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To link to this article: https://doi.org/10.1080/00313831.2019.1623308

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Published online: 05 Jun 2019.

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Teacher Stress and Students’ School Well-being: the Case of Upper Secondary Schools in Stockholm

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ABSTRACT
Stress and stress-related complaints such as fatigue and depressed mood are common among teachers. Yet, knowledge about the links between the overall level of teacher stress within a school and individual student outcomes is scarce. This study investigates if the levels of teacher-reported stress, fatigue, and depressed mood within a school are associated with students’ ratings of their school satisfaction and perceived teacher caring, respectively. Data derives from two separate data collections performed in upper secondary schools in 2016, the Stockholm School Survey (SSS) and the Stockholm Teacher Survey (STS), which were linked together (5367 students and 1045 teachers in 46 schools). Two-level linear regression analyses were performed. Results showed negative associations between school-level teacher stress, fatigue, and depressed mood and students’ school satisfaction and perceived teacher caring, even when controlling for student- and school-level sociodemographic characteristics. The findings suggest that teacher stress may have negative implications for students.

ARTICLE HISTORY
Received 20 June 2018
Accepted 19 May 2019

KEYWORDS
Teacher stress; school well-being; school satisfaction; perceived teacher caring; upper secondary school; contextual; multilevel

Introduction
Stress and stress-related complaints are reported by large proportions of teachers, both in Sweden (Swedish National Agency for Education [SNAE], 2016; Swedish Work Environment Authority [SWEA], 2014, 2016a) and internationally (e.g., Hakanen, Bakker, & Schaufeli, 2006; Maslach, Schaufeli, & Leiter, 2001). Several reports show that the levels of stress among Swedish teachers have increased sharply over the last decades (SGOR, 2014, p. 5; SNAE, 2016; SWEA, 2014, 2016a). That high levels of stress among teachers affect their own health and well-being seems obvious and is well documented (Dicke et al., 2015; Evers, Brouwers, & Tomic, 2002; Peltzer, Shisana, Zuma, Van Wyk, & Zungu-Dirwayi, 2009; Skaalvik & Skaalvik, 2010). However, teacher stress may also affect students’ everyday life. Teachers experiencing stress, exhaustion or even depressed mood are likely to have reduced or inadequate ability to engage in the work of strengthening relationships with their students. Research has indeed shown that students can become less interested and motivated to learn when their teachers do not have enough energy and passion for inspirational teaching (Klummann, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Pakarinen et al., 2010; Skaalvik & Skaalvik, 2007). Earlier studies have demonstrated that teachers who experience stress and exhaustion tend to withdraw from social relationships with students (Chang, 2009). They also more often feel ineffectuous about their teaching tasks and insufficient in providing relevant
support for their students compared to less stressed teachers (Burke, Greenglass, & Schwarzer, 1996; Grayson & Alvarez, 2008; Hoglund, Klinge, & Hosan, 2015). Yet, research on how the overall level of teacher stress within a school is related to student outcomes is limited. The present study investigates if higher levels of teacher-reported stress and stress-related complaints within a school are associated with lower student ratings of school satisfaction and perceived teacher caring, respectively. To this end, we use a new data material collected in 2016 that combines survey information from teachers and students in 46 upper secondary schools in Stockholm.

The Swedish School Market Context and Teacher Stress

Few other countries’ educational systems have undergone such dramatic changes as that of Sweden over the past 25 years. As part of a market-oriented shift, a reform in 1991 largely transformed the Swedish school from a centralized (state) to a decentralized (municipality) system, replacing the old rule-based management with a goal- and result-oriented steering model. This was accompanied by a reform in 1992 that made it possible for independent schools to establish themselves with public financial support, granting families the right to pick their school of choice through the introduction of a universal voucher system (Ramberg, 2015; SGOR, 2014, p. 5; Swedish National Agency for Education [SNAE], 2012).

The 1990s school reforms were, in many respects, poorly implemented (SGOR, 2014, p. 5), causing prolonged frustration among teachers along with a substantially increased administrative burden (SGOR, 2014, p. 5; Swedish Work Environment Authority [SWEA], 2012; Teachers’ Union, 2014). This, together with higher demands for flexibility and more uncertain positions in the workplace, have resulted in a generally increased level of anxiety and stress among teachers (Lundahl, Arreman, Holm, & Lundström, 2014; Lundström & Holm, 2011). In the recent decade, governments have sought to rectify the problems that arose in the wake of the 1990s school reforms through a number of new reforms and policy measures, including a new school act, a revised national curriculum and a new grading scale. At least in the short run, this has resulted in additional strain on the inner life of Swedish schools. The past years’ statistics show that teachers are among the most stressed occupational groups in Sweden today, with a higher work load, less feedback and support from superiors, less perceived control over their work situation, and higher sick-leave rates (especially from depression and burnout syndrome) compared to other non-manual occupational groups (SWEA, 2012, 2016a, 2016b; Teachers’ magazine, 2018; Teachers’ Union, 2014).

School segregation has also increased in the wake of the market-oriented reforms, especially in the larger urban areas, leaving the less attractive schools with an increasingly depleted stock of motivated and socioeconomically advantaged students (Bunar, 2010; Ramberg, 2016; Söderström & Uusitalo, 2010). It is reasonable to assume that teachers working in schools that have been most adversely affected by the past decade’s school segregation constitutes a particularly vulnerable group in terms of stress. Therefore, it is important to adjust for schools’ student composition as far as possible when examining the links between teacher stress and students’ school well-being.

Students’ School Satisfaction and Perceived Teacher Caring

In the present study, we analyze two core features of school well-being, school satisfaction and students’ perceptions of teacher caring. School satisfaction derives from the wider theoretical work of children’s life satisfaction (e.g., Huebner, 1994) and can be seen as an expression of students’ quality of life in school. Several studies show that students’ school satisfaction is positively associated with their interest in school and their academic achievement (Ervasti et al., 2012; Huebner & Gilman, 2007; Samdal, Nutbeam, Wold, & Kannas, 1998). A low level of school satisfaction, on the other hand, has been shown to predict increased risks of truancy and depression (Luopa, Pietikäinen, & Jokela, 2006; referred to in Ervasti et al., 2012), dropping out of school as well as unhealthy behaviors (World Health Organization [WHO], 2008).
Perceived teacher caring pertains to students’ perceptions of the quality of teacher-student relationships (Ramberg, Låftman, Almquist, & Modin, 2019). The concept refers to students’ perceptions of whether their teachers care about them, and if they think their teachers do “good” acts for them. Various aspects of the concept have been pointed out in previous studies, including responsiveness (Teven, 2001, 2007), giving praise to students who do well and works hard in school (Burnett, 2002), rewarding good behavior, willingness to listen, and the ability to reduce anxiety (Bulach, Brown, & Potter, 1998). Teachers’ capacity to establish a safe environment and of involving students in decision-making are also important for how students perceive their amount of caring (Hawk & Lyons, 2008).

**Stress and Stress-related Complaints among Teachers**

Occupational stress can be described as an individual experience caused by both internal and external factors (Kyriacou, 2001) tied to the organization’s structure, in this case the school. Teacher stress, as defined by Kyriacou (2001), is the experience of unpleasant, negative emotions (e.g., anger, anxiety, tension or frustration) resulting from excessive demands. Prolonged stress combined with insufficient tools or strategies to handle this can lead to symptoms of different kinds, such as fatigue. Although the concept of fatigue is not clearly specified in the literature, it refers to a state of energy depletion (Åkerstedt, Axelsson, Lekander, Orsini, & Kecklund, 2014). It is generally defined as extreme and persistent tiredness or exhaustion, whether mental, physical or both (Dittner, Wessely, & Brown, 2004).

Work-related depressed mood can be understood as a state of mind resulting from not being able to resolve the stress experienced in the work situation, thus resulting in too much negative stress (e.g., Niedhammer, Malard, & Chastang, 2015). Previous studies indicate that there is a causal relationship between stress and stress-related complaints, such that a high load of stress can lead to various forms of fatigue and depressed mood (e.g., Åkerstedt et al., 2014; Ihlström, Kecklund, & Anund, 2017; Shahid, Shen, & Shapiro, 2010). Stress-related conditions can therefore be described as different expressions and varying degrees of negative experiences linked to the work situation. Previous research has shown that work-related factors interact with the individual so that the work environment causes individual stress (Newman & Beehr, 1979; Richardson & Rothstein, 2008). Teachers’ perceptions of their work environment have been shown to differ across schools (Allodi & Fischbein, 2012) and a reasonable assumption is that this is the case also for teacher stress.

**Empirical Associations Between Teacher Stress and Student Outcomes**

Most studies on teacher stress have focused on its causes and consequences for the teachers themselves (Dicke et al., 2015; Evers et al., 2002; Greenglass & Burke, 2003; Kjellström, Almquist, & Modin, 2016; Lauermann & König, 2016; Montgomery & Rupp, 2005; Olivier & Venter, 2003; Peltzer et al., 2009; Skaalvik & Skaalvik, 2010), just as studies related to students’ school satisfaction and perceptions of teacher caring have mainly focused on explanatory factors at the student level (Ervasti et al., 2012; Gietz & McIntosh, 2014; Huebner & Gilman, 2007).

However, few studies have investigated the role of school-level teacher stress for various student outcomes. One exception is a large-scale German study of the association between teachers’ emotional exhaustion and students’ achievement in mathematics at the elementary level, which concluded that teachers’ well-being is an important predictor for students’ learning (Klusmann, Richter, & Lüdtke, 2016). Teachers’ levels of burnout have also proved to be negatively associated with students’ ratings of autonomous motivation (Shen et al., 2015). Similarly, teachers’ emotional exhaustion seem to be negatively associated with students’ school grades, achievement test scores, school satisfaction, and perceptions of teacher support at the school class level (Arens & Morin, 2016).
Aim and Research Questions

The aim of the study is to assess whether the average levels of stress and of stress-related complaints reported by the teachers in a school are associated with upper secondary students’ school satisfaction and perceived teacher caring, even when adjusting for student- and school-level sociodemographic characteristics. We assume that higher levels of stress and stress-related complaints among teachers at a school are associated with lower levels of school satisfaction and perceived teacher caring among its students.

The following research questions will be addressed:

(1) Are higher levels of teacher stress, fatigue, and depressed mood within a school associated with lower school satisfaction among its students?
(2) Are higher levels of teacher stress, fatigue, and depressed mood within a school associated with lower perceived teacher caring among its students?

Methods

Data

The study sample builds upon a new data material collected in 2016 in upper secondary schools in Stockholm municipality. Information from two sources are combined, the Stockholm Teacher Survey (STS) and the Stockholm School Survey (SSS), with the purpose to link school contextual information based on teacher-rated indicators with student reported information collected in the same schools.

The SSS was conducted by the Stockholm municipality during spring 2016, targeting second-year upper secondary students (N = 8324 students) in Stockholm municipality. The survey was obligatory in the public schools and voluntary in the independent schools. The number of responding students were 6415 (77.1%). The STS was conducted by our research group and was directed to all upper secondary school teachers (N = 2443) in the municipality of Stockholm in 2016. Upper secondary schools for individuals with learning disabilities were not included in the survey. The questionnaire was responded to by 1414 teachers (57.9%). In order to combine data from the same schools, information from both surveys was required. The merged data include information from 6129 students and 1204 teachers in 58 schools. Students with missing data on any of the control variables were excluded, while we allow the sample to vary between the two dependent variables. Furthermore, information at the school level regarding sociodemographic characteristics from the Swedish National Agency for Education [SNAE] was missing for 12 schools, which were excluded. Thus, the final study sample covers those schools that participated in both surveys and had school level information on sociodemographic characteristics from the SNAE. This resulted in a sample consisting of 5367 students and 1045 teachers (whose responses were aggregated to the school-level) distributed across 46 upper secondary schools. Figure 1 illustrates the process whereby the final study sample was obtained.

Individual Level Measures

The dependent variables were constructed from two indices that were identified through confirmatory factor analysis (CFA) (Muthén & Muthén, 2012). School satisfaction was measured using an index consisting of four items intended to capture the students’ satisfaction of their school by asking whether they: enjoy going to school, look forward to going to their classes, experience schoolwork as pointless (reversely coded), and feel that most of their teachers make learning interesting. The response alternatives correspond to a four-point Likert scale with the following options: (a) “very poorly”, (b) “rather poorly”, (c) “rather well”, and (d) “very well”. Items were coded so that high
scores correspond to higher school satisfaction. The index ranges between 4 and 16, and has high internal consistency (Cronbach’s alpha 0.70). Perceived teacher caring covers seven items, based on questions about whether the students report that their teachers: provide direct support if needed, give praise to students who do well (two items), involve students in the planning of educational content, explain what is allowed and what is not, provide positive feedback to parents, and intervene if someone is being harassed or bullied. The response alternatives were the same as above, resulting in an index ranging between 7 and 28, with high internal consistency (Cronbach’s alpha 0.73). Several control variables were taken into account in the statistical analyses in order to adjust for student background characteristics. Gender was measured through the question: are you a boy or girl? Family type was constructed from the question: which persons do you live with? with the following options to mark (a) “mother”, (b) “stepfather/stepmother”, (c) “moves between mother and father”, (d) “foster parents”, (e) “I live alone”, (f) “father”, (g) “siblings”, (h) “other relatives”, and (i) “other”. Respondents that ticked both “mother” and “father” were classified as living in a household with two custodial parents and contrasted to all others. Parents’ education was measured from the question: what is the highest level of education of your parents? The response categories could be ticked separately for the mother and for the father and were: (a) “less than 9 years of schooling”, (b) “compulsory school”, (c) “upper secondary school”, (d) “university”, and (e) “don’t know”. The variable was dichotomized into those who had at least one parent with university education and to those who had not. Migration background was measured by the question: how long time have you lived in Sweden? with the response categories (a) “all my life”, (b) “10 years or more”, (c) “5–9 years”, (d) “less than 5 years” and was dichotomized into those who have lived in Sweden 10 years or more and those who have lived in Sweden less than 10 years.
School Level Measures

The main independent variables used in this study are based on three indices measuring teachers’ level of perceived stress, fatigue, and depressed mood, each of which have been aggregated to the school level from individual teachers’ ratings. Teacher stress was measured by asking teachers to what extent they have days when they constantly feel tense or wound up, have days when they feel pressured, nearly more than they can manage, and have days when they constantly feel stressed. The response alternatives were: (a) “not at all”, (b) “sometimes”, (c) “fairly often”, and (d) “nearly always”, resulting in an index ranging between 3 and 12, with a high internal consistency (Cronbach’s alpha 0.94). Teacher fatigue was measured by asking teachers if they have experienced persistent fatigue, mental fatigue, and physical exhaustion during the last three months. The response alternatives were: (a) “never”, (b) “rarely”, (c) “sometimes” (many times/month), (d) “often” (1–2 times/week), (e) “mostly” (3–4 times/week), and (f) “always” (at least 5 times/week), resulting in an index ranging between 3 and 18, with a high internal consistency (Cronbach’s alpha 0.95). Teacher depressed mood was measured by asking to what extent in the past week teachers had experienced: fatigue or lack of energy, depressed mood, blaming their self for things, excessive worry, lack of interest, and that everything feels exhausting. The response alternatives were: (a) “not at all”, (b) “a little”, (c) “moderately”, (d) “fairly”, and (e) “very much”, resulting in an index ranging between 6 and 30, with high internal consistency (Cronbach’s alpha 0.92). This index (SCL-CD6) has been found to be a valid scale for rating depressed mood (Magnusson Hanson et al., 2014). The three indices are highly correlated (r = 0.64–0.85), and therefore analyzed in separate models (Djurfeldt & Barmark, 2009). Once aggregated to the school-level, the three measures were transformed into standardized z-scores with a mean of 0 and a standard deviation of 1. At the school level, five variables from the Swedish National Agency for Education were included in order to adjust for sociodemographic characteristics. Proportion of students with a foreign background refers to the schools’ percentage proportion of students born abroad and/or whose parents were both born abroad. Proportion of students with post-secondary educated parents is the schools’ percentage of students with parents who have post-secondary education. Number of students per teacher indicate the staff density at the school, while proportion of teachers with a pedagogical degree indicate the level of qualified teachers among the staff at the school. School type captures whether schools are public or independent.

Statistical Method

The statistical method used is multilevel modeling, handling hierarchical data (combined school- and student-data) (Rabe-Hesketh & Skrondal, 2008). Two-level linear regression analyses were conducted in Stata 14 using the xtmixed command. In order to assess whether there was statistically significant variation between schools in the dependent variables, we estimated an empty model, which contained no independent variables, but allowed the variation in the dependent variable to be separated into two components: students and schools. Model 1 shows the estimate for the school-level independent variable, while Model 2 adjusts for student-level control variables (gender, family background, parents’ education and migration background). Model 3 further adjusts for the school-level variables (proportion of students with foreign background, proportion of students with post-secondary educated parents, number of students per teacher, proportion of teachers with a pedagogical degree, and school type). In all models, standardized z-scores of the independent variables have been used in order to facilitate comparisons. For each model, the Intra Class Correlation (ICC) is reported, which provides information about how much of the total variance in the dependent variable that is accounted for by the school-level rather than the student-level (Hox, 2002). We also report the effect size in terms of coefficient of determination ($R^2$) (Bryk & Raudenbush, 1992).
Data from the Stockholm School Survey is not considered as an issue of ethical concern, because the
data is collected anonymously, according to the decision by the Regional Ethical Review Board of
has approved the Stockholm Teacher Survey and its linkage with the SSS.

**Results**

**Table 1** provides descriptive information of all variables used in the study. The study sample contains
slightly more girls (52.8%) than boys (47.2%). Regarding family type, almost two thirds of the stu-
dents belong to households with two custodial parents. Likewise, about two thirds have at least one
parent with university education. About 90% have lived in Sweden for ten years or more. School-
level averages of teacher-rated stress, fatigue, and depressed mood all lie very close to zero due to
the standardization of these variables, although the estimates indicate that the average is slightly
higher in the study sample compared to the full sample.

At the school level, the proportion of students with foreign background ranges between 6.0
and 95.7, with an average of 41.4. Likewise, the proportion of students with post-secondary
educated parents varies considerably and ranges between 7.0 and 86.3, with an average of
51.4. The average number of students per teacher is 16.5, with a range from 5.1 to 26.7 per-
cent, and the proportion of teachers with a pedagogical degree differs between schools with a
range from about 41 percent to 100 percent, with a total average of 84.6. With regards to
school type, 60.4% of the students in our data attended a public school and 39.6% an indepen-
dent school.

**Table 1. Descriptives of the data.** \( n = 5367 \) students distributed across 46 upper secondary schools.

<table>
<thead>
<tr>
<th>Individual-level</th>
<th>Mean</th>
<th>S.D</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School satisfaction(^a)</td>
<td>11.1</td>
<td>2.5</td>
<td>4–16</td>
</tr>
<tr>
<td>Perceived teacher caring(^b)</td>
<td>18.7</td>
<td>3.6</td>
<td>7–28</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>2534</td>
<td>47.2</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>2833</td>
<td>52.8</td>
<td></td>
</tr>
<tr>
<td>Family type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two custodial parents</td>
<td>3400</td>
<td>63.4</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1967</td>
<td>36.7</td>
<td></td>
</tr>
<tr>
<td>Parents’ education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No one with post-secondary education</td>
<td>1839</td>
<td>34.3</td>
<td></td>
</tr>
<tr>
<td>At least one with post-secondary education</td>
<td>3528</td>
<td>65.7</td>
<td></td>
</tr>
<tr>
<td>Migration background</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived in Sweden ≥10 years</td>
<td>4846</td>
<td>90.3</td>
<td></td>
</tr>
<tr>
<td>Lived in Sweden &lt;10 years</td>
<td>521</td>
<td>9.7</td>
<td></td>
</tr>
<tr>
<td>School-level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher stress</td>
<td>0.1</td>
<td>0.97</td>
<td>−4.5–2.3</td>
</tr>
<tr>
<td>Teacher fatigue</td>
<td>0.0</td>
<td>0.96</td>
<td>−3.5–4.1</td>
</tr>
<tr>
<td>Teacher depressed mood</td>
<td>0.1</td>
<td>0.95</td>
<td>−5.0–2.6</td>
</tr>
<tr>
<td>Proportion with students with foreign background</td>
<td>41.4</td>
<td>21.7</td>
<td>6.0–95.7</td>
</tr>
<tr>
<td>Proportion of students with post-secondary educated parents</td>
<td>51.4</td>
<td>24.9</td>
<td>7.0–86.3</td>
</tr>
<tr>
<td>Number of students per teacher</td>
<td>16.5</td>
<td>3.4</td>
<td>5.1–26.7</td>
</tr>
<tr>
<td>Proportion of teachers with a pedagogical degree</td>
<td>84.6</td>
<td>11.6</td>
<td>41.6–100</td>
</tr>
<tr>
<td>School type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>3241</td>
<td>60.4</td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>2126</td>
<td>39.6</td>
<td></td>
</tr>
</tbody>
</table>

\(^{a}n = 4760.\)

\(^{b}n = 4523.\)
Table 2 presents results from the two-level regression models where school satisfaction is the dependent variable and teacher stress, teacher fatigue, and depressed mood serve as the independent variables. The results show that teacher stress is negatively associated with students’ school satisfaction ($b = -0.26$, $p = 0.001$). The estimate indicates that students’ average school satisfaction decreases by 0.26 units for every standard deviation increase in the schools’ average level of teacher stress. When adjusting for student-level variables (gender, family type, parents’ education, and migration background) in Model 2, and school-level variables (proportion of students with foreign background, proportion of students with post-secondary educated parents, number of students per teacher, proportion of teachers with a pedagogical degree and school type) in Model 3, this estimate is not affected to any noteworthy degree. The ICC in the empty model is 0.065, indicating that 6.5 percent of the variation in school satisfaction occurs at the school level. In Model 1, when including teacher stress, the ICC decreases to 5.1 percent, and when adding the student-level control variables in Model 2, it decreases to 4.9 percent. In Model 3, when adding the school-level control variables, it decreases further to 4.7 percent. This suggests that teacher stress contributes to explaining the school-level differences in students’ school satisfaction. Teacher stress predicts 23 percent of the variance in students school satisfaction (Model 1: $R^2 = 0.23$). When adding the control variables in Model 2 and Model 3, the $R^2$ increases to 0.26 and 0.30 respectively.

Regarding teacher fatigue, the same pattern is revealed, with higher school averages of teacher fatigue being associated with lower levels of school satisfaction among the students at the school. The ICC of Model 1 is 0.053, and when adding the student level control variables in Model 2 it decreases to 0.051. When adding the school level variables in Model 3, it decreases further to 0.049, indicating that teacher fatigue explains some of the between-school differences in students’ school satisfaction. Teacher fatigue predicts about 20 percent ($R^2 = 0.20$) of the variance in students’ school satisfaction.

The corresponding results for the schools’ average level of depressed mood among teachers points to a somewhat weaker association, although statistically significant. Consequently, the ICC (0.057) is
somewhat higher, and the $R^2$ lower (0.13) in Model 1, compared to the corresponding results for school-level stress and fatigue among teachers.

Overall, the estimates are not affected to any noteworthy degree when including student- and school level control variables, thus indicating that the school concentration of teacher-reported stress, fatigue, and depressed mood are negatively associated with students’ school satisfaction.

Table 3 presents results for students’ perceptions of teacher caring in relation to the teachers’ ratings of stress, fatigue and depressed mood. Regarding teacher stress, the estimate for perceived teacher caring in Model 1 is $-0.49$ ($p = 0.000$), indicating that students’ ratings on the perceived teacher caring index decreases 0.49 units for every standard deviation increase in the schools’ average level of teacher stress. Even when adjusting for student- and school-level control variables (Models 2 and 3), the estimates remain substantial and highly significant. The ICC in the empty model shows that the variation in perceived teacher caring accounts for 9.2 percent at the school level. It decreases to 6.6 percent when teacher stress is included in Model 1, but is not affected to any larger degree when adding the student-level variables. However, when the school-level control variables are added, a more pronounced reduction of ICC takes place. This suggests that teacher stress and the other school-level variables included in the model contribute substantially to explaining the variance between schools regarding students’ perceptions of teacher caring. Teacher stress predicts a considerable part ($R^2 = 0.31$) of the variance of perceived teacher caring, and the added school-level variables in Model 3 also contribute extensively to “explaining” the variance of perceived teacher caring.

Teacher fatigue is not as strongly associated with students’ perceived teacher caring as teacher stress, but the estimates are still highly significant throughout the models (Models 1–3). The ICC corresponds to 7.8 percent and $R^2$ to 17 percent in Model 1.

The results for teacher depressed mood shows a very similar pattern to that of teacher fatigue, with an estimate of $-0.38$ ($p = 0.002$) and an ICC of 0.077 in the first model. Furthermore, 18 percent of the variation in students’ perceived teacher caring is “explained” by the school’s concentration of teacher depressed mood.

### Table 3. Two-level linear regression analyses of student-reported perceived teacher caring regressed on school-level measures of teacher-reported stress, fatigue, and depressed mood with 95% Confidence Intervals. $n = 4523$ students in 46 upper secondary schools.

<table>
<thead>
<tr>
<th></th>
<th>Perceived teacher caring $(n = 4523)$</th>
<th>Empty model$^a$</th>
<th>Model 1$^b$ [95% CI]</th>
<th>Model 2$^c$ [95% CI]</th>
<th>Model 3$^d$ [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>b</td>
<td>b</td>
<td>b</td>
</tr>
<tr>
<td>Teacher stress</td>
<td></td>
<td>-0.49***</td>
<td>-0.45***</td>
<td>-0.36**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.72, -0.26]</td>
<td>[-0.67, -0.22]</td>
<td>[-0.59, -0.13]</td>
<td></td>
</tr>
<tr>
<td>School level variance</td>
<td>1.20</td>
<td>0.84</td>
<td>0.80</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>ICC$_{school}$</td>
<td>0.092</td>
<td>0.066</td>
<td>0.064%</td>
<td>0.047</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
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<td>0.33</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher fatigue</td>
<td></td>
<td>-0.39**</td>
<td>-0.35**</td>
<td>-0.35**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.64, -0.14]</td>
<td>[-0.60, -0.10]</td>
<td>[-0.60, -0.11]</td>
<td></td>
</tr>
<tr>
<td>School level variance</td>
<td>1.20</td>
<td>1.00</td>
<td>0.94</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>ICC$_{school}$</td>
<td>0.092</td>
<td>0.078</td>
<td>0.074</td>
<td>0.049</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.17</td>
<td>0.22</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher depressed mood</td>
<td></td>
<td>-0.38**</td>
<td>-0.34**</td>
<td>-0.30*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[-0.62, -0.14]</td>
<td>[-0.57, -0.10]</td>
<td>[-0.54, -0.07]</td>
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</tr>
<tr>
<td>School level variance</td>
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<td>0.99</td>
<td>0.94</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>ICC$_{school}$</td>
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<td>0.077</td>
<td>0.074</td>
<td>0.051</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.18</td>
<td>0.22</td>
<td>0.48</td>
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</table>

$^{*}p < 0.001$ $^{**}p < 0.01$ $^{*}p < 0.05$.

$^a$Empty model contains no independent variables.

$^b$Includes only one independent variable (teacher stress / teacher fatigue / teacher depressed mood).

$^c$Model 2 + student-level variables (gender, family type, parents’ education, and migration background).

$^d$Model 3 + school-level variables (proportion of students with foreign background, proportion of students with post-secondary educated parents, number of students per teacher, proportion of teachers with a pedagogical degree and school type).
When summing up the multilevel regression models, school-level averages of teacher stress, fatigue, and depressed mood are all significantly negatively associated with students’ perceptions of teacher caring, also when adjusting for background characteristics at both the student- (Models 2) and the school-level (Models 3).

**Discussion**

This study investigated whether the levels of teacher stress and stress-related complaints in upper secondary schools in Stockholm are associated with the students’ school satisfaction and perceived teacher caring at the same school. The results demonstrated strong and consistent negative associations between schools’ levels of teacher-reported stress, fatigue, and depressed mood with students’ school satisfaction and perceived teacher caring. The findings were robust even when controlling for socio-demographic characteristics at the student- and the school level. Moreover, the associations were stronger for perceived teacher caring than for school satisfaction.

As shown previously, there are differences between schools in terms of teachers’ perception of and satisfaction with their work environment (Allodi & Fischbein, 2012). Our results add to these findings by demonstrating that there is also variation between upper secondary schools in the Stockholm municipality regarding teachers’ reported levels of stress, fatigue and depressed mood. The reasons for the variation of teacher stress between schools can be assumed to have multiple causes. Firstly, it may be because of the market-adaptation of the school system, as this has contributed to a more differentiated student population (Bunar, 2010; Ramberg, 2016; Söderström & Uusitalo, 2010). Consequently, it is reasonable to assume that teachers who work at schools that have been most negatively affected by school segregation is a particularly exposed group. Secondly, as suggested in previous studies (Newman & Beehr, 1979; Richardson & Rothstein, 2008), it is likely that there are school-specific features that have an impact on the level of teacher stress at a school, such as differences in how school leaders manage to prevent and counteract stress, as well as the degree of support systems can be assumed to vary between schools.

Previous research has pointed to the importance of school-level characteristics for different student outcomes. Often, such studies concern associations between conditions such as school leadership, teacher cooperation or school ethos/climate on the one hand, and student outcomes such as grades and school achievement on the other hand (Archambault, Janosz, & Chouinard, 2012; Grosin, 2003; Ramberg et al., 2019; Rutter & Maughan, 2002; Vangrieken, Dochy, Raes, & Kynadt, 2015). Studies of the links between teacher stress and stress-related complaints and student outcomes are more scarce, but those that exist have shown that teachers’ emotional exhaustion is negatively associated with students’ learning in mathematics (Klusmann et al., 2016), and that burnout among teachers is negatively associated with students’ motivation (Shen et al., 2015). At the school class-level, teachers’ emotional exhaustion has also been shown to be negatively associated with students’ school satisfaction, school grades and perceptions of teacher support (Arens & Morin, 2016).

Even though these studies were conducted in other national contexts and in other age groups than the current study, our findings are very much in line with those of previous research, and thereby provide further general support to the idea that teachers’ level of stress and stress-related complaints are important for students’ well-being and performance at school.

Our results are also well in line with research showing that students may become more uninterested and unmotivated in education and learning if they have teachers who feel stressed (Klusmann et al., 2008; Pakarinen et al., 2010; Skaalvik & Skaalvik, 2007). We therefore conclude that our results essentially reinforce previous findings within the field.

Our results pointed to stronger associations with perceived teacher caring than with school satisfaction. A possible explanation may be that perceived teacher caring refers specifically to the relations between students and teachers, while school satisfaction is linked to a more general experience of how students enjoy school, which may also be related to other factors such as relations with peers and a general interest in school activities.
Regarding the Intra Class Correlation (ICC), the results reveal that the ICC decreases in Models 1 (from 6.5 to 5.1, 5.3, and 5.7 percent for school satisfaction, and from 9.2 to 6.6, 7.8, and 7.7 percent for perceived teacher caring). This indicates that parts of the between-school variation in school satisfaction and in perceived teacher caring, respectively, is accounted for by differences in teacher stress, fatigue and depressed mood.

As stated previously, teachers represent an occupational group who report high levels of stress. In Sweden, the occurrence of stress among teachers has increased, especially since the 1990s (SNAE, 2016; SWEA, 2014, 2016a). Research has shown that the implementation of the educational reforms in Sweden in the 1990s, which resulted in clearer market adaptation and additional administrative workload for teachers, has contributed to this increased stress (Lundahl et al., 2014; SGOR, 2014, p. 5). For instance, previous studies have shown how the independent school reform changed the teacher role to a more market-oriented one (Fredriksson, 2009), which implied new tasks such as marketing of the school and recruitment of students. It also meant increased demands for flexibility and a more uncertain position in the workplace (Lundahl et al., 2014), factors that teachers in both public and independent schools describe as contributing to higher levels of stress (Lundström & Holm, 2011). Overall, the changed teacher role and the market-adapted school system are likely to have contributed to the increased levels of stress among Swedish teachers. To empirically assess the determinants of teacher stress and to explain the increase in teacher stress over time is however beyond the scope of this study, and a relevant task for future research.

In addition to the negative consequences that this implies for the affected parts of the teacher profession in terms of worse health and poorer quality of life, our findings indicate that teachers’ levels of stress (and stress-related complaints) also adversely affect the students attending these schools. As previous research suggests, teachers who experience stress tend to withdraw from social relationships with their students. They also more often feel ineffectual about their teaching tasks and insufficient in providing relevant support to their students, compared to less stressed teachers (Burke et al., 1996; Chang, 2009; Grayson & Alvarez, 2008; Hoglund et al., 2015). Based on this, it is reasonable to assume that different groups of students are affected to different degrees by teachers’ stress. Students who do well in school, and/or with strong support from home, are reasonably not affected by teachers’ level of stress to the same extent as students who are struggling academically and in more need of help and support by their teachers. Future research should investigate such potentially moderating effects.

Counteracting a stressful work situation for teachers would not only favor the well-being and health of the teachers themselves but would also most likely be accompanied by a more positive perception of the teachers and an increased school satisfaction among students. Furthermore, students’ well-being in school is important for its intrinsic value but also because it is a significant link to school achievement and health (e.g., Ervasti et al., 2012; Gietz & McIntosh, 2014; Samdal et al., 1998).

**Strengths and Limitations**

One of the study’s strengths lies in the two separate data collections at the same schools, which decreases the bias related to common measures variance. Another benefit of the study is that we have strengthened the validity of our findings by using three separate measures for teachers’ stress and stress-related complaints. The indices used in the study are well conceptualized and they all show high internal consistency. Although they are strongly related to each other, together they give a clearer picture than what just one measure would do.

By adding school-level information from the SNAE to our data, we have also been able to adjust for schools’ student sociodemographic composition, as an attempt to isolate the effects of teacher stress on student school well-being as far as possible.

The response rate in the SSS was reasonably high (77.1%), while the attrition in the STS was more substantial (response rate 57.9%). An assumption based on the STS is that the teachers who experienced a high level of stress, fatigue or depressed mood are likely to have responded to a lower extent.
than their colleagues, thus underestimating the levels of stress in our data. If anything, this probably means even higher levels of stress, fatigue and depressed mood among the total population of teachers. Likewise, it is possible that there was systematic attrition in the SSS in that students with low school well-being were probably more likely to be absent from school when the survey was completed and therefore underrepresented in the data. Thus, it may be the case that the absolute levels of students’ school satisfaction and perceived teacher caring are somewhat overestimated in our data compared to the population. However, we do not see any reasons that this potential bias would have affected the associations between teacher stress and school well-being. Furthermore, a number of students were excluded from the SSS data in the selection process leading to the final sample. The distributions of the variables in our final study sample were however similar to those of the total sample, indicating that the selection process did not infer any bias.

As the study was based on cross-sectional data, we cannot make any claims about causality with support in the data. For instance, we cannot rule out the risk that working in a school with a high concentration of students who do not like school, may affect the levels of teacher stress, fatigue and depressed mood. To draw conclusions about the causal links between teacher stress and student outcomes, it is desirable that future studies also collect data over time.

Another limitation of the study is its geographical context, since the between-school variation among upper secondary schools in Stockholm is considered particularly high, why the generalizability to other contexts should be done with caution. Further studies in other geographical areas, educational systems and among students of other age groups are recommended. Yet, although the degree of teacher stress and the variation in teacher stress between schools may be particularly pronounced in Stockholm, we see no reason why the associations with student outcomes would not exist also in other contexts, which has also been shown by previous studies in the field (Arens & Morin, 2016; Klusmann et al., 2016; Shen et al., 2015).

The upper secondary school in Sweden is clearly divided between different educational programs, and it is possible that there are differences in our main variables of interest between different educational programs. However, our data do not contain information on educational programs and hence we did not have the possibility to investigate this. Therefore, future studies could also examine possible differences in the association between teacher stress and student school well-being across, for example, academic and vocational programs.

**Conclusions**

The relationship between teacher stress and teachers’ health has been shown to be important in previous studies (e.g., Dicke et al., 2015; Kjellström et al., 2016; Lauermann & König, 2016). To prevent and support efforts to reduce teacher stress and fatigue would therefore give direct implications for a healthier teacher profession. In addition, this study suggests that it would also convey direct implications for students’ school well-being (school satisfaction and students’ perceptions of teacher caring), aspects that other studies raise as crucial for increasing school performance and for promoting future health (Ervasti et al., 2012; Gietz & McIntosh, 2014; Samdal et al., 1998). In order to reduce stress among teachers, and thereby increase students’ school well-being, different actions on several levels can be taken into account. It may concern supporting individual teachers exposed to high levels of stress and preventive work at the school level. Municipalities and other school providers, as employers, have a significant role in the preventive work, and it could be addressed to a greater extent within the country’s teacher education programs.

**Disclosure Statement**

No potential conflict of interest was reported by the authors.
Funding

This work was financially supported by Forte, Formas and Vetenskapsrådet [grant number 2014-10107] and Swedish Royal Academy of Sciences [grant number 2015-0088].

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