meaning particularly disadvantaged.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Effect of the intervention by school level

| School level | All | 1-month ATE | 3-month ATE |
|---|---|---|---|
| All | 0.161*** | 0.159*** | 0.163*** |
| | (0.051) | (0.058) | (0.057) |
| | [0.050] | [0.056] | [0.058] |
| Middle schools | 0.096* | 0.072 | 0.120** |
| | (0.050) | (0.065) | (0.058) |
| | [0.051] | [0.07] | [0.057] |
| High schools | 0.272*** | 0.280* | 0.255* |
| | (0.089) | (0.136) | (0.143) |
| | [0.092] | [0.129] | [0.128] |

*Notes:* This Table shows the ATE of the intervention on the composite index. Results are given by subgroups of school level. Standard errors clustered at the school×year level in parenthesis. Standard errors clustered at the school level in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.6: Effect of the intervention on subindexes and 10 objectives by school level

| | All | Middle Schools | High Schools |
|---|---|---|---|
| | (1) | (2) | (3) |
| **Taboo** | 0.166*** | 0.075 | 0.528*** |
| | (0.052) | (0.058) | (0.068) |
| | [0.051] | [0.058] | [0.07] |
| Close circle | 0.002 | −0.025 | 0.128*** |
| | (0.021) | (0.022) | (0.032) |
| | [0.021] | [0.022] | [0.033] |
| School staff | 0.103*** | 0.081*** | 0.177*** |
| | (0.014) | (0.017) | (0.014) |
| | [0.014] | [0.018] | [0.015] |
| **Awareness** | 0.116** | 0.086* | 0.074 |
| | (0.048) | (0.050) | (0.076) |
| | [0.048] | [0.052] | [0.078] |
| Choice | 0.039* | 0.021 | 0.062*** |
| | (0.020) | (0.021) | (0.016) |
| | [0.020] | [0.021] | [0.016] |
| Pathology | −0.007 | −0.027** | 0.009 |
| | (0.012) | (0.012) | (0.011) |
| | [0.012] | [0.012] | [0.011] |
| Diversity | −0.028 | −0.026 | −0.136*** |
| | (0.020) | (0.019) | (0.040) |
| | [0.022] | [0.023] | [0.043] |
| Negative consequences of anti-LGBT harassment | 0.039** | 0.039** | 0.073*** |
| | (0.015) | (0.019) | (0.024) |
| | [0.015] | [0.02] | [0.022] |
| Legal consequences of anti-LGBT harassment | 0.082*** | 0.081*** | 0.050 |
| | (0.019) | (0.021) | (0.057) |
| | [0.019] | [0.023] | [0.056] |
| How to aid a victim | 0.019 | 0.014 | 0.017 |
| | (0.012) | (0.014) | (0.040) |
| | [0.012] | [0.015] | [0.039] |
| **Attitude** | −0.006 | −0.083 | 0.072 |
| | (0.052) | (0.055) | (0.047) |
| | [0.051] | [0.056] | [0.05] |
| Willingness to defend | −0.013 | −0.027** | 0.039* |
| | (0.011) | (0.013) | (0.018) |
| | [0.011] | [0.014] | [0.019] |
| Positive attitude toward LGBT people | 0.009 | −0.022 | 0.014 |
| | (0.021) | (0.021) | (0.014) |
| | [0.021] | [0.021] | [0.014] |

*Notes:* This Table shows the ATE of the intervention on the ten objectives of *SOS homophobie*. Standard errors are clustered at the school×year level in parenthesis. Standard errors are clustered at the school level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.7: Effect of the intervention : Double Lasso

| | ATE | 1-month ATE | 3-month ATE |
|---|---|---|---|
| Composite Index | 0.147*** | 0.140** | 0.155*** |
| | (0.045) | (0.054) | (0.048) |
| Taboo | 0.166*** | 0.198*** | 0.131** |
| | (0.045) | (0.054) | (0.052) |
| Awareness | 0.086* | 0.065 | 0.109** |
| | (0.044) | (0.054) | (0.046) |
| Attitude | −0.063 | −0.131** | 0.000 |
| | (0.039) | (0.053) | (0.042) |

*Notes:* This Table shows the ATE of the intervention on the three weighted subindices using Double Lasso procedure to select controls. We use 5-fold cross-validation to select the penalty parameter. Standard errors are clustered at the school×year level in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.8: Effect of the intervention : Randomization-based inference and multiple-hypothesis testing

| | ATE | 1-month ATE | 3-month ATE |
|---|---|---|---|
| Composite Index | 0.161 | 0.159 | 0.163 |
| | (0.009) | (0.027) | (0.016) |
| | [0.013] | [0.014] | [0.014] |
| Taboo | 0.166 | 0.198 | 0.134 |
| | (0.013) | (0.010) | (0.065) |
| | [0.013] | [0.013] | [0.014] |
| Awareness | 0.116 | 0.098 | 0.133 |
| | (0.048) | (0.160) | (0.050) |
| | [0.018] | [0.039] | [0.020] |
| Attitude | −0.006 | −0.055 | 0.041 |
| | (0.911) | (0.462) | (0.536) |
| | [0.292] | [0.121] | [0.164] |

*Notes:* This Table shows the ATE of the intervention on the three weighted subindices. Randomization-based inference p-values are shown in parenthesis. FDR-adjusted q-values are shown in parenthesis. For the computation of these we use the procedure in Benjamini et al. (2006).

Table A.9: Effect of the intervention for the entire sample ($n = 10,356$)

| | ATE | 1-month ATE | 3-month ATE |
|---|---|---|---|
| Composite Index | 0.136*** | 0.139*** | 0.132*** |
| | (0.035) | (0.047) | (0.041) |
| | [0.035] | [0.046] | [0.042] |
| Taboo | 0.138*** | 0.172*** | 0.104** |
| | (0.041) | (0.053) | (0.041) |
| | [0.041] | [0.054] | [0.04] |
| Awareness | 0.104*** | 0.088** | 0.119*** |
| | (0.032) | (0.040) | (0.041) |
| | [0.032] | [0.041] | [0.042] |
| Attitude | −0.012 | −0.051 | 0.027 |
| | (0.037) | (0.049) | (0.043) |
| | [0.038] | [0.049] | [0.045] |

*Notes:* This Table shows the ATE of the intervention on the three weighted subindices for the entire sample, including non-random observations. Standard errors are clustered at the school×year level in parenthesis. Standard errors are clustered at the school level in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.10: Effect of the intervention – LATE

| | 1-month LATE | 3-month LATE |
|---|---|---|
| Composite Index | 0.152*** | 0.170*** |
| | (0.058) | (0.059) |
| | [0.057] | [0.060] |
| Taboo | 0.195*** | 0.137*** |
| | (0.063) | (0.053) |
| | [0.064] | [0.045] |
| Awareness | 0.092* | 0.139** |
| | (0.055) | (0.060) |
| | [0.054] | [0.061] |
| Attitude | −0.049 | 0.036 |
| | (0.060) | (0.065) |
| | [0.056] | [0.068] |

*Notes:* This Table shows the LATE of the intervention on the three weighted subindices. Standard errors clustered at the school×year level are in parenthesis. Standard errors clustered at the school level are in brackets.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.11: Treatment Heterogeneity – CLAN : Composite index

| | $G_1$ | $G_2$ | $G_3$ | $G_4$ | $G_4 - G_1$ | $G_4 - G_2$ | $G_4 - G_3$ |
|---|---|---|---|---|---|---|---|
| GATES | 0.094 | 0.182** | 0.240*** | 0.284*** | 0.179 | 0.109 | 0.031 |
| | [0.264] | [0.034] | [0.003] | [0.000] | [0.131] | [0.341] | [0.768] |
| Female | 0.337 | 0.490 | 0.547 | 0.612 | 0.276*** | 0.114*** | 0.054** |
| | | | | | [0.000] | [0.000] | [0.026] |
| Age | 14.622 | 14.632 | 14.772 | 15.098 | 0.496*** | 0.480*** | 0.309*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Grade | 3.671 | 3.711 | 3.833 | 4.152 | 0.473*** | 0.456*** | 0.300*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of female students in the class | 0.436 | 0.481 | 0.496 | 0.504 | 0.065*** | 0.022*** | 0.008 |
| | | | | | [0.000] | [0.000] | [0.125] |
| General track | 0.096 | 0.145 | 0.193 | 0.333 | 0.244*** | 0.196*** | 0.147*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| High school | 0.216 | 0.252 | 0.298 | 0.449 | 0.238*** | 0.205*** | 0.132*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of French students in the school | 0.807 | 0.832 | 0.844 | 0.851 | 0.041*** | 0.020*** | 0.008** |
| | | | | | [0.000] | [0.000] | [0.047] |
| Average SPI | 93.207 | 95.470 | 96.207 | 96.470 | 3.228*** | 1.136* | 0.429 |
| | | | | | [0.000] | [0.093] | [0.439] |
| > 500m from QPV | 0.366 | 0.447 | 0.440 | 0.463 | 0.094*** | −0.009 | 0.001 |
| | | | | | [0.000] | [0.729] | [0.935] |
| # Interventions in past 5 years | 0.541 | 1.079 | 1.461 | 1.625 | 1.060*** | 0.512*** | 0.180** |
| | | | | | [0.000] | [0.000] | [0.023] |
| Wave 1 | 0.238 | 0.325 | 0.443 | 0.614 | 0.374*** | 0.276*** | 0.166*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Wave 2 | 0.206 | 0.205 | 0.181 | 0.154 | −0.048*** | −0.058*** | −0.020 |
| | | | | | [0.009] | [0.002] | [0.277] |
| Wave 3 | 0.552 | 0.468 | 0.376 | 0.228 | −0.317*** | −0.245*** | −0.153*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Créteil | 0.746 | 0.786 | 0.775 | 0.743 | −0.001 | −0.040* | −0.048** |
| | | | | | [0.953] | [0.064] | [0.021] |
| Paris | 0.230 | 0.176 | 0.173 | 0.174 | −0.062*** | 0.000 | 0.004 |
| | | | | | [0.003] | [0.992] | [0.803] |
| Versailles | 0.010 | 0.030 | 0.048 | 0.077 | 0.065*** | 0.039*** | 0.029*** |
| | | | | | [0.000] | [0.000] | [0.010] |
| Not in REP nor REP+ | 0.393 | 0.412 | 0.382 | 0.247 | −0.140*** | −0.182*** | −0.130*** |
| | | | | | [0.000] | [0.000] | [0.000] |

*Notes:*This Table shows the estimates for the GATES and CLAN described in (Chernozhukov et al., 2023) for the composite index. Column (1) gives the estimates for the least-affected individuals, whereas Column (4) presents the estimates for the most-affected ones. We also provide estimates for the differences between groups. For this variable, the best ML algorithm was SVM. $p$-values are reported in brackets.

Table A.12: Treatment Heterogeneity – CLAN : Taboo

| | $G_1$ | $G_2$ | $G_3$ | $G_4$ | $G_4 - G_1$ | $G_4 - G_2$ | $G_4 - G_3$ |
|---|---|---|---|---|---|---|---|
| GATES | −0.005 | 0.095 | 0.213** | 0.407*** | 0.412*** | 0.324*** | 0.206 |
| | [0.954] | [0.296] | [0.029] | [0.000] | [0.002] | [0.008] | [0.102] |
| Female | 0.534 | 0.490 | 0.444 | 0.501 | −0.023 | 0.005 | 0.044* |
| | | | | | [0.363] | [0.631] | [0.059] |
| Age | 14.598 | 14.642 | 14.636 | 15.200 | 0.618*** | 0.565*** | 0.574*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Grade | 3.701 | 3.743 | 3.668 | 4.185 | 0.491*** | 0.460*** | 0.498*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of female students in the class | 0.485 | 0.474 | 0.485 | 0.475 | −0.010 | 0.002 | −0.007 |
| | | | | | [0.153] | [0.645] | [0.281] |
| General track | 0.101 | 0.099 | 0.169 | 0.371 | 0.278*** | 0.265*** | 0.204*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| High school | 0.233 | 0.221 | 0.263 | 0.488 | 0.261*** | 0.269*** | 0.228*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of French students in the school | 0.815 | 0.828 | 0.836 | 0.851 | 0.035*** | 0.026*** | 0.016*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Average SPI | 95.870 | 95.437 | 94.948 | 95.711 | 0.068 | 0.083 | 0.777 |
| | | | | | [0.852] | [0.817] | [0.157] |
| > 500m from QPV | 0.428 | 0.425 | 0.420 | 0.465 | 0.047* | 0.035* | 0.046* |
| | | | | | [0.051] | [0.061] | [0.060] |
| # Interventions in past 5 years | 0.813 | 0.997 | 1.242 | 1.635 | 0.794*** | 0.656*** | 0.411*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Wave 1 | 0.315 | 0.317 | 0.415 | 0.573 | 0.266*** | 0.247*** | 0.166*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Wave 2 | 0.246 | 0.215 | 0.163 | 0.130 | −0.125*** | −0.103*** | −0.038** |
| | | | | | [0.000] | [0.000] | [0.036] |
| Wave 3 | 0.435 | 0.460 | 0.409 | 0.294 | −0.142*** | −0.165*** | −0.113*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Créteil | 0.738 | 0.751 | 0.797 | 0.786 | 0.048** | 0.032 | −0.009 |
| | | | | | [0.019] | [0.125] | [0.636] |
| Paris | 0.216 | 0.209 | 0.160 | 0.160 | −0.064*** | −0.046** | −0.007 |
| | | | | | [0.002] | [0.023] | [0.720] |
| Versailles | 0.034 | 0.041 | 0.045 | 0.049 | 0.018** | 0.007 | 0.005 |
| | | | | | [0.044] | [0.445] | [0.590] |
| Not in REP nor REP+ | 0.394 | 0.419 | 0.373 | 0.235 | −0.186*** | −0.179*** | −0.154*** |
| | | | | | [0.000] | [0.000] | [0.000] |

*Notes:* This Table shows the estimates for the GATES and CLAN described in (Chernozhukov et al., 2023) for the taboo subindex. Column (1) gives the estimates for the least-affected individuals, whereas Column (4) presents the estimates for the most-affected ones. We also provide estimates for the differences between groups. For this variable, the best ML algorithm was boosting. $p$-values are reported in brackets.

Table A.13: Treatment Heterogeneity – CLAN : Awareness

| | $G_1$ | $G_2$ | $G_3$ | $G_4$ | $G_4 - G_1$ | $G_4 - G_2$ | $G_4 - G_3$ |
|---|---|---|---|---|---|---|---|
| GATES | −0.104 | 0.017 | 0.097 | 0.260*** | 0.362*** | 0.246** | 0.162 |
| | [0.290] | [0.840] | [0.228] | [0.003] | [0.005] | [0.044] | [0.153] |
| Female | 0.356 | 0.471 | 0.603 | 0.529 | 0.162*** | 0.029 | −0.080*** |
| | | | | | [0.000] | [0.215] | [0.001] |
| Age | 14.945 | 14.814 | 14.675 | 14.682 | −0.349*** | −0.109 | −0.015 |
| | | | | | [0.000] | [0.171] | [0.859] |
| Grade | 3.925 | 3.854 | 3.731 | 3.791 | −0.210*** | −0.048 | 0.033 |
| | | | | | [0.001] | [0.462] | [0.620] |
| % of female students in the class | 0.454 | 0.480 | 0.493 | 0.485 | 0.034*** | 0.002 | −0.004 |
| | | | | | [0.000] | [0.390] | [0.593] |
| General track | 0.175 | 0.170 | 0.173 | 0.240 | 0.063*** | 0.064*** | 0.074*** |
| | | | | | [0.001] | [0.001] | [0.000] |
| High school | 0.322 | 0.274 | 0.271 | 0.349 | 0.026 | 0.077*** | 0.090*** |
| | | | | | [0.243] | [0.000] | [0.000] |
| % of French students in the school | 0.819 | 0.822 | 0.832 | 0.856 | 0.032*** | 0.034*** | 0.023*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Average SPI | 94.725 | 93.387 | 94.367 | 98.501 | 3.947*** | 5.063*** | 3.842*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| > 500m from QPV | 0.429 | 0.367 | 0.401 | 0.531 | 0.115*** | 0.155*** | 0.116*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| # Interventions in past 5 years | 1.025 | 1.068 | 1.199 | 1.345 | 0.328*** | 0.258*** | 0.148* |
| | | | | | [0.000] | [0.001] | [0.054] |
| Wave 1 | 0.368 | 0.365 | 0.399 | 0.478 | 0.098*** | 0.101*** | 0.081*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Wave 2 | 0.171 | 0.170 | 0.182 | 0.216 | 0.039* | 0.045*** | 0.032 |
| | | | | | [0.052] | [0.010] | [0.104] |
| Wave 3 | 0.439 | 0.462 | 0.415 | 0.314 | −0.126*** | −0.150*** | −0.103*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Créteil | 0.751 | 0.802 | 0.774 | 0.724 | −0.037* | −0.072*** | −0.045** |
| | | | | | [0.097] | [0.000] | [0.037] |
| Paris | 0.209 | 0.152 | 0.174 | 0.206 | 0.024 | 0.054*** | 0.032* |
| | | | | | [0.175] | [0.005] | [0.076] |
| Versailles | 0.032 | 0.038 | 0.042 | 0.064 | 0.029*** | 0.031*** | 0.022** |
| | | | | | [0.004] | [0.006] | [0.046] |
| Not in REP nor REP+ | 0.339 | 0.355 | 0.363 | 0.356 | 0.022 | 0.003 | −0.016 |
| | | | | | [0.325] | [0.897] | [0.510] |

*Notes:* This Table shows the estimates for the GATES and CLAN described in (Chernozhukov et al., 2023) for the awareness subindex. Column (1) gives the estimates for the least-affected individuals, whereas Column (4) presents the estimates for the most-affected ones. We also provide estimates for the differences between groups. For this variable, the best ML algorithm was boosting. $p$-values are reported in brackets.

Table A.14: Treatment Heterogeneity – CLAN : Attitude

| | $G_1$ | $G_2$ | $G_3$ | $G_4$ | $G_4 - G_1$ | $G_4 - G_2$ | $G_4 - G_3$ |
|---|---|---|---|---|---|---|---|
| GATES | −0.292*** | −0.140 | −0.011 | 0.227*** | 0.511*** | 0.367*** | 0.226* |
| | [0.004] | [0.116] | [0.903] | [0.007] | [0.000] | [0.003] | [0.072] |
| Female | 0.305 | 0.488 | 0.617 | 0.549 | 0.246*** | 0.065*** | −0.069*** |
| | | | | | [0.000] | [0.005] | [0.006] |
| Age | 14.798 | 14.660 | 14.646 | 14.964 | 0.195** | 0.327*** | 0.337*** |
| | | | | | [0.010] | [0.000] | [0.000] |
| Grade | 3.784 | 3.730 | 3.731 | 4.044 | 0.264*** | 0.333*** | 0.304*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of female students in the class | 0.456 | 0.476 | 0.488 | 0.494 | 0.038*** | 0.016*** | 0.005 |
| | | | | | [0.000] | [0.008] | [0.385] |
| General track | 0.140 | 0.153 | 0.194 | 0.288 | 0.143*** | 0.132*** | 0.091*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| High school | 0.250 | 0.260 | 0.292 | 0.413 | 0.160*** | 0.156*** | 0.123*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| % of French students in the school | 0.825 | 0.825 | 0.837 | 0.844 | 0.019*** | 0.019*** | 0.003 |
| | | | | | [0.000] | [0.000] | [0.303] |
| Average SPI | 93.240 | 93.671 | 96.766 | 97.142 | 3.332*** | 3.298*** | 0.411 |
| | | | | | [0.000] | [0.000] | [0.520] |
| > 500m from QPV | 0.367 | 0.378 | 0.465 | 0.501 | 0.131*** | 0.138*** | 0.026 |
| | | | | | [0.000] | [0.000] | [0.181] |
| # Interventions in past 5 years | 0.925 | 1.039 | 1.183 | 1.511 | 0.628*** | 0.435*** | 0.313*** |
| | | | | | [0.000] | [0.000] | [0.000] |
| Wave 1 | 0.380 | 0.393 | 0.412 | 0.425 | 0.053** | 0.048** | 0.035 |
| | | | | | [0.031] | [0.050] | [0.104] |
| Wave 2 | 0.185 | 0.178 | 0.215 | 0.172 | −0.016 | −0.011 | −0.047** |
| | | | | | [0.428] | [0.567] | [0.019] |
| Wave 3 | 0.423 | 0.413 | 0.371 | 0.387 | −0.038 | −0.069*** | 0.025 |
| | | | | | [0.119] | [0.006] | [0.275] |
| Créteil | 0.799 | 0.797 | 0.717 | 0.750 | −0.043** | −0.035* | 0.031 |
| | | | | | [0.038] | [0.082] | [0.112] |
| Paris | 0.154 | 0.162 | 0.246 | 0.178 | 0.031* | 0.004 | −0.060*** |
| | | | | | [0.063] | [0.813] | [0.006] |
| Versailles | 0.045 | 0.027 | 0.038 | 0.062 | 0.019 | 0.034*** | 0.027** |
| | | | | | [0.102] | [0.000] | [0.018] |
| Not in REP nor REP+ | 0.391 | 0.362 | 0.382 | 0.298 | −0.108*** | −0.061** | −0.088*** |
| | | | | | [0.000] | [0.011] | [0.000] |

*Notes:* This Table shows the estimates for the GATES and CLAN described in (Chernozhukov et al., 2023) for the attitude subindex. Column (1) gives the estimates for the least-affected individuals, whereas Column (4) presents the estimates for the most-affected ones. We also provide estimates for the differences between groups. For this variable, the best ML algorithm was boosting. $p$-values are reported in brackets.