Perceived teacher support and student psychosomatic health complaints

Exploring the role of schools’ student composition and gender

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Abstract

Mental health problems have increased among adolescents in Sweden and research suggests that contextual matters could be of importance over and beyond individual socio-demographic characteristics. One such social context is school, where both the student composition of the school and its support can influence student health. This study explored the distribution of psychosomatic health complaints (PHC) and perceived teacher support (PTS) as well as the association between PTS and PHC, across school segregated profiles. It also examined gender differences in these distributions and associations. The study design was cross-sectional, and data came from classroom-surveys within Stockholm municipality of ninth grade students in 2014 (n=4904). Linear regression analyse was applied. Results showed that average levels of PHC varied across school segregation profiles for girls, while PTS varied for both gender. PTS was negatively associated with PHC for all students, while the strength of association varied across school profiles to the benefit of students in the most privileged schools. Gender differences in these associations was also observed. Conclusions were that school context, based on the student composition of the school, and its provided support was linked to psychosomatic health complaints among students in Stockholm and that gender played a role in understanding pathways in these associations.

Key words

Psychosomatic health complaints, perceived teacher support, adolescent health, school context, social disorganisation theory, pedagogic segregation, gender
# Table of contents

**Introduction** ........................................................................................................................................................................ 1

Psychosomatic health complaints .......................................................................................................................... 2

The school context as a social determinant of health ......................................................................................... 3

Student composition .................................................................................................................................................... 4

Social support and health ............................................................................................................................................. 5

Perceived teacher support and student health ........................................................................................................... 6

Theoretical perspectives ................................................................................................................................................ 8

Study aim and research questions ......................................................................................................................... 9

**Methods** ........................................................................................................................................................................... 10

Data material ................................................................................................................................................................. 10

Variables ........................................................................................................................................................................ 10

Statistical analysis ......................................................................................................................................................... 13

Ethical considerations ................................................................................................................................................ 14

**Results** ........................................................................................................................................................................ 15

**Discussion** ...................................................................................................................................................................... 23

Strengths and limitations of the study .................................................................................................................... 28

Conclusions ................................................................................................................................................................. 29

**References** .................................................................................................................................................................. 32

**Appendices** ................................................................................................................................................................. 38
Introduction
A majority of adolescents in Sweden report good health and well-being, however health complaints have increased the last 30 years (The Public Health Agency of Sweden, 2018). Even though it is well known that individual factors, such as disadvantaged family background is associated with a higher risk of developing any kind of mental health complaints (Reiss, 2013), the increase in mental health problems applies to the whole adolescent population and not only to those from disadvantaged social circumstances (The National Board of Health and Welfare, 2017). This makes it relevant to investigate any contextual factors that might be associated to these troubling trends. One such contextual factor of importance for adolescents are schools.

School segregation has increased in Sweden, a phenomenon referring to rising differences in student composition across schools (The Swedish National Agency for Education, 2018). This development calls for a better understanding of how school segregation might affect the students within the schools. According to Social Disorganization Theory (SDT) (Shaw & McKay, 1942) applied to the school setting, school environments with a high proportion of students with low socioeconomic background and a high proportion of students with ethnic minority background have low social cohesion and control within the school setting (Bradshaw, Sawyer, & O’Brennan, 2009). This is in turn related to higher levels of problematic behaviors (ibid) and worse mental health among students (Modin et al., 2018). Empirical studies investigating the association between a “disadvantaged” school environment and mental health confirms this relationship to different degree depending on how student composition is measured and the health outcome in focus (Gutman & Feinstein, 2008; Jablonska et al., 2014; Modin et al., 2018).

Schools also has the potential of influencing adolescent health through the existence or absence of teacher support (Modin & Östberg, 2009). High perceived teacher support (PTS) has been linked to better self-esteem and lower levels of depressive symptoms while poor PTS has been linked to diverse health problems (Gustafsson et al., 2010; Thapa, Cohen, Guffey, & Higgins-D’Alessandro, 2013; Sonmark & Modin, 2017). Whether schools differ in PTS, based on their student composition, is less investigated. However, based on the concept of pedagogic segregation, there is reasons to assume that students attending more disadvantaged schools experience lower levels of PTS compared to students in more privileged schools. According to the concept of pedagogic segregation it is due to less
qualified teachers, who would not have the knowledge and experience to provide good support to these students (Hansson & Gustafsson, 2016).

The role of PTS on psychosomatic health complaints (PHC) for students in different kinds of school contexts, based on their student composition profile, is also less known. On one hand Wight, Botticello and Aneshensel (2006) has shown that general social support seemed to benefit adolescent health more in affluent surroundings than in disadvantaged surroundings. On the other hand, it would make sense for PTS to be more important for student health in environments of less resources. A study by Olsson (2009) showed a stronger association between teacher support and health among students with low socioeconomic background.

In addition, gender differences in PHC among 15 year old students in Sweden has been found, where girls displayed higher levels than boys (Public Health Agency of Sweden, 2018). Gender differences has also been found in PTS while these findings were mixed and incomplete (Reddy, Rhodes & Mulhall, 2003; Rueger, Malecki, & Demaray, 2010), as they were in relation to gendered differences in the association between PTS and PHC (Danielsen, Samdal, Hetland, & Wold, 2009; Kjellström, Modin, & Almquist 2016; Warne, Snyder, & Gådin, 2017). Therefore, gender seemed to be of importance when investigating the association between PTS and PHC among students, in particular in relation to schools with different student composition profile.

In sum, knowledge about the link between teacher support and students’ mental health complaints, when considering both school segregated environment and gender, is incomplete and scarce, but has the potential of contributing to the ongoing discussion concerning increases in adolescent mental health complaints (The Public Health Agency of Sweden, 2018).

**Psychosomatic health complaints**

The concept of PHC is embedded in the wider concept of psychological distress and is an important component of mental disorder. Psychosomatic health problems refers to an internalizing reaction to surrounding stressors with psychological symptoms such as worry, depression and anxiety, that also could transform into somatic reactions such as headache, stomach-ache and sleeping problems (Bremberg & Dalman, 2015; van Geelen & Hagquist 2016) which in turn often co-occur (Gandour et al., 2004). Possible short-term consequences of psychosomatic health problems has been shown to be school related problems, self-inflicted injuries, alcohol and drug abuse (Salmi, Björkenstam, & Ringbäck Weitoft, 2013)
while possible long-term consequences has been found in relation to impaired mental health, suicide attempt and completed suicide as well as educational underachievement, unemployment and early parenthood (Fergusson & Woodward, 2002; Mörk, Sjögren, & Svaleryd, 2014).

PHC have increased the last 30 years among adolescents in Sweden. In fact, between 2010 and 2014, mental health problems among 15 year old students increased most in Sweden than in any of the 42 other countries participating in the Health Behavior in School-aged Children study (Bremberg, 2015; van Geelen & Hagquist, 2016). This correspond to analyses made on register based data showing a doubling of children aged 13-18 years being hospitalized due to mental illness the last 20 years in Sweden (Mörk et al., 2014).

There are clear gender differences in psychosomatic health complaints among 15 year old students in Sweden where girls to a larger extent than boys seems to suffer from mental health problems (Bremberg & Dalman, 2015). This gender discrepancy has also been confirmed in relation to levels of stress, where girls report significantly more stress than boys (Östberg et al., 2015). A systematic review by King et al. (2014) of pain prevalence, not related to disease, showed that prevalence was higher in girls and increased with age for most pain types such as e.g. headache and abdominal pain.

*The school context as a social determinant of health*

According to Bronfenbrenner (1981) individuals are set into different social contexts (family, friends, work) that can affect them directly in several ways, but that these different contexts also interact with each other, thereby exerting an influence indirectly on that same individual. Hence, it is not only family related living conditions that are important for the health of adolescents, but also environmental circumstances. Research even suggest that conditions outside the family is of particular importance during those years of youth (West & Sweeting, 2004). Schools are one such social context with a particular importance for the lives of young people, since schools are mandatory and thus adolescents therefore spend much of their time within these environments. A large body of research have demonstrated school environmental effects on health, over and above the effects of students' individual characteristics (Karvonen, Vikat, & Rimpela, 2005; Bonell et al., 2013; Vieno, Lenzi, Santinello, & Scacchi, 2013; Jablonska et al., 2014), even if there are some exceptions who did not find any such results (Nygren, Bergström, Janlert, & Nygren, 2014). Still there seem to be a general agreement that
school environment is considered a social determinant for student health (Sellström & Bremberg, 2006).

The importance of school environment for student health has also been underscored by the The Public Health Agency of Sweden (2018) who stated that one of the primary reasons for the increase in mental health problems among children and adolescents in Sweden were related to flaws in the function of Swedish schools.

Student composition
During the last 25 years, schools in Sweden have gone through major educational reforms which have been linked to rising school segregation, a term referring to increasing differences in student body compositions of schools (The Swedish National Agency of Education, 2018). These differential patterns has been most evident in the bigger cities such as Stockholm (Åman, 2011). Previous research argues that different student body compositions of schools are linked to differences in student outcomes such as academic achievement (Granvik Saminathen, Brolin Låftman, Almquist, & Modin, 2018), bullying related behaviors (Bradshaw et al., 2009), health-risk behaviors (Olsson & Fritzell, 2015) and student psychosomatic health (Modin et al., 2018).

Reasons for the increase in school segregation has partly been attributed to the school reforms introduced in Sweden in the 1990’s. These reforms included a shift in governance and responsibility of schools from the state to municipalities as well as the possibility of free school choice (Olsson & Fritzell, 2015). These changes came to be in favor of privileged families who more easily could navigate in the complicated educational system and thereby chose more prestigious schools for their children (Bunar, 2010). In addition to this, the possibility for independent private schools, funded by the state, to compete with municipality schools opened up. These independent schools also contributed to the socially divided educational landscape by more often chose geographical and pedagogical settings in favor of the already privileged students and their families (Granvik Saminathen et al., 2018). Together with above mentioned reforms general tendencies in society such as increased income inequality, housing segregation and levels of migration also contributed to the current patterns of school segregation (Böhlmark, Holmlund, & Lindahl, 2015).

School segregation has happened even though schools are obliged by law to even out any differences in living conditions of children in order for them to equally make use of an education as well as provide an equal standard of education for all regardless of where they
might reside (Skollag, 2010:800). School segregation has been suggested to be one of the
drivers in shaping the present trend of differentiated aspects of school environments. One
such aspect is the quality of supportive relationship between teachers and students (Granvik
Saminathen et al., 2018; Ramberg, Brolin Låftman, Almquist, & Modin, 2018).

Social support and health

A way for schools to potentially influence adolescents’ health is through the existence or the
absence of social support (Due, Lynch, Holstein, & Modvig, 2003; Eccles & Roeser, 2011;
Tennant et al., 2014). Support comes in different forms and have different meaning for the
receiver. This is especially true for children and adolescents where parental support has been
considered the most important source of support, with rising importance of peers and friends
as well as of teachers in schools (Berkman, Glass, Brissette, & Seeman, 2000; Modin &
Östberg, 2009; Sonmark & Modin, 2017). Studies further suggest that there is a significant
difference between perceived social support and objectively measured social support on
individual mental health and well-being. Actual received social support has be shown to have
no effect on health if it is not perceived by the receiver as support (Cobbs, 1976). This would
mean that if an individual is not told or shown that he or she is loved and appreciated, valued
and included in a community or network, even though it is the case, it will have no positive
effect on health. Therefore, the perception of support could be considered a good measure of
support that people are receiving when investigating influence on health (Turner & Brown,
2010).

Support could act directly on health, as well as indirectly by buffering against surrounding
stressors and thereby reducing risks of health problems (Cohen and Wills, 1985).

Longitudinal studies showed that support could be considered to be comparable with other
established risk factors of mortality, meaning that high support predict lower risk for
mortality regardless of sex and across all ages (Holt-Lunstad, Smith, & Layton, 2010). For
adolescents in particular, social support in general has been associated with lower levels of
depressive symptoms (Turner & Brown, 2010; Plenty et al., 2014; Pössel et al., 2018) and
anxiety as well as higher levels of self-esteem and academic adjustment (Rueger et al., 2010).
Conversely, lack of social support could act in an opposite way and increase risk of health
problems (Cobbs, 1976; Cohen & Wills, 1985). As a confirmation of the buffering
hypothesis, social support has been found to be of significant importance for individuals in
low socioeconomic position that were experiencing high levels of stress (Turner & Noh,
1983).
Perceived teacher support and student health

Teacher support could also be interpreted and perceived in different ways. A qualitative study showed that students could perceive teachers to be supportive when teachers tried to connect on an emotional level, use diverse and best-practice teaching strategies, encourage and acknowledge academic success, show fairness in relation to students and create an accepting classroom environment (Suldo et al., 2009). Just as for social support in general it was the actual perceived teacher support of students that were of importance for their outcomes (Teven & McCroskey, 1997).

An important aspect has proven to be teacher’s expectations upon their students. Research showed that high, clear and fair expectations tended to result in higher engagement in schools, which in turn was positively associated to health through higher test scores (Klem & Connel, 2004). The importance of expectations has also been stated as a possible link to lower levels of teacher efficacy in socially disadvantaged schools (Auwarter & Aruguete, 2008).

Both cross-sectional and longitudinal studies have concluded that the quality of teacher-student relationship as well as perceived classroom belonging were positively associated with academic motivation, engagement and learning (Klem & Connel, 2004; Thapa et al., 2013; Liu, Mei, Tian, & Huebner, 2016), social-emotional well-being in school (Eccles & Roeser, 2011; Tennant et al., 2014) and general self-esteem (Jia et al., 2009). There were also proof of its negative association with subsequent behavioral problems (Way et al., 2007; Thapa et al., 2013), depressive symptoms (Reddy et al., 2003; Way, Reddy, & Rhodes, 2007; Jia et al., 2009) and psychosomatic health complaints (Due et al., 2003; Berg, Hagquist, & Starrin, 2011; Kjellström et al., 2017). The longitudinal studies also underscored the unidirectional relationship, rather than the bi-directional relationship, indicating that while student health could influence the way teachers support their students it was mainly the support perceived by students that influenced their health (Way et al., 2007).

There could be gender differences in relation to perceived teacher support, but the results gave a somewhat unclear picture. In studies investigating the importance of multiple sources of support, girls perceived significantly higher support from all sources than boys, including teacher support, with the exception of parental support (Reddy et al., 2003; Rueger et al., 2010). On the other hand other studies reported higher levels of perceived teacher support among boys (Modin & Östberg, 2009; Kjellström et al., 2016), while some claimed that there
were no gender differences at all (Danielsen et al. 2009). However, the type of support perceived by girls and boys respectively has been shown to differ, where girls reported more emotional support and boys more instrumental and appraisal support (Brolin Låftman & Modin, 2012). These findings were in line with conclusions made by Cohen and Wills (1985) stating that women, health wise, seemed to benefit more from support of a more emotional and intimate character while men benefited more from support of a more instrumental and activity shaped character.

Studies showed that the association between perceived teacher support and health also varied by gender (Way et al., 2007; Brolin Låftman & Modin, 2012), by type of teacher support (Tennant et al., 2014) and by school composition (Wight et al., 2006). Again the results were mixed and somewhat scarce, indicating on the one hand that significant differences between gender existed to the benefit of girls (Natvig, Albrektsen, Anderssen, & Qvarnstrom, 2009), while a study by Warne et al. (2017) showed a stronger relationship among boys. Also, Colarossi & Eccles (2003) found no gender differences in the association between perceived teacher support and depression and self-esteem. However stratified analysis revealed significant negative estimates for depression among girls.

With regards to school composition, not much research has been done at all with this specific focus. Wight et al. (2006) concluded that social support in general were more beneficiary for adolescent health in affluent compared to disadvantaged surroundings. However, it would make sense for students in a disadvantaged school environment to benefit more health wise of PTS, since they have a generally higher risk of experiencing surrounding stressors. This follows the logic of a study by Jablonska et al. (2014) showing that low school SES seemed to negatively affect the mental health of all students in the school regardless of their individual socioeconomic situation. In addition, the association between teacher support and psychological complaints has been shown to be especially strong among students from economically vulnerable households (Olsson, 2009). Auwarter and Aruguete (2008) also suggested that teachers tended to perceive students from low socioeconomic background as having less promising futures and generally develop more negative attitudes towards these students especially if they were boys.
Theoretical perspectives

A way of understanding how school segregation could be associated to student health and perceived teacher support is through Social Disorganization Theory (SDT). This theory have been used when studying stratification on an aggregated level and was first formulated by Shaw and McKay (1942), when studying the importance of neighborhood factors for adolescent crime in the slums of Chicago. They concluded that social disorganization could be seen as a mediator in the association between socio-economic conditions at neighborhood levels and crime rates. The theory claimed that structural disadvantages (e.g. high concentration of poverty and residential mobility) reduced community levels of social cohesion and social control.

Lack of collective social control and social cohesion in turn made disadvantaged settings more vulnerable to risky exposures such as criminality and other deviant behaviors. The lack of collective social control and social cohesion could therefore affect health outcomes in more disadvantaged settings directly (Shaw & McKay, 1942), but also via their impact on crime rates, violence and drug use that had been linked to poorer mental wellbeing in disadvantaged neighborhoods (Aneshensel & Sucoff, 1996). Although originally concerned with neighborhood effects, SDT has later been applied to the school context. In such studies, features linked to structural disadvantage like low school socioeconomic situation (SES) and high concentration of ethnic minority students have been associated with higher levels of mental health and behavioral problems among students (Gutman & Feinstein 2008; Bradshaw et al., 2009; Eklund & Fritzell, 2013; Modin et al., 2018).

Less research has focused on how such school features (low school SES and high concentration of ethnic minority) could be related to students’ perceptions of teacher support. However, the concept of pedagogic segregation has recently been developed to explain the role of teaching and teachers in a segregated school landscape. The concept has been derived through research showing that even though disadvantaged schools (high proportion of students with native language teaching) had lower student-teacher ratios, due to compensatory economic allocations provided by the municipality (Andersson, Janson, Nilsson, & Tealohi, 2017), they lacked in teaching quality. This was explained in terms of lower levels of formal education and knowledge as well as less experience among teachers in disadvantaged schools (Hansson & Gustafsson, 2016). Hence, that the lack of competence within these schools would weaken the ability of teachers to provide adequate support, thereby affecting students perceived teacher support negatively. In addition other research has
suggested that the higher staff turnover rates as well as a high concentration of mobile students, associated with more disadvantaged school settings, could contribute to lower levels of trust and thereby decreased social control through the lack of stability and continuity in the relationship between teacher and students (Bradshaw et al., 2009).

Study aim and research questions

The aim of the thesis is firstly to explore the distribution of perceived teacher support (PTS) as well as psychosomatic health complaints (PHC) among students attending schools with different student composition. Secondly, the thesis will examine any possible association between PTS and PHC with a particular focus on whether the school composition profiles might influence this association. Finally, any possible gender differences in the above mentioned distribution and association will be explored. The research questions are:

1) Do levels of psychosomatic health complaints among students differ across school composition profiles?
2) Do levels of students’ perceived teacher support differ across school composition profiles?
3a) Is perceived teacher support related to less psychosomatic health complaints among students?
3b) Does the hypothesized association between teacher support and psychosomatic health complaints differ across school composition profiles?
4) For research questions 1-3, are there gender differences?
Methods

Data material

The data was retrieved from the Stockholm School Survey, a survey conducted since the 1970’s in Stockholm by the Stockholm City Administration with the purpose of mapping out patterns in behaviours and different outcomes among adolescents. The results of the surveys create a foundation for the city’s preventive efforts as well as for research and knowledge development. Respondents are students in ninth grade (compulsory school) and eleventh grade (upper secondary school) from all public schools and most private schools in Stockholm municipality. External attrition for 2014 has been estimated to 24 % by the Stockholm City Administration (Stockholm School Survey, 2014). The current study sample was restricted to students in ninth grade during the year of 2014 within Stockholm municipality (n=5112). The study sample was further restricted to students attending schools, for which information from the Swedish National Agency for Education was available. This information constituted the background indicators for the school cluster variables used in this study (n=4904). This also restricted the sample from 81 to 72 schools. The final analytic sample had complete information on all variables used in the study (n=3888), thus corresponding to 79 % of the defined study sample. Patterns in missing data revealed a slightly higher representation of girls than boys in the analytical sample compared to the study sample. Missing data were also more common among students who did not know what education their parents had or did not answer the question, among students who had not lived in Sweden all their life, among students who did not live with both parents and among students within the deprived immigrant cluster. For more detailed information about the excluded study subjects please see Appendix 1.

Variables

Dependent variable

The present study explored psychosomatic health complaints (PHC) as the main dependent variable by using an index composed by ten questions. Items included were: “How often have you had a headache this school year?”, “Do you feel sad and depressed without knowing why?”, “Do you ever feel frightened without knowing why?”, “How often do you have a bad appetite?”, “How much would you like to change yourself?”, “How often this school year have you had a “nervous tummy”?”, “How often do you feel you’re not good enough?”, “How often this school year have you had difficulty falling asleep?”, “Do you feel sluggish
and uneasy?” “How often this school year have you slept uneasily and woken up during the night?”. Depending on how the question was formulated response alternatives ranged from “Never” to “Several times/nights a week” or from “Seldom” to “Very often”. All questions had five response alternatives equivalent to a score between 1 and 5 where higher scores indicated more serious health complaints.

The index was normally distributed for the total sample (Skewness 0.43, Kurtosis 3.05) as well as by school cluster and gender. A factor analysis concluded that the ten items fell into one single factor (Eigenvalue 3.39) with factor loadings ranging between 0.53-0.73. The index ranged from 10 to 50 points with higher values representing more psychosomatic health complaints. A Cronbach’s alpha of 0.83 indicated good internal reliability. Other studies have used a similar health index in relation to the Stockholm School Survey (Modin, Brolin Låftman, & Östberg, 2015; Kjellström et al., 2016). In order to be part of the analytic sample, a study subject had to answer at least ⅔ of the items forming the PHC index.

Independent variable: individual level
Perceived teacher support (PTS) was measured by an index composed by seven questions. Items included were: “Students take part in the planning of what we will do in class.”, “Teachers praise students who do something good at school.”, “The teachers let us know what we can and can’t do.”, “The school lets my parents know if I’ve done something good.”, “Adults step in if anyone is harassed or bullied.”, “My teacher doesn’t give me any praise when I work hard.”, “If you don’t understand something, you get help from the teacher straight away”. Response alternatives ranged from “Describes very poorly” to “Describes very well”. All questions had four response alternatives equivalent to a score between 1 and 4 where higher scores indicated better teacher support.

The index was normally distributed for the total sample (Skewness -0.09, Kurtosis 3.38) as well as by school cluster and gender. A factor analysis concluded that the seven items fell into one single factor (Eigenvalue 2.13) with factor loadings ranging between 0.39-0.68. The index ranged from 7 to 28 points with higher values representing higher teacher support. A Cronbach’s alpha of 0.75 indicated good internal reliability. Other studies has used a similar index in relation to the Stockholm School Survey (Ramberg et al., 2018). In order to be part of the analytic sample, a study subject had to answer at least ⅔ of the items forming the PTS
Independent variable: school level

To capture features of school segregation a school cluster variable was used. The variable has previously been used in school contextual studies (Granvik Saminathen et al., 2018; Kjellström et al., 2018) by a research team at the Department of Public Health Sciences at Stockholm University. Four types of clusters were identified through latent class analysis (LCA) made out of variables from the Stockholm School Survey aggregated to school level (student motivation) and official statistics from the Swedish National Agency for Education (proportion of newly immigrants, proportion of student with foreign background, average parental education). The following four clusters were identified:

Privileged - higher average on parental education as well as motivation than the others, lower levels of foreign background and recently immigrated.

Typical - levels of parental education, foreign background and recently immigrated were in between privileged and deprived schools. Student motivation were as low as in deprived schools.

Deprived - remarkably lower levels of parental education than typical schools although similar levels of motivation. Higher proportion of students with foreign background and newly immigrated than privileged and typical schools.

Deprived immigrant - lowest level of parental education and highest proportion of students with immigrant background and newly immigrated. Second lowest student motivation of all four clusters.

Covariates

A set of socio-demographic variables were adjusted for and treated as confounders since research showed that they all were presumed to be associated with both PTS and PHC (Wight et al., 2006).

Gender was assessed through the question “Are you a boy or a girl?” with the response option of “Boy” or “Girl”.
Parental education was measured by the question: “What is the highest education your parents have?” Response options were available for both mothers and fathers and were: “Old elementary school (folkskola)”, “Compulsory school (max 9 years schooling)”, “Upper secondary school”, “University and University College” and “Don’t know”. To avoid high internal attrition students answering “Don’t know” or did not answer the question at all were joined together. Three categories were therefore created for the analysis: “At least one parent with university education”, “Both parents with less than university education” and “Don’t know or missing”.

Parent’s employment status was measured by the question: “What do your parents do?” Response options were available for both mothers and fathers. Response alternatives were “Work (full-time or part-time)”, “Study”, “Leave of absence/parental leave”, “Unemployed”, “Other” and “Don’t know”. Two categories were created for the analysis: “Neither parent unemployed” and “One or both parents unemployed”.

In order to capture migration background, the question: “How long have you lived in Sweden?” was used as an indicator. Response options were: “All my life”, “10 years or more”, “5-9 years” and “Less than 5 years”. Two categories were created for the analysis: “Lived in Sweden my whole life” and “Have not lived in Sweden my whole life”.

Family situation was measured by the question: “Which people do you live with? Response options were: “Mother”, “Stepfather/stepmother”, “Mother and father alternately”, “Foster parents”, “I live alone”, “Father”, “Brothers/sisters”, “Other relatives” and “Other”. Two categories were created for the analysis: “Live with both parents” and “Do not live with both parents”.

Statistical analysis
Diagnostic tests
The assumptions behind the correlation analysis of the dependent variable (PHC) and main independent variable (PTS) were met being two continuous variables and having a linear relationship without any outliers. Satisfactory model fit results for multiple linear regression were shown with no outliers, homoscedasticity, normality of residuals, linearity of residuals and no multicollinearity.
Analytic strategies

All statistical analyses was performed in Stata 15.0.

First, a table of descriptive statistics was produced in order to highlight patterns in the distribution of variables within the analytical sample. Second, descriptive analysis using means of PHC and PTS was presented in bar charts for total population and gender. Third, means of PHC and PTS was once again presented in bar charts for total population and gender but now distributed by school clusters. T-tests and ANOVA tests were performed in order to assess significant differences. Fourth, in order to examine any association between PTS and PHC a series of regression models was assessed. Since the outcome variable (PHC) was continuous, linear regression was performed and b-coefficients presented. Variables of interest were included in a stepwise manner. The models looked as followed:

Bivariate = assessed any independent association of the independent variables on PHC.
Model 1 = PTS + Gender
Model 2 = Model 1 + Parental education + Parent’s employment status + Migration background + Family situation
Model 3 = Model 2 + School cluster

Fifth, two interactions terms were created and added to the models. The first, PTS*Gender, had the purpose of identifying possible moderating effects of gender on the association between PTS and PHC in Model 2. The second, PTS*School cluster, had the purpose of identifying possible moderating effects of school cluster on the association between PTS and PHC in Model 3. Test of model fit was assessed for this categorical (with more than two values) interaction variable by using the command “testparm” in Stata (UCLA, 2017). Sixth, in order to explore possible patterns in the association between PTS and PHC across different types of schools linear regressions of Model 2 were run stratified by school cluster. Finally, to explore if those patterns differed by gender the same strategy was repeated now stratified by gender.

Ethical considerations

The Stockholm School Survey was conducted in an anonymous and voluntary way. The students answered a paper questionnaire anonymously in class during a specific class hour and handed them in in a sealed envelope. Due to the personal character of the questions asked a notification at the end of the information letter addressed to the student suggested that, if
needed, he or she could talk to e.g. the school nurse or school counsellor (Stockholm School Survey, 2014). According to Swedish ethical regulations there is no obligation to receive consent from caregivers of 15 year old respondents (Codex, 2018).

Results

In Table 1 the distribution of main variables and covariates by studied subjects is presented. The analytical sample is evenly distributed over gender - 49.6% percent boys versus 50.4% percent girls. For the socio-demographic characteristics approximately half of the sample (54.3%) has at least one parent with university education while quite a high proportion of students don’t know their parents education or did not answer (29.9%). Most students have neither parent unemployed (93.6%), have lived in Sweden all their life (86.4%) and live with both their parents (68.3%). A majority of the students can be found in the typical cluster (61.8%) while the other three clusters are of more equal size and contain between 11.0 and 15.2 percent of the students.

Table 1. Distribution of main variables and covariates by studied subjects. Percentage for distribution within each covariate (n=3888).

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
</tr>
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<tbody>
<tr>
<td>PHC</td>
<td>3888 (100)</td>
</tr>
<tr>
<td>PTS</td>
<td>3888 (100)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>1929 (49.6)</td>
</tr>
<tr>
<td>Girls</td>
<td>1959 (50.4)</td>
</tr>
<tr>
<td>Parents education</td>
<td></td>
</tr>
<tr>
<td>At least one parent with university edu.</td>
<td>2113 (54.3)</td>
</tr>
<tr>
<td>Both parents with less than university edu.</td>
<td>614 (15.8)</td>
</tr>
<tr>
<td>Don’t know for both parents or missing</td>
<td>1161 (29.9)</td>
</tr>
<tr>
<td>Parents employment status</td>
<td></td>
</tr>
<tr>
<td>Neither parent unemployed</td>
<td>3641 (93.6)</td>
</tr>
<tr>
<td>One or both parents unemployed</td>
<td>247 (6.4)</td>
</tr>
<tr>
<td>Migration background</td>
<td></td>
</tr>
<tr>
<td>Lived in Sweden all life</td>
<td>3360 (86.4)</td>
</tr>
<tr>
<td>Have not lived in Sweden all life</td>
<td>528 (13.6)</td>
</tr>
<tr>
<td>Family situation</td>
<td></td>
</tr>
<tr>
<td>Live with both parents</td>
<td>2657 (68.3)</td>
</tr>
<tr>
<td>Do not live with both parents</td>
<td>1231 (31.7)</td>
</tr>
<tr>
<td>School clusters</td>
<td></td>
</tr>
<tr>
<td>Privileged</td>
<td>591 (15.2)</td>
</tr>
<tr>
<td>Typical</td>
<td>2401 (61.8)</td>
</tr>
<tr>
<td>Deprived</td>
<td>430 (11.0)</td>
</tr>
<tr>
<td>Deprived immigrant</td>
<td>466 (12.0)</td>
</tr>
</tbody>
</table>
In *Figure 1* levels of psychosomatic health complaints is presented for the total sample and for boys and girls separately. Higher mean level indicates more health complaints and lower mean level less health complaints. As indicated by the figure, the total sample has a mean level of 25.1 (SD 7.5). Girls report significantly higher levels of health complaints (mean=28.0, 95% CI 27.6, 28.3) than boys (mean=22.2, 95% CI 21.9, 22.5).

![Figure 1. Bar chart of mean levels of PHC for total sample and by gender with 95% CI (n=3888).](image)

*Figure 2* presents levels of perceived teacher support. The total sample has a mean level of 18.6 (SD 3.5). Boys report significantly higher levels of perceived support (mean=18.9, 95% CI 18.7, 19.0) than girls (mean=18.3, 95% CI 18.1, 18.4).

![Figure 2. Bar chart of mean levels of PTS for total sample and by gender with 95% CI (n=3888).](image)
In Figure 3 mean levels of PHC are displayed by school cluster for the total sample as well as by gender. There are practically no differences in PHC across clusters in the total sample. Boys report similar levels of PHC over all clusters while girls’ levels differ more. ANOVA test shows non-significant estimates for total sample and for boys which means that it is not possible to reject the null hypothesis (that there are no difference) at the 5% significant level.

For girls the p-value of the ANOVA test were close to significant (p=0.08). To scrutinize this further a linear regression was conducted with PHC as outcome. The results from these analyses (not shown) suggest that prevalence of PHC among girls is significantly higher in the deprived cluster (mean=28.7) compared to the privileged (mean=27.4) and the deprived immigrant cluster (mean=27.3), respectively.

![Psychosomatic Health Complaints by School Clusters](image)

*Figure 3. Bar charts of mean levels of PHC by school clusters, for total sample and gender (n=3888).*

In Figure 4 mean levels of PTS are displayed by school cluster for the total sample and by gender. Boys seems to experience higher levels of PTS than girls across all school clusters except in the deprived cluster where the mean values are similar for both genders. Boys and girls in privileged and deprived immigrant schools seem to experience higher levels of PTS than boys and girls in typical and deprived schools. ANOVA tests showed significant differences for all three groups (total, boys and girls), meaning that it is possible to reject the null hypothesis at the 5% level. In order to see if these significant differences were applicable between all clusters for all groups’ linear regressions were made with PTS as the outcome. Results (not shown) confirm that differences across school clusters are significant at a 5% level. The exceptions are for the deprived cluster (mean=18.3) compared to the typical
(mean=18.3) in the total group. For boys the exception was found between the privileged (mean=19.7) and the deprived immigrant cluster (mean=19.1) as well as for the typical (mean=18.7) and the deprived cluster (mean=18.3). The exceptions concerning girls was found between the deprived cluster (mean=18.3) and the deprived immigrant (mean=18.8) and typical cluster (mean=17.9) respectively.

![Perceived Teacher Support by School Clusters](image)

**Figure 4.** Bar charts of mean levels of PTS by school clusters and gender (n=3888).

Next the association between perceived teacher support and psychosomatic health complaints is examined. *Table 2* show the results from the linear regression analysis with PHC as the outcome, presented as B-coefficients. In the Bivariate model significant estimates show that average levels of PHC decrease with -0.46 units for every unit increase in PTS, which means that students perceived teacher support is negatively associated with psychosomatic health complaints. The model also show that girls, on average, experience more than five units higher levels of PHC (b=5.76) compared to boys. Having one or two unemployed parents increases levels of PHC (b=2.48) compared to not having unemployed parents. Living with both parents seems to have a protective effect on PHC (b=-1.26) compared to those who do not live with both parents. The school cluster variable show no significant association with PHC. In Model 1, adjusting for gender results in a slight reduction of the PTS estimate (b=-0.39), suggesting that gender partly accounts for the association between PTS and PHC. In Model 2, when adjusting also for other socio-demographic characteristics, PTS shows a more or less unchanged negative significant association with PHC (b=-0.38). The significant estimates from the bivariate model stays significant with a slight reduction of strength for parent’s employment status (b=1.90) and family situation (b=-1.06). To explore possible moderating effects of gender on the association between PTS and PHC an interaction term (PTS x gender) was added, but was not shown to be significant at the 5% level (p=0.090) and
therefore removed from the model. However, stratified analysis of Model 2 by gender (not shown) suggest that the significant association between PTS and PHC is stronger for girls (-0.43) than for boys (-0.34) meaning that PTS has a stronger influence on the health complaints of girls than of boys.

In Model 3 the different school clusters are taken into account. The main association of interest, between PTS and PHC, stays unchanged (b=-0.39). In terms of explained variance the adjusted R2 goes from 18.16 % in Model 1 to 19.07% in Model 2 and Model 3 respectively which suggest that the included variables explains slightly more of the variance in PHC in the final models.

Finally, an interaction term of PTS and school cluster was added to explore possible moderating effects of school cluster on the association between PTS and PHC (Model 3). Test of model fit suggest that the inclusion of the interaction term do not significantly improve the overall model (p=0.069) and the interaction term was therefore removed. However, given the close to significant results, the interaction of interest is presented in Model 3 with the purpose of demonstrating differential tendencies in the association. As suggested by the result in Model 3 the interaction terms for each cluster indicates a stepwise decrease in effect of the association of PTS on PHC from the privileged cluster to the deprived immigrant cluster (typical b=0.16; deprived b=0.21; deprived immigrant b=0.31). The interaction terms of the typical (p=0.080) and the deprived (p=0.067) clusters show non-significant p-values while the interaction term for deprived immigrant cluster is significant (p=0.010).
Table 2. Linear regression of psychosomatic health complaints regressed on perceived teacher support shown as B-coefficients (p-values within brackets) (n=3888).

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Bivariate a</th>
<th>Model 1 b</th>
<th>Model 2 c</th>
<th>Model 3 d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PTS</strong></td>
<td>-0.46 (0.000)</td>
<td>-0.39 (0.000)</td>
<td>-0.38 (0.000)</td>
<td>-0.39 (0.000)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Girls</td>
<td>5.76 (0.000)</td>
<td>5.52 (0.000)</td>
<td>5.53 (0.000)</td>
<td>5.51 (0.000)</td>
</tr>
<tr>
<td><strong>Parents education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parents with less than university (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>At least one parent with university</td>
<td>-0.63 (0.066)</td>
<td>-0.59 (0.059)</td>
<td>-0.62 (0.049)</td>
<td></td>
</tr>
<tr>
<td>Don't know for both parents or missing</td>
<td>-0.53 (0.152)</td>
<td>-0.51 (0.130)</td>
<td>-0.50 (0.136)</td>
<td></td>
</tr>
<tr>
<td><strong>Parent's employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither parents unemployed (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>One or both parents unemployed</td>
<td>2.48 (0.000)</td>
<td>1.90 (0.000)</td>
<td>1.91 (0.000)</td>
<td></td>
</tr>
<tr>
<td><strong>Migration background</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived in Sweden all life (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Have not lived in Sweden all life</td>
<td>-0.02 (0.963)</td>
<td>-0.16 (0.614)</td>
<td>-0.17 (0.599)</td>
<td></td>
</tr>
<tr>
<td><strong>Family situation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not live with both parents (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Live with both parents</td>
<td>-1.26 (0.000)</td>
<td>-1.06 (0.000)</td>
<td>-1.08 (0.000)</td>
<td></td>
</tr>
<tr>
<td><strong>School cluster</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privileged (ref)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical</td>
<td>-0.04 (0.914)</td>
<td></td>
<td></td>
<td>-0.43 (0.170)</td>
</tr>
<tr>
<td>Deprived</td>
<td>0.51 (0.282)</td>
<td>-0.03 (0.941)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprived immigrant</td>
<td>0.02 (0.962)</td>
<td>-0.46 (0.288)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interaction term: PTS*Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p=0.090</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interaction term; PTS*School cluster</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p=0.069</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privileged (ref)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical</td>
<td>0.16 (0.080)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprived</td>
<td>0.21 (0.067)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprived immigrant</td>
<td>0.31 (0.010)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adj R² | 18.16% | 19.07% | 19.07%

a Unadjusted; b Adjusted for Gender; c Model 1 + Socio-demographic characteristics; d Model 2 + School cluster
e Interaction analysis were run in a separate model
To scrutinize the patterns suggested by the interaction terms in Model 3, linear regressions of PHC regressed on PTS, stratified by school clusters and adjusted for socio-demographic characteristics, are demonstrated in Table 3. As suggested by the presented b-coefficients students in the privileged cluster seem to benefit most from support of teachers (b=0.56) while students in the deprived immigrant cluster benefit the least (b=0.27). This confirms the proposed tendency indicated by the interaction term in Model 3 (Table 2).

Table 3. Linear regression of psychosomatic health complaints regressed on perceived teacher support, stratified by school clusters. All analyses are adjusted for socio-demographic characteristics. Shown as B-coefficients (p-values within brackets).

<table>
<thead>
<tr>
<th></th>
<th>Privileged (n=591)</th>
<th>Typical (n=2401)</th>
<th>Deprived (n=430)</th>
<th>Deprived immigrant (n=466)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTS</td>
<td>-0.56 (0.000)</td>
<td>-0.39 (0.000)</td>
<td>-0.31 (0.001)</td>
<td>-0.27 (0.003)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (ref)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Girls</td>
<td>4.87 (0.000)</td>
<td>5.74 (0.000)</td>
<td>6.22 (0.000)</td>
<td>4.30 (0.000)</td>
</tr>
<tr>
<td>Interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>term: PTS*Gender</td>
<td>p=0.116</td>
<td>p=0.629</td>
<td>p=0.021</td>
<td>p=0.316</td>
</tr>
<tr>
<td>Adj R2</td>
<td>20.71%</td>
<td>21.24%</td>
<td>17.24%</td>
<td>12.92%</td>
</tr>
</tbody>
</table>

*Interaction analysis were run in a separate model

Hence, even though it is not possible to say that the association between PTS and PHC differs significantly across clusters it is clear that the PTS estimates differ in strength depending on the kind of school attended by students. In addition, previous analyses suggest that means of PTS and means of PHC differs by gender (Figure 1 & 2) and that the association between the two may vary somewhat by gender (Table 2, Model 2), however not statistically significant at conventional levels (p=0.090). To further investigate this pattern an interaction term between PTS and gender was added in each regression in Table 3. The p-value in the deprived cluster suggest a significant moderating effect of gender on the association of PTS on PHC (p=0.021) while the other clusters showed no significant interaction.

Finally the results from Table 3 suggest, as indicated by the R2-values, that the included variables explain most of the variance in PHC among students in the first two clusters (20.71% and 21.24%). The amount of explained variance is then being reduced for the last two clusters ending up at 12.92% in the deprived immigrant cluster. This indicates that the
variance in PHC among students in the deprived immigrant cluster is less explained by the model than for the other clusters.

To further explore the meaning of gender in the association between PTS and PHC across clusters a stratified analysis by both cluster and gender is shown in Table 4. The results suggest that boys in privileged (b=-0.46) and typical schools (b=-0.40) report less PHC if they perceive teacher support as high. No significant effect of PTS on PHC is shown among boys in deprived (b=-0.17) and deprived immigrant schools (b=-0.20). Girls in privileged (b=-0.67) and deprived schools (b=-0.55) report less PHC if they perceive teacher support as high than those in typical (-0.36) and deprived immigrant schools (-0.28).

Table 4. Linear regressions of psychosomatic health complaints regressed on perceived teacher support stratified by school clusters and gender. All analyses are adjusted for socio-demographic characteristics. Shown as B-coefficients (p-values in brackets).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Privileged</th>
<th>School clusters</th>
<th>Deprieved</th>
<th>Deprived immigrant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (n=266)</td>
<td>Girls (n=325)</td>
<td>Boys (n=1224)</td>
<td>Girls (n=1177)</td>
</tr>
<tr>
<td>PTS</td>
<td>-0.46 (0.000)</td>
<td>-0.67 (0.000)</td>
<td>-0.40 (0.000)</td>
<td>-0.36 (0.000)</td>
</tr>
<tr>
<td>Adj R2</td>
<td>6.15%</td>
<td>11.45%</td>
<td>7.41%</td>
<td>4.49%</td>
</tr>
</tbody>
</table>

*Negative R2 values can be interpreted as a result of irrelevant independent variables in combination with a small sample.

In addition, results suggest, as indicated by the R2 values, that the included variables explain most of the variance in PHC for girls in privileged schools (11.45%) compared to any other stratified group. In sum, the stepwise decrease in association of perceived teacher support on health complaints among students across school clusters presented in Table 3 suggest more complex patterns when stratified by gender. For girls the results points to a more uniform direction than for boys, since all stratified estimates are negativly significant. However, there is no coherent tendancy in the association across the social gradient of school clusters. For boys, the two more advantaged school environments (privileged and typical) show negativ and similar significant associations, while the two less advantaged school environments (deprived and deprived immigrant) show no significant associations. In addition, the R2 in the deprived cluster for boys suggest that the model is inapplicable for that particular group.
Discussion

The purpose of this study is to explore the distribution of perceived teacher support (PTS) as well as psychosomatic health complaints (PHC) in schools with different student composition. It also aims to examine any possible association between PTS and PHC with a particular focus on whether student composition might influence this association. Furthermore, any gender differences in the distribution as well as in the association is to be investigated.

The first research question asks whether any differences in student’s PHC can be seen across school composition profiles. Results show, when looking at the total sample, that there is no significant differences. In relation to gender, significant differences is found for girls only. According to Social Disorganization Theory (SDT) a more disadvantaged environment would render higher levels of mental health problems (Shaw & McKay, 1942). In other words, low school SES and high concentration of ethnic minority students as in deprived immigrant schools would be expected to display the highest levels of PHC among students (Gutman & Feinstein, 2008; Bradshaw et al., 2009), which is not the case in this study. In fact, absolute levels of privileged and deprived immigrant schools is practically the same, again contradicting the discussed theory (Shaw & McKay, 1942) as well as previous research (Jablonska et al., 2014).

One possible explanation could be found in the importance of health-risk behaviors for psychosomatic health problems. In a study by Olsson and Fritzell (2015) based on a sample of ninth grade students in Stockholm, results concluded that high alcohol consumption and drug use were greater in more advantaged than disadvantaged school settings, even when individual characteristics were taken into account. Health-risk behaviors of this sort might therefore negatively contribute to higher PHC among students in privileged schools (DiClemente, Hansen, & Ponton, 2013).

One the other hand, the evenly distributed results of PHC across school composition profiles, might be a consequence of school environmental aspects. One such aspects could be the school-related stress due to examinations and grading’s which would affect all students in the same manner regardless of school composition profile (Gustafsson et al., 2010), while another aspect could be social support provided by schools through teachers types (Due et al., 2003; Modin & Östberg, 2009; Tennant et al., 2014), which would positively contribute to an
even health level across school. Going back to SDT (Shaw & McKay, 1942), this would suggest that the disadvantaged schools in this study, have managed to compensate or buffer against these stressors by for example the provision of social support (Turner and Noh, 1983), which in that case would be considered encouraging from a public health perspective (The Public Health Agency of Sweden, 2018).

The overall gender differences in PHC, where girls report more complaints than boys, confirms previous research and reports (ibid, Bremberg & Dalman, 2015). A possible explanation is that mental health issues can take different forms for boys and girls respectively. Girls tend to report more internalizing problems, such as PHC, while boys report more externalizing problems, such as aggressiveness and norm breaking behaviors (Westling Allodi, 2010). In addition, girls report higher levels of school-related stress related to achievements, grades and worries about the future, than boys (Östberg et al., 2015). Other complementary explanations could be related to differences in the construct and expectation of gender (West & Zimmerman, 1987) as well as biological and hormonal differences (Hauglund, Wold, Stevenson, Aaroe, & Woynarowska, 2001).

When looking at the distribution of PHC for boys in relation to school segregated profiles there are no significant differences. Girls in deprived schools, on the other hand, seems to suffer from worse psychosomatic health than girls in privileged and deprived immigrant schools respectively. While girls in deprived schools are the “worst off”, girls in deprived immigrant schools are the “best off”. These findings are somewhat unexpected, but has been confirmed by previous research arguing that girls in the most deprived schools, deprived immigrant schools in the case of this study, are less high-performing and have less of an internal fear of failing than girls in other school types (Perski & Rose, 2017) which could have positive implications on their mental health (Östberg et al., 2015).

The second research question concerns levels of students’ perceived teacher support (PTS) and whether these differ across school composition profiles. Results show that they do differ significantly except between typical and deprived schools. It seems that students in privileged schools perceive the highest teacher support compared to the other school settings. Boys perceive overall higher levels than girls and that pattern remains across school profiles.

The fact that students in the most privileged schools report the highest levels of PTS can partly be explained by the concept of pedagogic segregation. The idea of the concept is that
socially disadvantaged schools offer less qualitative teacher support due to lower levels of education as well as inadequate knowledge and experience among teachers, than does the advantaged schools (Hansson & Gustafsson, 2016). Higher staff turnover rates in disadvantaged schools could be a reason why they need to consider less educated teachers at all. The amount of educated teachers are limited and those existing are prone to priorities more privileged schools with a higher concentration of motivated students as their workplace (Granvik Saminathen et al., 2018). The higher staff turnover rates in combination with high concentration of mobile students could also contribute to lower levels of trust and social cohesion in disadvantaged schools (Bradshaw et al., 2009) since the relationship between teachers and students never get the chance to establish and evolve. In addition, lower teacher expectations on students in typical and deprived schools compared to those in privileged schools might contribute to the different levels of PTS in this study (Auwarter & Aruguete, 2008).

These differences however, seems not applicable to the students in deprived immigrant schools who displays levels of perceived teacher support closer to the privileged schools than those of typical and deprived schools. These unexpected findings could be related to the motivation levels of students in these schools, which are the second highest among all school composition profiles (Kjellström et al., 2018). In addition, academic motivation and PTS are positively associated to each other (Klem & Connel, 2004).

The compensatory effects of the resource allocation system in use in Stockholm municipality, where more disadvantaged schools receive extra financial resources that they, to a large extend use to lower the student-teacher ratio of the school, might also be a possible explanation (Andersson et al., 2016). Taking the pedagogic segregation perspective, this could indicate that these particular schools have found an alternative way of using their additional financial resources. Possibly to motivate educated and skilled teachers to work and stay in these particular schools and thereby raise the quality of the perceived teacher support in these schools (Hansson & Gustafsson, 2016). Results from this study also clearly shows that relatively speaking the majority of students, that is in typical and deprived schools, experienced low levels of PTS compared to the other schools, which can be considered a school contextual problem since all students have the right to an equal provision of education and thereby school support (Skollag 2010:800).
In terms of gender differences in PTS, boys perceive significantly higher levels of PTS than girls in this study. The results adds to the existing mixed and unclear research in relation to gendered perception of teacher support (Reddy et al., 2003; Modin & Östberg, 2009; Danielsen et al., 2009) where type of received support, e.g. emotional or instrumental, seems to matters in different ways for boys and girls (Brolin Låftman & Modin, 2012). This study has not assessed type of teacher support and can therefore not distinguish between any such differences.

The next research question explores if higher PTS is associated to less PHC among students. Results confirms such a negative association both in the crude model and when adjusting for individual socio-demographic characteristics, even though the association is slightly weakened. These findings corroborate research stating the importance of PTS on mental health in students (Due et al., 2003; Berg et al., 2011; Kjellström et al., 2017) as well as the influence of gender on this association, even though there are no clear conclusions in how gender might interact (Way et al., 2007, Brolin Låftman & Modin, 2012). However Cohen and Wills (1985) have stated that type of support perceived by girls and boys might have different implications on their health outcomes respectively.

The negative association of PTS on PHC is also found across different school composition profiles, but the strength of the association vary across school type. This confirms the importance of teacher support for all students regardless of individual social circumstances and regardless of what kind of school they attend (Wight et al., 2006). The differences in the associations are mainly attributed to the diverse student composition of the schools, meaning that if a student would change school from one composition profile to another, the expected influence of PTS on PHC would change with him or her, regardless of individual socio-demographic background. In the present study the strength of the association decreases in a stepwise manner starting with privileged schools and then going all the way to deprived immigrant schools where the importance of PTS on PHC is the weakest.

The stronger association between PTS and PHC in privileged schools confirms the findings from longitudinal studies made by Wight et al. (2006) where general social support seemed to benefit adolescent health more in affluent surrounding than in disadvantaged surroundings. Set into a school context, the somewhat unexpected finding of the present study, might be understood in light of the importance of academic motivation. Research suggests that the
association between teacher support and student mental health can operate through academic achievement, meaning that teacher support becomes more relevant health wise among academically motivated students (Klem & Connel, 2004; Brolin Låftman & Modin, 2012; Andersson et al., 2016). Also there is a reciprocal relationship between achievement and health, where students accomplishing good grades feel better which in turn increases chances of higher school performance (Gustafsson et al., 2010). In line with these arguments, differences in school achievements by differences in student composition of schools have increased, where students in more privileged schools generally achieve higher grades than those in more disadvantaged schools (Andersson et al., 2016), even when adjusting for individual socio-demographic characteristics (Granvik Saminathen et al., 2018). In addition, 15 to 16 year old students in Sweden attending theoretically oriented studies were found to be more sensitive towards teacher recognitions, rewards and penalties compared to non-theoretically oriented students (Berg et al., 2010). This was explained through the notion of students striving to conform to the culture present in school, and the culture of theoretically oriented programs often included higher academic achievement. To conclude, these aspects taken together could explain why students in privileged schools seems to be more sensitive to the support of teachers than in any of the other school composition settings.

In addition, the largest absolute gap in the importance of PTS on PHC across school composition profiles is found between students in privileged schools and all the others which suggest that privileged schools not only benefit the most of teacher support, but that they stand out in relation to the rest. Initially it might have been expected that students in deprived immigrant schools would benefit the most of teacher support due to the disadvantaged student composition of their schools. Instead they seem to benefit the least. There are probably other important aspects for these students, than the one investigated in this study, that would better explain variations in their mental health complaints. It has been suggested that issues concerning discrimination and stigma (Wight et al., 2006) as well as reasons for migration and country of origin (Nielsen & Krasnik, 2010) could matter. This highlights a problem that often occurs when investigating non-native populations, namely the tendency to classify them as a homogeneous group, when in fact they represent different ethnic features, cultures and practices in relation to health (ibid).

When exploring gender differences in the association between PTS and PHC more complex patterns emerge. Even though this study is not able to establish any significant interaction
effect of gender in the total sample, stratified analyses by gender (not shown) suggested a stronger influence for girls than boys which is in line with research by Natvig et al. (2009) as well as Colarossi and Eccles (2003). When investigating these gender differences further across school composition profiles, gender only seems to interact with PTS among students in deprived schools even though the model explains variations in PHC to a lesser extent than for students in privileged and typical schools.

It is a challenging task to interpret the gender specific analyses of PTS on PHC in general and its meaning when taking school segregation profiles into consideration. It seems that teacher support might be of importance for all girls’ mental health, regardless of the student composition of their school, possibly through higher academic ambition and thereby higher sensitivity towards support from teachers (Berg et al., 2010; Östberg et al., 2015). For boys however, it is not the case and the results from the present study suggest that any possible explanation could be found in relation to the student composition of deprived and deprived immigrant schools. Indeed, the academic ambition is generally lower in these school settings (The Swedish National Agency for Education, 2018), especially among boys (Östberg et al., 2015) which would imply less need of teacher affirmation for boys (Berg et al., 2010). In addition, teachers expectations on boys attending disadvantaged schools has been shown to be the lowest among all students (Auwarter & Arguete, 2008), thus implying a negative effect on teacher efficacy on these students.

When summarizing results of the study from a gender perspective, girls in deprived schools stand out since they seem to suffer most from PHC while they perceive relatively low levels of PTS, even though they are the ones benefiting the second most of teacher support health wise. On the other hand, boys in deprived and deprived immigrant schools also stands out, since they never seem to get the possibility of experiencing health benefits from teacher support at all even though all other students in Stockholm do.

Strengths and limitations of the study
The study sample is based on a large number of students in Stockholm municipality and the surveys were conducted and collected under well-established circumstances due to the regular execution by Stockholm City Administration which is a strength of the present study. However the generalizability is affected by internal as well as external attrition. The external attrition could be related to students being absent from school because of health reasons, lack
of teacher support or worse school environment. This is partially confirmed by the analyze made of the internal attrition (excluded study objects) in Appendix 1, where the mean levels of PHC are slightly higher and levels of PTS slightly lower respectively compared to the study objects. The internal attrition also show signs of an underrepresentation of students in deprived immigrant schools, among students who do not live with both parents, among students who have not lived in Sweden all their life and for students who don’t know both parents educational background or has not answered the question. In other words, patterns in the internal attrition proposes that any results in this study related to the socio-demographic aspects of students and the student composition of schools might be underestimated. In addition, the study cannot be generalized to all Swedish ninth graders, due to its setting in Stockholm which displays a more segregated school landscape than the country at large (Åman, 2011).

A second limitation is the cross-sectional study design, which makes it impossible to draw any causal inference from the associations. However, previous research have established longitudinal effects of social support on adolescent health (Way et al., 2007; Pössel et al., 2018) including perceived teacher support on health outcomes in students (Thapa et al., 2013). In addition the longitudinal studies also underscores the unidirectional relationship, rather than the bi-directional relationship, between different measures of perceived school support and psychological as well as behavioral health among adolescents (Way et al., 2007). This strengthens the arguments that results from this study can be considered relevant and important.

Finally, the school cluster variable is a school-level measure which means that it consists of aggregated data based on means and proportions of individual students. In order to properly assess any contextual effects, future studies are encouraged to investigate the association between teacher support and student health across schools with different student composition profiles using multilevel analysis (Rasbash, Steele, Browne, & Prosser, 2015).

Conclusions
This study highlights patterns in PHC as well as PTS among adolescents in Stockholm by showing that PHC is linked to differences in school student composition for girls and that PTS is linked to differences in school student composition for both boys and girls. This study also highlights the mental health benefits of teacher support for all students in Stockholm. In
addition, it suggests that the health benefits of teacher support decreases for all students when attending a school with a more disadvantaged student composition, regardless of individual socio-demographic background. Finally, the study puts forward the role of gender when interpreting the differences in the association between PTS and PHC across school composition profiles.

In sum, this study confirms that the school context is of importance when trying to decrease psychosomatic health complaints among students in Stockholm. However it cannot confirm that it would be one of the most important ways of doing it, as suggested by The Public Health Agency of Sweden (2018). It seems unreasonable to assume that schools alone are responsible for the mental health development of adolescents in Sweden, since schools are imbedded in society as a whole, where the phenomena of school segregation can be seen as a product of increased income inequality, housing segregation as well as levels of migration (Böhlmark et al., 2015). Yet, schools might be used as a tool of reducing absolute and relative differences in health complaints. For disadvantaged schools a strengthening of the internal environment, in order to increase levels of trust and social cohesion (Bradshaw et al., 2009), could possibly protect students from external contextual stressors in their otherwise disorganized surroundings (Wight et al., 2006). It is possible that this internal “safety” within disorganized schools needs to be in place before any importance of teachers support can be seen on these students’ health outcomes. I would therefore propose efforts to strongly enhance the school environment of the more disadvantaged schools in Stockholm, e.g. by motivating well educated and skilled teachers to work and stay in these schools. Taking a wider perspective, I would also propose responsible authorities to counteract the segregated patterns on a larger societal level which prevails in Stockholm today.

Future research are encouraged to investigate what aspects in the life of students attending disadvantaged schools that matter most in order to identify what might lie in the way for teacher support to influence their mental health. In addition, research assessing type of support received by boys and girls respectively seems necessary to understand how gender might influence the association of teacher support on mental health. Also, using a wider perspective on mental health problems, by incorporating externalizing behaviors, might explain health differences in boys to a greater extent.
Acknowledgements

I would like to give my warmest thanks to my supervisors Sara Brolin Läftman and Gabriella Olsson for their knowledge, commitment and patience during the process of writing this thesis. In my case, their guidance definitely confirmed that perceived support reduces risk of mental health problems, especially when facing academic challenges. I would also like to thank the Department of Public Health Sciences and especially Bitte Modin, for the opportunity to work with this thesis in an inspiring environment. Finally, all my love to Johan and Vala for the multitude of support you’ve given me during the whole process.
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Appendices

Appendix 1. Distribution and missing of main variables and covariates by excluded subjects. Column percentage for distribution within each covariate and row percentage for proportion of students who answered on each category but were excluded from the analytical sample due to missing information on at least one of the included variables (n=1016).

<table>
<thead>
<tr>
<th>Covariates</th>
<th>n (column %)</th>
<th>row %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>434 (55.5)</td>
<td>18</td>
</tr>
<tr>
<td>Girls</td>
<td>348 (44.5)</td>
<td>15</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>234</td>
<td></td>
</tr>
<tr>
<td><strong>Parents education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least one parent with university edu.</td>
<td>386 (38.0)</td>
<td>15</td>
</tr>
<tr>
<td>Both parents with less than university edu.</td>
<td>151 (14.9)</td>
<td>20</td>
</tr>
<tr>
<td>Don't know for both parents or missing</td>
<td>479 (47.1)</td>
<td>29</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Parents employment status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither parent unemployed</td>
<td>494 (91.8)</td>
<td>12</td>
</tr>
<tr>
<td>One or both parents unemployed</td>
<td>44 (8.2)</td>
<td>15</td>
</tr>
<tr>
<td>Missing</td>
<td>478</td>
<td></td>
</tr>
<tr>
<td><strong>Migration background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived in Sweden all life</td>
<td>676 (75.4)</td>
<td>17</td>
</tr>
<tr>
<td>Have not lived in Sweden all life</td>
<td>221 (24.6)</td>
<td>30</td>
</tr>
<tr>
<td>Missing</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td><strong>Family situation</strong></td>
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<td></td>
</tr>
<tr>
<td>Live with both parents</td>
<td>421 (41.4)</td>
<td>14</td>
</tr>
<tr>
<td>Do not live with both parents</td>
<td>595 (58.6)</td>
<td>33</td>
</tr>
<tr>
<td>Missing</td>
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<td></td>
</tr>
<tr>
<td><strong>School clusters</strong></td>
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<td></td>
</tr>
<tr>
<td>Privileged</td>
<td>105 (10.3)</td>
<td>15</td>
</tr>
<tr>
<td>Typical</td>
<td>568 (55.9)</td>
<td>19</td>
</tr>
<tr>
<td>Deprived</td>
<td>112 (11.0)</td>
<td>21</td>
</tr>
<tr>
<td>Deprived immigrant</td>
<td>231 (22.8)</td>
<td>33</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Main variables</strong></td>
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<td></td>
</tr>
<tr>
<td>PHC</td>
<td>Range</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td>10-50 (few-many)</td>
<td>26.00 (7.0)</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td></td>
</tr>
<tr>
<td>PTS</td>
<td>7-28 (poor-good)</td>
<td>17.93 (3.6)</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td></td>
</tr>
</tbody>
</table>