School-Contextual Paths to Student Bullying Behaviour: Teachers Under Time Pressure are Less Likely to Intervene and the Students Know It!

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ABSTRACT
We assessed whether the level of time-pressure reported by a school’s teachers is predictive of student bullying perpetration. We combined data from two surveys conducted in 129 schools in 2016: the Stockholm School Survey performed among students in grades 9 and 11 (n = 10,668), and the Stockholm Teacher Survey carried out among senior level (grades 7–9) and upper secondary school (grades 10–12) teachers (n = 2259). Multilevel path analyses showed that teachers’ stress and time-pressure increased with declining school leadership functioning. Teachers’ level of time-pressure was, in turn, positively associated with student traditional and cyberbullying behaviour, through its effect on the school staff’s tendency (not) to intervene against bullying, but not through the teachers’ stress level. We conclude that schools with leadership that provides opportunities for the teachers to focus on their main mission can counteract bullying among the students and therefore indirectly also to promote student health.

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1. Introduction
The school constitutes one of the most important social arenas in young people’s lives. Besides its function as a teaching institution, it is also a place where various kinds of social relationships are formed and negotiated over time. The patterns of intrapersonal relationships that emerge in a given school setting partly build on students’ hierarchical ranking of each other according to status (Gronlund, 1959; Mjaavatn et al., 2016; Moreno, 1953). Competition for status and power is an essential component in the establishment of peer relations, and in this struggle, bullying behaviour can sometimes serve as an effective strategy to climb the status ladder (Saarento et al., 2015a). Status goals have been empirically identified as an important driving force behind bullying behaviour in the school setting (Faris & Felmlee, 2011; Sijtsema et al., 2009), with several social benefits to be potentially gained by the individual student in terms of popularity (Rodkin et al., 2006), social connectedness (Young et al., 2015) and self-esteem (Gendron et al., 2011; Olweus, 1993). Efforts by teachers to reduce social status inequalities in the classroom have indeed also been linked to a decreased number of bullied students (Serdiouk et al., 2015).
Teachers play a key role in fostering an accepting school climate and setting the standards for classroom behaviour and everyday interaction (Battistish et al., 1997; Craig et al., 2000; Troop-Gordon & Ladd, 2015). At the same time, present-day teachers are among the professions reporting the highest levels of work-related stress in Sweden (Swedish Governmental Official Reports, 2014; The Swedish Work Environment Authority, 2016a, 2016b) and many other European countries alike (European Union, 2013). The school leadership’s capacity to relieve the burden of stress and time-pressure on their teachers is, however, likely to differ between schools. Therefore, the teachers’ space for paying attention to, and intervening in, bullying situations is also likely to vary across schools. In this study, we address this question by examining how the school’s leadership functioning – via the teachers’ levels of time-pressure and stress as well as the students’ perception of their teachers’ readiness to intervene against bullying – is associated with student bullying perpetration.

Bullying perpetration refers to an intentional act meant to cause social, psychological and/or physical harm to another, less powerful, individual (Olwens, 1993, 1997). It can take the form of either direct or indirect expressions of disapproval. The former type includes both physical bullying such as hitting and kicking, and verbal bullying such as teasing, threatening and insulting, whereas the latter type refers to more subtle forms of bullying, such as spreading rumours, ostracizing and excluding someone from the peer group. Bullying can be performed face to face (traditional bullying) or through electronic devices such as mobile phones and computers (cyberbullying). In an international perspective, Sweden stands out as a country with very low rates of bullying. According to the most recent international report from the Health Behaviour in School-aged Children (HBSC) study, the average proportions of 15-year-olds who reported to have been bullied at least two or three times a month in the past couple of months in the international data material as a whole were 8% for girls and 9% for boys. For Sweden, the corresponding share were 3% for girls and boys alike (Inchley et al., 2016, p. 201). With regards to bullying perpetration, the HBSC average of 15-year-olds who reported to have bullied others at least two or three times a month in the past couple of months was 6% for girls and 12% for boys. The corresponding shares among 15-year-olds in Sweden were 1% for girls and 3% for boys (Inchley et al., 2016, p. 203).

A vast amount of research has been conducted in order to identify individual characteristics associated with bullying behaviour. According to a recent systematic review on this topic, psychological traits such as impulsivity, hyperactivity, sensation seeking, aggressiveness and absence of empathy are predictive of being a bully, as are anti-social behaviour problems associated with callous-unemotional traits and other types of norm-violating conduct (Alvarez-Garcia et al., 2015). Despite these less than desirable qualities, being a bully still seems to be positively associated with sociometric popularity among peers (Alvarez-Garcia et al., 2015; De Bruyn et al., 2010; Rodkin et al., 2006), while the corresponding relationships with social competence and self-esteem show mixed results (Alvarez-Garcia et al., 2015). In a more recent investigation based on Chinese high school students, Young et al. (2015) found that while a sizeable share of the bullies in their study reported being unhappy and socially disconnected, the majority still claimed to be happy and socially connected with their fellow students.

The above findings not only suggest that social rewards can be obtained by individual students through bullying behaviour, but they also imply that these benefits come at a very low, or no, “social cost” for some students. The cost for the victim, on the other hand, may be very high in terms of adverse health both in the short (Gini & Pozzoli, 2009) and the long term (Wolke & Lereya, 2015). Bullying has thus been identified as a significant public health problem (Srabstein et al., 2008; Espelage and De La Rue, 2012).

If left unattended, incentives like the ones described above will no doubt spur bullying among individual students and could, in extension, unleash social forces fostering an overall hostile school climate. As in any other social setting, however, every school has a set of commonly held norms of what is, or is not, socially acceptable behaviour. Ideally, these social norms should reflect the school’s articulated value system as stipulated by its leadership, rather than some moral standards that have evolved among the students themselves over time (Modin et al., 2017). This requires a conscious
strategy by the leadership on how to convey the school’s values to the students via channels such as their teachers’ classroom work. A leadership that (proactively) succeeds in implementing and maintaining a set of shared norms for social conduct at the school will also save time that would have otherwise been spent on reactive measures against bullying and other unwanted behaviours. Schools with a strong teacher-rated leadership have furthermore been found to have lower levels of bullying among their students (Espelage et al., 2014; Låftman et al., 2017a).

An important property of social norms is that they can modify behaviour of individual group members through interpersonal expectations and sanctions (Miller & Prentice, 2016; Reynolds et al., 2014). A school’s social norms, therefore, hold the capacity to make acts of bullying become associated with “costs”, rather than rewards, in the minds of the students (Brendgen et al., 2015; Salminvalli & Voeten, 2004). Publically expressed disapproval from fellow students and/or school staff is an example of a foreseeable “cost” that can lead a student to refrain from acting in a certain way. If necessary, teachers can also exercise formal sanctions against perpetrators of bullying in order to remind them (and their peers) of the importance of conforming to existing school norms.

Prior research has shown that teacher-student relationships characterized by caring not only strengthen student learning and motivation, but also their social and moral development (Velasquez et al., 2013). Bullying tends to be less common in schools characterized by positive student-teacher relationships and in contexts where teachers show disapproving attitudes – and intervene – against bullying (Azeredo et al., 2015; Låftman et al., 2017b; Saarento et al., 2013, 2015a, 2015b). A supportive teacher climate has furthermore been empirically linked to an increased willingness for bullied students to seek help (Elot et al., 2010). By contrast, schools characterized by poor professional cultures in terms of leadership, teacher affiliation and collaborative activities tend to exhibit higher levels of bullying (Ertesvåg & Roland, 2015; Roland & Galloway, 2004).

Most human beings tend to act in their own interest (see e.g., Ratner & Miller, 2001), and school bullying is therefore not likely to cease as long as there are personal gains to be made through such behaviours. Thus, a crucial task in schools’ anti-bullying work is to counteract all sorts of existing incentives for bullying behaviour that they can observe in the school environment, and prevent the emergence of new ones. Here, an important prerequisite is of course that teachers and other school staff pay attention to, and intervene in, situations where bullying takes place. Such activities require time, commitment and energy; resources which may be difficult to mobilize in a school landscape characterized by stressed and overloaded teachers like the Swedish one. Stress and exhaustion among teachers are related to feelings of insufficiency in providing support for their students as well as an increased tendency towards social withdrawal from students and colleagues in general (Grayson & Alvarez, 2008; Höglund et al., 2015). Stress has also been shown to predict the quality of teachers’ relationship with students (Yoon, 2002).

The substantially increased administrative burden that Swedish teachers have experienced during the past decades, following a long series of school reforms, is a clear contributor to their overall heightened level of stress (Swedish Governmental Official Reports, 2014; Teachers’ magazine, 2018). While teachers’ core tasks comprise teaching and planning, many teachers also feel that they have to spend an inordinate amount of time on administration, documentation and other chores that are not directly related to the teaching profession (Kjellström et al., 2016). Excessive performance of tasks that do not belong to their core chores is highly predictive of teachers’ perceived stress, depressed mood and poor self-rated health (Kjellström et al., 2016). It thus seems reasonable to assume that stressed teachers in general, and time-pressured teachers in particular, have fewer possibilities to foster positive student-teacher relationships and to intervene when bullying occurs. A school leadership that stays informed about their teachers’ working conditions and is prepared to rectify emerging problems that might aggravate their situation, is of course a key factor for minimizing stress and time-pressure among teachers. The prerequisites for the leadership to build a common value-system for the school and to provide the necessary conditions for their teachers to work “collectively” in a student-centered manner is nevertheless likely to differ between schools depending on their student composition profile (Liu et al., 2015). Therefore, socioeconomic and demographic
characteristics of the school’s student body are important to take into consideration when trying to identify various school-contextual paths to student bullying behaviour. By using the school’s leadership functioning as the point of departure and while controlling for the school’s student composition, this study examines whether the level of time-pressure reported by a school’s teachers is predictive of student perpetration of traditional and cyberbullying, and whether any such relationship operates through pathways involving the teachers’ overall stress level and/or the teachers’ inclination to intervene in bullying situations when they occur. To this end, we use a unique data material that combines information from two separate surveys conducted amongst teachers and students, respectively. The assumed causal structure between the variables is depicted in Figure 1.

We hypothesize that school staff’s inclination to intervene in situations where bullying occurs is negatively associated with student bullying behaviour. We also expect that the level of time-pressure among teachers is positively associated with student bullying behaviour, and that this association is mediated by teacher stress and by the school staff’s lower tendency to intervene against bullying in these schools. Further, we hypothesize that the schools’ leadership functioning is negatively associated with student bullying behaviour, both directly and indirectly through a path going via “stressed and/or time-pressured teachers” and “school staff’s inclination to intervene”. Finally, we anticipate our school-contextual predictors to be more strongly linked to traditional- than to cyberbullying perpetration.

2. Material and Method
  2.1. Data and Procedure

The data were derived from three separate sources, the Stockholm School Survey (SSS), the Stockholm Teacher Survey (STS), and the National Agency for Education’s information system SIRIS. The SSS is a cross-sectional survey administered by Stockholm Municipality. It is carried out biennially among students in the 9th (final) grade of the elementary school (≈15 years old) and in the eleventh grade (i.e., the second grade of the upper secondary school; ≈17 years old). All public schools are obliged to participate, whereas independent schools are invited to participate on a voluntary basis. The questionnaires are administered by teachers and are filled in by the students in the
classroom. The SSS is part of Stockholm municipality’s preventive work and accordingly encompasses a large set of questions on alcohol, smoking and drugs, but areas such as the students’ working conditions at school, bullying behaviour and psychological health are also included.

The STS is an initiative from the Centre for Health Equity Studies (CHESS) at Stockholm University and has been carried out twice (2014 and 2016). In 2016, the STS was performed among all senior-level teachers (grades 7–9) and upper-secondary level teachers (grades 10–12) in Stockholm municipality. The overall aim of the STS was to obtain information on schools through teachers’ assessments of aspects such as the school leadership, cooperation and consensus, and school ethos, as well as of teachers’ working conditions and experiences of stress, and to link these school-contextual aspects to students’ responses from the SSS. The STS was performed through a web-based questionnaire. The questionnaires were to a large extent similar in 2014 and in 2016, with the exception that in 2016, there was an expanded battery of questions on teachers’ time use.

SIRIS is an online information system on school results and quality, and contains among other things basic facts about schools such as numbers of students and teachers, percentage of parents with a tertiary education, proportion of students with a foreign background etc. (Swedish National Agency of Education, 2016).

Since the purpose of the present study was to assess how teachers’ time pressure is related to traditional bullying and cyberbullying perpetration among students, we used data from the 2016 surveys. In the SSS of 2016, external non-response (due to student absence during the day of the survey) has been estimated at about 22% (Stockholm Municipality, 2016). Since the data were collected anonymously, with no information on the identity of individual students, it is not possible to determine to what extent the non-response is systematically biased. It is however likely that students who are often absent from school (due to illness or other reasons) are somewhat underrepresented in the SSS data. In the STS of 2016, external non-response was 46% among senior-level teachers and 43% among upper secondary school teachers.

Our combined teacher-student data cover a total of 11,764 students and 2362 teachers distributed over 146 schools. Due to missing information in the SIRIS database, 16 (small-sized) schools were lost. After excluding all 24 students from one school with missing information on teachers’ time use (in STS); as well as 396 students who did not report their gender (in SSS), the final analytic sample consisted of 10,668 students (of whom 5271 were ninth grade students, and 5397 eleventh grade students), which corresponds to 80% of all students in the selected schools. The aggregated school-level data for the same schools was based on responses from 2259 teachers (of whom 1139 were upper secondary school teachers, and 1120 senior level teachers), corresponding to 53% of all teachers in the selected schools. These students and teachers were distributed across 129 schools (of which 46 were upper-secondary level and 83 senior-level schools). An overview of the process by which the final study sample was selected is presented in Figure 2.

**2.2. Variables**

*Traditional bullying perpetration*, one of the two outcomes of interest, was assessed by the question (in the SSS): “Have you taken part in the bullying or harassment of other students this school year?” Students who responded “No” or “Yes, occasionally” were classified as not being perpetrators of traditional bullying. Those who marked “Yes, 2 or 3 times a month”, “Yes, about once a week” or “Yes, several times a week” were classified as perpetrators of traditional bullying. The answer “Don’t know” was coded as missing value.

*Cyberbullying perpetration*, the second outcome of interest, was captured by the question (in the SSS): “Have you taken part in the bullying or harassment of other students on the Internet or by text messaging this school year?” The response categories were “Yes”, “No” and “Don’t know”. The last alternative was coded as missing.

*Teacher’s ratings of the school leadership*, was assessed by the question (in the STS): “How do the following statements describe the school leadership?” and the statements, (a) “The management has
an interest in pedagogical questions”; (b) “The management shows an understanding of my work problems”; (c) “When the management makes decisions on important issues they first discuss it with the teaching staff”; (d) “The management allows room for teachers’ pedagogical freedom”; (e) “I regularly receive feedback from the management about my performance as a teacher”; (f) “The management is a good support for teachers experiencing difficulties with a class”; (g) “The distribution of responsibility between teachers is clear at this school”; and (h) “This school is lead in a good way”. Each item had five response alternatives: “Strongly agree”, “Agree”, “Neither agree nor disagree”, “Disagree”, and “Strongly disagree”. The scores from each statement were summed to form an index. It ranged from 8 to 40 with higher values indicating more satisfaction with the leadership. The index showed high internal consistency (Cronbach’s alpha = 0.90). In the analyses, school level average of the index was used.

*Teachers’ time pressure* was captured by the question (in the STS): “Do you sometimes work with tasks in any of the following areas that you do not think should be part of your job as a teacher?” and the statements (a) “Excessive administration and documentation”; (b) “Excessive contact with parents”; (c) Practical chores (e.g., act as as schoolkeepers or housekeepers”; and (d) “Other tasks”. For each item, the response categories were “Very often”, “Fairly often”, “Sometimes” and “Not at all”. Additionally, answer to the question “Do you feel that your time is used for the right tasks?” with response options “Often”, “Sometimes”, “Rarely” and “Never” was used. The values from each statement were summed to form an index. It ranged from 5 to 20 with higher values indicating more time spent on tasks that are not part of the main chores and thus indicating more time pressure. The index showed high internal consistency (Cronbach’s alpha = 0.71). In the analyses, school level average of the index was used.

Figure 2. Flow-chart showing how the analytic sample was formed, starting with all schools in Stockholm municipality in 2016.
Teacher’s perceived stress was assessed by the question (in the STS) “I have days when I...” and the statements (a) “Constantly feel tense or wound up”; (b) “Feel pressured, nearly more than I can manage”; and (c) “Constantly feel stressed”. The four responses options included “Not at all”, “Sometimes”, “Fairly often”, and “Nearly always”. The values from each statement were summed to form an index ranging between 3-12, with higher values indicating more stress. The index showed high internal consistency (Cronbach’s alpha = 0.88). In the analyses, school level average of the index was used.

The variable “Adults intervene against bullying” was assumed to be a mediator between teacher’s time-pressure and/or perceived stress and student bullying behaviour. It was measured by the statement (in the SSS): “Adults step in if anyone is harassed or bullied”. The response categories were “Describes very poorly”, “Describes rather poorly”, “Describes rather well” and “Describes very well”. The first two categories were contrasted against the latter two.

Additional variables that could act as potential confounders were also included. Grade was added in all the analyses. Gender was measured by the question “Are you a boy or a girl?”; respondents who ticked neither “Boy” nor “Girl” were excluded. Information about the proportion of students in the school with at least one parent with post-secondary education, and proportion of students with a foreign background (i.e., born outside Sweden or having both parents born outside of Sweden), were retrieved from SIRIS.

2.3. Ethics

The Regional Ethical Review Board of Stockholm has provided permission for the Stockholm Teacher Survey (2013/2188-31/5; 2015/1827-31/5). Data from the Stockholm School Survey are not subject to consideration for ethical approval since the questionnaires are filled in anonymously by the students, with no information on personal identification (2010/241-31/5).

2.4. Statistical Method

For the analyses, all the variables with two possible values were assigned values 0 or 1 (e.g., gender was coded as boy = 0 and girl = 1; grade was coded as ninth grade = 0 and eleventh grade = 1; bullying perpetration as no = 0 and yes = 1). All the associations within the path model were analysed as linear, i.e., linear probability models were estimated. All the variables were treated as observed (i.e., not latent) and continuous.

The data were analysed with multilevel path analysis. Gender and grade were measured on the individual level and modelled on the within level only. Teachers’ time pressure, teachers’ stress, school leadership, proportion of students with parents with post-secondary education, and proportion of students with foreign background were measured on the school level and modelled on the between level only. Traditional bullying and cyberbullying perpetration and student perception of the adults’ tendency to intervene were measured on the individual level and modelled on both the within and between levels. The path model was estimated using maximum likelihood with robust standard errors (default in Mplus), and including individuals with missing information on dependent variables (Muthén & Muthén, 2007). We had complete information on the school level characteristics as well as grade and gender. There were up to 5% missing values in the three variables bullying and cyberbullying perpetration, and whether the adults intervene if bullying occurs. Only 79 (0.7%) students missed information on all the three measures and 199 (<2%) missed two out of three. Mediation effects of time pressure on bullying perpetration through teachers’ stress or student perception of the adults’ tendency to intervene were estimated with MODEL CONSTRAINT in Mplus.

Two similar models were estimated, based on the assumed causal structure between the variables as shown in Figure 1. In the first model the main outcome of interest was traditional bullying and in the second model it was cyberbullying while the rest of the model remained the same. Due to the low
number of bullying perpetrators and because student gender did not modify the association between teachers’ time pressure and bullying by the student (data not shown), both genders were analysed simultaneously. However, as bullying perpetration was more common among boys than girls, we added gender in the path model as a covariate. For similar reasons grade was added to the models as well. Data preparation and exploratory analysis were performed with StataSE 15.1 (Stata Corp LP, College Station, Texas, USA). The SEM analyses were run with Mplus Version 7.11 (Muthén and Muthén, 1998-2013).

3. Results

In Table 1 the distribution of all variables is presented, both in the total sample and by thirds of the student sample defined by the schools’ level of teachers’ time pressure. Note that the thirds in the analytic sample are not equal in size as they were defined before excluding the students and schools with missing information on other variables, and thus represent the thirds in the full sample.

Average teacher ratings of school leadership decreased across the three categories of schools, while teachers’ stress increased and the proportion of students who feel that the adults at school intervene when bullying occurs tended to decrease with increasing time pressure among the teachers at the school level. The overall prevalence of traditional bullying and cyberbullying were 2% and 4%, respectively, without any clear trend across categories of schools defined by the level of time pressure of the teachers. The prevalence however differed considerably between schools, from between 0% and 10% in most of the schools but reaching levels as high as 25% for traditional and 40% for cyberbullying in some specific (small sized) schools. Intraclass correlations were 0.010 for bullying perpetration and 0.011 for cyberbullying perpetration.

Table 1. Description of the analytic sample.

| Thirds of time pressure index | Lowest third, n = 3401 students, N = 49 schools | Middle third, n = 3587 students, N = 35 schools | Highest third, n = 3680 students, N = 45 schools | Total sample N = 10,668 students, N = 129 schools |
|------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| School level variables       |                                                |                                                |                                                |                                                |
| Time pressure index: mean (SD); range | 10.9 (.54); 8.7–11.5 | 11.9 (.23); 11.5–12.4 | 13.1 (.62); 12.4–15.5 | 12.0 (.51); 8.7–15.5 |
| School leadership: mean (SD); range | 28.2 (3.79); 17.0–35.8 | 26.8 (2.87); 18.5–33.5 | 25.9 (3.34); 19.0–33.3 | 27.0 (3.48); 17.0–35.8 |
| Teachers’ stress: mean (SD); range | 6.8 (.72); 4.0–8.3 | 7.0 (.65); 5.7–8.6 | 7.3 (.72); 5.6–9.6 | 7.1 (.73); 4.0–9.6 |
| Parental education: mean (SD); range | 61% (26%); 10–92% | 61% (21%); 7–91% | 56% (21%); 13–84% | 59% (23%); 7–92% |
| Foreign born: mean (SD); range | 38% (28%); 5–97% | 33% (18%); 5–82% | 35% (25%); 10–96% | 35% (24%); 5–97% |
| Student level variables      |                                                |                                                |                                                |                                                |
| Grade: n (%)                 |                                                |                                                |                                                |                                                |
| 9th grade                    | 1494 (44%) | 1555 (43%) | 2222 (60%) | 5271 (49%) |
| 11th grade                   | 1907 (56%) | 2032 (57%) | 1458 (40%) | 5397 (51%) |
| Gender: n (%)                |                                                |                                                |                                                |                                                |
| Boy                          | 1515 (45%) | 1782 (50%) | 1888 (51%) | 5185 (49%) |
| Girl                         | 1886 (55%) | 1805 (50%) | 1792 (49%) | 5483 (51%) |
| Bullying perpetration: n (%) |                                                |                                                |                                                |                                                |
| No                           | 3194 (94%) | 3360 (94%) | 3384 (92%) | 9938 (93%) |
| Yes                          | 45 (1%) | 54 (2%) | 85 (2%) | 184 (2%) |
| missinga                     | 162 (5%) | 173 (5%) | 211 (6%) | 546 (5%) |
| Cyberbullying perpetration: n (%) | 3126 (92%) | 3293 (92%) | 3318 (90%) | 9737 (91%) |
| No                           | 123 (4%) | 117 (3%) | 154 (4%) | 394 (4%) |
| Yes                          | 152 (4%) | 177 (5%) | 208 (6%) | 537 (5%) |
| Adults intervene: n (%)      |                                                |                                                |                                                |                                                |
| No                           | 713 (21%) | 873 (24%) | 995 (27%) | 2581 (24%) |
| Yes                          | 2527 (74%) | 2496 (70%) | 2469 (67%) | 7492 (70%) |
| missinga                     | 161 (5%) | 218 (6%) | 216 (6%) | 595 (6%) |

*Students with missing values on dependent variables are included in the multilevel path analyses.*
Coefficients from the two-level path analysis corresponding to the hypothesized causal structure shown in Figure 1 are presented in Table 2. The first column of coefficients is from the model predicting traditional bullying, and the second column is from the model predicting cyberbullying. Both models fit the data very well (RMSEA = .000, CFI = 1.000 and TLI = 1.000). Coefficients from the identical parts of the two models are almost equal, varying slightly due to the fact that all the associations in a SEM are estimated simultaneously and are thus adjusted for each other. Non-standardized coefficients are presented. As bullying was measured as a proportion (between 0 and 1), each 0.01 units in the point estimates for prediction of bullying correspond to 1% difference in bullying perpetration prevalence per unit increase in the predictor variables.

The direct effect of teachers’ time pressure on bullying was not statistically significant, but there was a significant effect of time pressure on student perception of the adults’ tendency to intervene when bullying occurs, and further from the adults’ tendency to intervene to bullying perpetration. This indirect effect was statistically significant (point estimates .001 ($p = .013$) and .001 ($p = .017$) for traditional bullying and cyberbullying, respectively).

**Table 2.** Results from the two-level path analysis, coefficients and 95% confidence intervals.

| Predictors of bullying: a | Regression coefficients (95% confidence intervals) in the model predicting traditional bullying | Regression coefficients (95% confidence intervals) in the model predicting cyberbullying |
|--------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Adults intervene         | $-0.33$ ($-0.43, -0.24$)                                                                     | $-0.29$ ($-0.39, -0.19$)                                                                     |
| Grade                    | $-0.14$ ($-0.21, -0.07$)                                                                     | $-0.21$ ($-0.32, -0.10$)                                                                     |
| Gender                   | $-0.21$ ($-0.28, -0.14$)                                                                     | $-0.32$ ($-0.40, -0.23$)                                                                     |
| Predictors of adults intervene: |                                                                                           |                                                                                              |
| Grade                    | $0.36$ ($0.03, 0.69$)                                                                        | $0.36$ ($0.03, 0.70$)                                                                        |
| Gender                   | $-0.15$ ($-0.35, 0.05$)                                                                     | $-0.15$ ($-0.35, 0.05$)                                                                     |
| Between level            |                                                                                               |                                                                                                |
| Predictors of bullying: a |                                                                                           |                                                                                                |
| Teachers’ time pressure  | $0.04$ ($0.00, 0.08$)                                                                        | $0.03$ ($0.00, 0.10$)                                                                        |
| Teachers’ stress         | $-0.01$ ($-0.06, 0.03$)                                                                     | $-0.03$ ($-0.10, 0.05$)                                                                     |
| School leadership        | $-0.01$ ($-0.02, 0.00$)                                                                     | $0.00$ ($0.00, 0.02$)                                                                       |
| Proportion of parents with post-secondary education b | $0.00$ ($0.00, 0.02$)                                                                     | $-0.01$ ($-0.05, 0.02$)                                                                     |
| Proportion of students with foreign background b | $0.01$ ($-0.01, 0.03$)                                                                     | $0.03$ ($0.00, 0.06$)                                                                        |
| Predictors of adults intervene: |                                                                                           |                                                                                                |
| Teachers’ time pressure  | $-0.21$ ($-0.37, -0.06$)                                                                     | $-0.22$ ($-0.37, -0.06$)                                                                     |
| Teachers’ stress         | $-0.06$ ($-0.29, -0.16$)                                                                     | $-0.07$ ($-0.29, -0.15$)                                                                     |
| School leadership        | $0.04$ ($0.00, 0.09$)                                                                        | $0.04$ ($0.00, 0.09$)                                                                       |
| Proportion of parents with post-secondary education b | $-0.03$ ($-0.15, 0.08$)                                                                     | $-0.03$ ($-0.14, 0.09$)                                                                     |
| Proportion of students with foreign background b | $-0.10$ ($-0.20, -0.01$)                                                                     | $-0.10$ ($-0.19, -0.01$)                                                                     |
| Predictors of teachers’ stress: |                                                                                           |                                                                                                |
| Teachers’ time pressure  | $0.25$ ($0.12, 0.38$)                                                                        | $0.25$ ($0.12, 0.38$)                                                                        |
| School leadership        | $-0.06$ ($-0.10, -0.03$)                                                                     | $-0.06$ ($-0.10, -0.03$)                                                                     |
| Proportion of parents with post-secondary education b | $0.007$ ($-0.09, 0.107$)                                                                    | $0.007$ ($-0.09, 0.107$)                                                                    |
| Proportion of students with foreign background b | $0.054$ ($-0.24, 0.131$)                                                                     | $0.054$ ($-0.24, 0.131$)                                                                    |
| Predictors of teachers’ time pressure: |                                                                                           |                                                                                                |
| School leadership        | $-0.091$ ($-0.15, -0.029$)                                                                   | $-0.091$ ($-0.15, -0.029$)                                                                   |
| Proportion of parents with post-secondary education b | $-0.033$ ($-0.15, 0.094$)                                                                    | $-0.033$ ($-0.15, 0.094$)                                                                    |
| Proportion of students with foreign background b | $-0.052$ ($-0.16, 0.063$)                                                                     | $-0.052$ ($-0.16, 0.063$)                                                                    |

aTraditional bullying in the second and cyberbullying in the third column.

bCoefficients are per 10% change in the predictor variable.
Teachers’ stress was predicted by time pressure, but was neither significantly associated with adults’ tendency to intervene when bullying occurs, nor with bullying perpetration. The hypothesized indirect effect from teachers’ time pressure to bullying perpetration through pathways involving teachers’ stress was therefore not statistically significant ($p = .561$ and $p = .518$ for the pathway time pressure $\rightarrow$ stress $\rightarrow$ bullying, for traditional bullying and cyberbullying, respectively; and $p = .595$ and $p = .577$ for the pathway time pressure $\rightarrow$ stress $\rightarrow$ tendency to intervene $\rightarrow$ bullying).

Higher teacher ratings of school leadership were associated with lower levels of both teachers’ stress and teachers’ time pressure, and there was a direct effect (i.e., effect other than operating through these two variables) from school leadership to traditional bullying perpetration, but not to cyberbullying perpetration or students’ perception of adults’ tendency to intervene when bullying occurs. Grade and gender were associated with bullying perpetration: eleventh grade students and girls were less prone to bullying than ninth graders and boys, respectively. The point estimates of path coefficients indicated 1-2% lower traditional and cyberbullying perpetration prevalence for eleventh compared to ninth grade, and 2-3% lower prevalence for girls compared to boys. Proportion of students in the school with a foreign background was negatively associated with student perception of the adults’ tendency to intervene when bullying occurs, and positively associated with cyberbullying perpetration.

Path coefficients from the two separate models predicting traditional and cyberbullying, respectively, were of the same magnitude. Student perception of adults’ tendency to intervene when bullying occurs was inversely associated with both traditional and cyberbullying perpetration. Point estimates were very close ($-.033$ vs. $-.029$) and confidence intervals almost overlapping. The effects of grade and gender seemed to be approximately 1.5 times stronger for cyberbullying than for traditional bullying, but the confidence intervals were partly overlapping. On the between level, school leadership was a significant predictor of traditional but not of cyberbullying perpetration. In contrast, the proportion of students with a foreign background was a significant predictor of cyberbullying but not of traditional bullying. An illustrative summary of our main findings is presented in Figures 3 and 4.

4. Discussion

Bullying behaviour is linked with personal traits such as impulsivity, hyperactivity, sensation seeking, aggressiveness and absence of empathy (Alvarez-Garcia et al., 2015), but there is also a social dimension in that students who are ranked as popular by peers are more inclined to bully others (Alvarez-Garcia et al., 2015; De Bruyn et al., 2010; Rodkin et al., 2006). This implies that there may be
incentives for the individual to engage in bullying behaviour in terms of a possible gain in social status and popularity.

Schools may however hinder the potential gains of bullying, and instead attach “costs” to it, by communicating to the students that such behaviour is not acceptable. Through common values and norms, schools signal to their students which behaviours are socially desirable and which are not. Preferably, such values and norms are purposefully formulated by the school leadership (Modin et al., 2017), and reflected and realized in the daily social interaction between the school staff and the students. This, in turn, requires that the teachers have the time, commitment and energy to actively engage in, for instance, showing disapproval of bullying in situations when it occurs. Yet, many Swedish teachers feel time-pressured due to the expectation to spend a great deal of their time on tasks that are not directly related to their main mission (Kjellström et al., 2016), raising the question of whether such time pressure is linked to a lower capacity to monitor and intervene against behaviours that oppose school values. Using combined survey data collected among teachers and students in 129 Stockholm schools, this study investigated the links between teachers’ ratings of time-pressure and of stress and student-reported bullying behaviour. Multilevel path analysis allowed us to examine a complex network of associations, connecting school contextual factors with individual behaviour.

We hypothesized that time-pressure among teachers was positively associated with bullying perpetration among the students, and that this association was mediated by greater teacher stress and by a lower tendency among the school staff to intervene against bullying in these schools. Our analyses confirmed that bullying perpetration was more common in schools with time-pressured teachers. This association was mediated by students’ perception of adults’ tendency to intervene when bullying occurs, but not by teachers’ overall stress level. In a previous study, we found that higher levels of teacher stress at the school-level were predictive of less perceived teacher caring and lower school satisfaction among students (Ramberg et al., 2019). However, the present study shows no corresponding association with bullying behaviour, indicating that the teachers manage their stress so that it does not influence their ability to monitor the students or otherwise prevent bullying behaviours.

Further, we expected the schools’ leadership functioning to be negatively associated with student bullying behaviour, partly through a direct path and partly through indirect effects operating via teachers’ time-pressure and stress and via the students’ reports on the school staff’s inclination to intervene. The analyses showed that teachers’ ratings of the school leadership functioning were negatively associated with both stress and time-pressure among teachers. There was a direct path from teachers’
ratings of the school leadership to traditional bullying perpetration, but not to cyberbullying perpetration. For both types of bullying, there were also indirect effects of school leadership, with a pathway through time pressure among teachers and the school staff’s inclination to intervene, but not through teacher stress. It is important to note that these mediation effects operated on the school level (because teachers’ time pressure was constant within a given school) regardless of the fact that both students’ perception of the school staff’s inclination to intervene and bullying behaviour were measured at individual level (Preacher et al., 2010). The association between students’ perception of adults’ tendency to intervene when bullying occurs, and bullying perpetration, on the other hand, was separable into two parts, one operating at the student and the other at the school level. It should however be noted that between-school variation in both traditional and cyberbullying was low, implying that individual-level factors accounted for the lion’s share of the total variation in bullying perpetration, which corresponds well with findings from other studies (Bevilacqua et al., 2017; Bradshaw et al., 2009).

Finally, we hypothesized that the school-contextual predictors were more strongly associated with traditional than with cyberbullying perpetration. Overall, the results were similar for traditional and cyberbullying perpetration, but the associations were somewhat weaker for the latter. Grade and gender seemed to be more strongly associated with cyberbullying (possibly occurring outside school) than with traditional bullying (occurring at school). The association with teachers’ time pressure, in contrast, was of similar magnitude for both traditional and cyberbullying. This suggests that the effect of teachers’ time-pressure on students’ bullying behaviour remains even outside the school context. This result corresponds with prior research which has shown that even when bullying occurs electronically, it often tied to social relationships at school (Williams & Guerra, 2007).

Previous findings regarding gender differences in bullying perpetration are somewhat mixed, with some studies showing that perpetration is more common among boys than among girls (Inchley et al., 2016; Nansel et al., 2001), while others have reported disparate results for different types of bullying (Williams & Guerra, 2007) or that gender differences vary by age (Barlett & Coyne, 2014). In our data, both traditional and cyberbullying perpetration was more common among boys than among girls. However, the associations between teachers’ time pressure and traditional and cyberbullying perpetration were similar in boys and girls (data not shown).

One strength of this study is the rich data material used, with combined survey information collected among both teachers and students, decreasing potential bias due to common measures variance. Furthermore, by also linking school-level information from administrative registers to the data we were able to adjust for potential confounders at the school-level in terms of the sociodemographic composition of students. There are however also limitations. First, the SSS was completed by the students in the spring term and the questions on bullying perpetration considered the current school year, i.e., a long time span which may be subject to recall bias. Another source of measurement bias could be the reluctance in reporting this kind of unwanted behaviour by the students. We performed sensitivity analyses to address this possible bias due to social desirability by using another definition of bullying, categorizing only those who answered “No” as not being perpetrators of traditional bullying. Aside from higher intraclass correlation (0.019) and stronger associations with the predictors of bullying perpetration on the within level the results remained virtually unchanged. We thus conclude that this potential bias does not seem to have had a strong impact on our results. While the question on traditional bullying perpetration was followed by a list of ordered response categories referring to how often it had happened during the current school year, the question on cyberbullying perpetration only had yes/no categories, making this measure somewhat crude. The relatively high non-response rate in STS may have biased the measurement of school level variables reported by the teachers. It is plausible that non-response was highest among the most stressed and time pressured teachers within schools, resulting in underestimated average levels of stress and time-pressure in the analytic sample, and thus, the associations may be biased towards null. Furthermore, it should be acknowledged that since the data were collected in schools in Stockholm, the findings cannot be generalized to other populations. Further studies
should analyse the associations between teachers’ time pressure and bullying perpetration in other geographical settings and education systems.

To conclude, the present study showed that schools have the potential to prevent bullying through the articulation and compliance of a common set of values and norms addressing which behaviours are socially acceptable and which are not. A key prerequisite is that teachers monitor and intervene in situations where bullying takes place. Schools with a strong leadership that provides opportunities for their teachers to focus on their main mission are the ones bound to be the most successful in counteracting unwanted behaviours among the students. Conversely, schools with a weaker leadership and whose teachers are time-pressured due to the expectation that they should spend a great deal of their time on tasks that are not directly related to their main mission have a reduced capacity to monitor and intervene against behaviours that oppose school values, which in turn, leaves their students with more opportunities to engage in bullying. According to Swedish law, all schools are obliged to work against bullying. Yet, the findings of the present study indicate that formal anti-bullying measures must be accompanied by a decent work environment for the teachers, that allows them to provide the time, energy and commitment needed to monitor students and to intervene in situations when bullying occurs. To further investigate the role of teachers’ work environment for counteracting bullying among students, a suggestion for future research is to analyse if the effectiveness of anti-bullying measures varies by teachers’ assessment of their work environment, including their level of time-pressure due to tasks that are not related to their main mission.

Taken together, since bullying has been recognized as an important public health problem among youth (Srabstein et al., 2008; Espelage and De La Rue, 2012), the findings of the present study imply that schools have the capacity not only to prevent bullying behaviour but indirectly also to promote student health by improving the working conditions for their teachers.

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