



Research paper

Are test-based policies in the schools associated with burnout and bullying? A study of direct and indirect associations with pupil-teacher ratio as a moderator

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HIGHLIGHTS

- A school-goal structure characterized by performance goals is related to teacher burnout.
- A school-goal structure characterized by performance goals is indirectly associated with bullying in the classroom, through teacher burnout.
- Teacher burnout is associated with bullying in the classroom.
- Having an additional teacher in the class does not moderate the association between teacher burnout and bullying in the classroom.

ARTICLE INFO

Article history:

Received 24 September 2021

Received in revised form

2 February 2022

Accepted 8 February 2022

Available online 17 February 2022

Keywords:

Test-based accountability policies

Burnout

Bullying

Structural equation modelling

Performance goals

ABSTRACT

Research is lacking regarding how teachers' perceptions of a performance goal structure, relate to teacher and student outcomes. Thus, the present study examined associations among performance goal structure, teacher burnout, and bullying among students, and further whether pupil-teacher ratio moderated the relation between teacher burnout and bullying. 300 class teachers from 150 schools participated in the project, and structural equation modeling was applied. Results revealed significant associations among performance goal structure, teacher burnout, and bullying. However, having an additional teacher in the classroom did not moderate the association between burnout and bullying.

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1. Introduction

Teaching is a particularly stressful occupation and is associated with burnout in several countries (Hakanen et al., 2006; Johnson et al., 2005; Liu & Onwuegbuzie, 2012; Skaalvik & Skaalvik, 2017a; Stoeber & Rennert, 2008). Burnout can have detrimental effects for the individual teacher and has been found to relate to numerous psychological and physical health problems including coronary heart disease, musculoskeletal pain, depression, insomnia, and increased mortality (see Salvagioni et al., 2017 for meta-study). However, teacher burnout may also negatively affect students, and teacher well-being is the most essential determinant of a healthy classroom environment (Jennings & Greenberg, 2009). Studies have demonstrated that students can detect teacher

burnout (Evers et al., 2004), and evidence suggests associations between teacher burnout and higher cortisol levels among elementary school students (Oberle & Schonert-Reichl, 2016). Moreover, students perceive teachers who are burned out to be less emotionally supportive (Shen et al., 2015), and negative associations have also been found between teacher burnout and the quality of socioemotional relations between students in the classroom (Jensen & Solheim, 2020).

Considering the associations between teacher burnout and socioemotional relations in the classroom, teacher burnout might relate to bullying in the classroom as well. However, to the best of my knowledge, previous studies have not investigated this association. Still, it has been suggested a connection exists between how teachers treat their students as expressed through the teachers' classroom management and the presence of bullying in the classroom (Sullivan et al., 2004). Moreover, evidence indicates that when teachers have good relations with their students, students

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were less aggressive, both physically and relationally (Reavis et al., 2010). Additionally, in a meta-study conducted by Aloe et al. (2014), teacher burnout was related to student misbehaviors. Bullying behavior may be manifested in various ways, for example, teasing, active exclusion from a social group, or physical assault (Roland & Galloway, 2002). A meta-analysis conducted by Modecki et al. (2014) based on studies from 80 countries from various geographical zones concluded that the prevalence rate for involvement in bullying was 35%, indicating that bullying is a serious problem in schools. Indeed, bullying has devastating effects on the victim. In a recent study, bullying was found to be causally related to depression and anxiety in the victim (Schoeler et al., 2018). Thus, investigating how teacher burnout may relate to bullying in the classroom is essential.

If we consider teacher burnout as an antecedent of bullying among students in the classroom, it is important to investigate relevant contextual factors in teachers' work situations that might add to teacher stress and increase burnout levels. One particularly relevant factor in this respect is the strong emphasis placed on measurement and testing. During the last decades, test-based accountability policies have become increasingly dominant in the schools, which have increased student high-stakes test performance (Pianta & Hamre, 2009). In the United States, Europe, and many Asian countries, test-based accountability is the main tool applied to monitor student performance and the quality of schools (Mausethagen, 2013). The consequences of these policies have been related to reduced instructional depth and increased pressure to teach to the test (Menken, 2006). The most extreme consequences of test-based accountability policies are perhaps seen in the United States, where teachers and administrators working in schools can risk losing their job if the expected performance goals are not met (Cucchiara et al., 2015). During the last decade, teacher accountability has also become more salient in Norway (Mausethagen, 2013), and students in Norwegian schools are now also involved in high-stakes testing for national assessments in reading and mathematics. However, compared with other countries, little pressure has been placed on key actors in the Norwegian system (Skedsmo, 2011). Still, Norwegian teachers have historically possessed a relatively high degree of autonomy in society (Slagstad, 1998), and the use of such external control mechanisms has met strong resistance among teachers and in the teacher unions (Mausethagen & Granlund, 2012).

Increased focus on testing and student performance will most likely have implications for how teachers perceive the goal structure at their respective schools. School goal structure relates to the structure and practices that influence teachers' perceptions of the goals and values of the school, and schools that have adopted a strong performance goal structure emphasize test scores in preference to effort (Skaalvik & Skaalvik, 2011b, p. 153). The empirical evidence between teachers' perceptions of school goals structure and how it may influence their emotions and experience of work has been scarce (Rinas et al., 2020; Skaalvik & Skaalvik, 2017b). However, in one study among Norwegian teachers, a high-performance goal structure was found to increase teachers' stress levels and lead to burnout (Skaalvik & Skaalvik, 2017b). Moreover, recent research suggests that teachers' perceptions of pressure to increase student test scores relate to higher reported teacher stress (von der Embse & Putwain, 2015).

1.1. The present study

High workloads, a lack of social support from colleagues and management, and an increased focus on testing is a major concern within education, as these factors may contribute to work stress and burnout among teachers, which may threaten a positive

classroom environment (Oberle & Schonert-Reichl, 2016). Generally, this statement is in line with the abovementioned research, indicating that increased focus on performance goals eventually relates to student outcomes through burnout. Thus, the first aim of the present study was to offer a more complex and complete approach to how a performance goal structure might relate to teacher burnout and bullying in the classroom. Focusing on the performance goal structure as an antecedent to teacher burnout and bullying is relevant considering the increased test regime that has been implemented in schools in Norway and other countries. Moreover, to the best of my knowledge, the specific association between teacher burnout and bullying at the classroom level has not been investigated previously.

A second aim of the study was to examine whether the pupil-teacher ratio moderated the association between teacher burnout and bullying behavior. The background for this research question is the fact that previous research studying associations between pupil-teacher ratio and outcomes has primarily focused on class-size reduction (e.g., Hattie, 2009), whereas little research has explored how an increase in teacher resources relates to classroom processes (Jensen & Solheim, 2020). In a recent study applying the same teacher sample with a randomized control design, findings revealed that increasing the pupil-teacher ratio (measured as deploying an extra teacher resource in the class) moderated the associations between teacher burnout and the socioemotional climate (Jensen & Solheim, 2020). Thus, in this study, it was sought to examine whether the pupil-teacher ratio might also moderate the association between teacher burnout and bullying. A theoretical model of the study is shown in Fig. 1.

2. Theoretical framework and hypotheses

2.1. Performance goals versus mastery goals

Achievement goals refer to beliefs, attributions, and affect that produce the intention of behavior (Weiner, 1986). Generally, two types of achievement goals have received the highest attention within educational research: learning and performance goals (Ames, 1992). Mastery goals are characterized by an orientation towards developing new skills and improving the level of competence (Meece et al., 1988; Nicholls, 1989), with a focus on the internal value of learning (Butler, 1987). The mastery goal construct is characterized by a motivation to learn, where the individual demonstrates a determination to engage in the learning process (Ames, 1992). Moreover, mastery goals have been related to more risk-taking and challenges (Ames & Archer, 1988) and more positive attitudes when it comes to learning (Ames & Archer, 1988; Meece et al., 1988). Performance goals, on the other hand, are more concerned with achievement towards a normative standard, where one's ability is characterized as doing better than others (Meece et al., 1988) and where learning is primarily viewed as means to achieve planned and desired goals (Ames, 1992). The presence and perceptions of a goal structure are not only present at the individual level but can also be found in the school contexts, meaning schools also have distinct goal structures that relate to motivational and behavioral outcomes among students (Maehr & Midgley, 1991). Studies have shown that when students perceive school goals as performance-oriented, their self-beliefs are less adaptive, they avoid seeking help (Karabenick, 2004), and they demonstrate lower persistence and higher procrastination (Wolters, 2004).

However, as Skaalvik and Skaalvik (2017b) recently highlighted, teachers also receive signals regarding which goals are valued in their school—which can be referred to as the school goal structure. Most studies have been concerned with investigating how the goal structure in schools and classrooms affects student outcomes

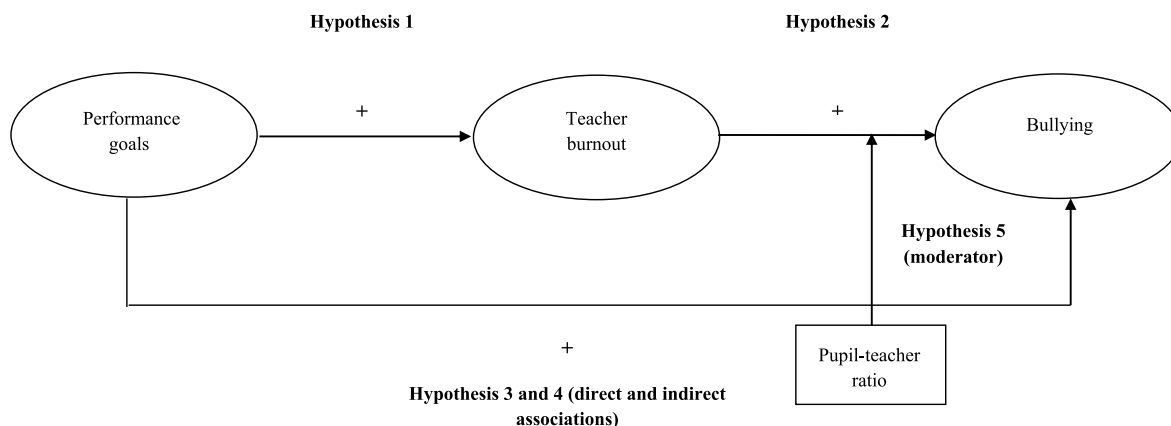


Fig. 1. Theoretical model of the study.

(Skaalvik & Skaalvik, 2017b), whereas few studies have examined how the school goal structure relates to teacher outcomes.

As referred to previously, teachers' perception of the school goal structure can be defined as the structure and practices that influence teachers' perceptions of the goals and values of the school (Skaalvik & Skaalvik, 2017b, p. 153). Specifically, such practices include values and norms concerning the use of achievement tests and criteria applied for rewarding teachers (Skaalvik & Skaalvik, 2017b). Consequently, both mastery and performance goal structures may exist in a specific school, but the variation will be seen between schools regarding which goal structure is emphasized the most. Generally, schools with a mastery or learning goal structure are characterized by recognitions of student efforts, where making mistakes is seen as a natural part of the learning process (Skaalvik & Skaalvik, 2013). Moreover, success is defined as an improvement rather than based on a comparison against standardized norms or others (Ames, 1992; Skaalvik & Skaalvik, 2013). On the contrary, schools that have adopted a strong performance goal structure emphasize test scores and achievement in preference to achievement and effort (Skaalvik & Skaalvik, 2011b). The definition of success is primarily understood as performing better than others, which results in a more competitive environment both between students and teachers and between schools (Skaalvik & Skaalvik, 2017b).

2.2. Performance goal structure and teacher burnout

Pekrun (2006) argued, achievement goals are "assumed to regulate the achievement-related thoughts and actions that shape ... emotions" (p. 583). Indeed, solid empirical evidence exists in support of this association. Recently, Goetz et al. (2016) identified 94 studies regarding relations between achievement goals and emotions, with 77 studies from the review study of Huang (2011), 9 studies from Linnenbrink-Garcia and Barger (2014), and 8 studies from their subsequent review. Findings from Goetz and colleagues' search support the assumption that while mastery goals relate positively to students' enjoyment, performance goals relate positively to students' anxiety. Moreover, performance goals were also found to be negatively associated with students' general well-being (Kaplan & Maehr, 1999). Conclusively, based on the above-mentioned research, exposure to a performance goal structure seems to contribute to negative emotions for the individual.

Butler (2007) stated that the school context, in addition to being an area for students to perform and achieve, is an arena for teachers to demonstrate their competence. Thus, in the same manner, different goal structures in the schools may have implications for

student well-being and emotions, and the school's goal structure may also influence teacher well-being and emotions. Still, as noted before, the empirical evidence between teachers' perceptions of school goal structure and how it may influence their emotions and experience of work have been scarce (Skaalvik & Skaalvik, 2017b; Rinas et al., 2020). However, in the few studies that have been conducted with teachers, a similar pattern has emerged to what was found among students: mastery goals relate positively to enjoyment and performance goals relate negatively to enjoyment and positively to anxiety (e.g., Janke et al., 2019; Wang et al., 2017).

It is reasonable to assume that when teachers are exposed to a performance goal structure in their work setting, they are more at risk of burnout. Burnout arises when demands surpass the resources the individual has available over time, as this may result in stress that eventually may lead to burnout (Bakker & Demerouti, 2007). According to Maslach et al. (1996), burnout is a three-dimensional concept that consists of depersonalization, reduced personal accomplishment, and emotional exhaustion. However, emotional exhaustion is the main component of burnout (Cordes et al., 1997), which refers to a feeling of being exhausted by one's work (Maslach & Jackson, 1981). Emotional exhaustion is expressed by energy loss, chronic fatigue, and a feeling of being worn-out (Pines & Aronson, 1988). Teaching is one of the occupations with the highest levels of job stress (Stoeber & Rennert, 2008); thus, teachers are especially vulnerable to burnout (Babadi, 2009). Both workload and time pressure are stress factors that are strongly related to the component of emotional exhaustion among teachers (Fernet et al., 2012; Skaalvik & Skaalvik, 2010, 2011a). Moreover, when teachers perceive that strong emphasis is put on performance goals in the work setting, implying that focus is primarily on test results, this can be stressful for the teachers due to social comparison with other teachers and schools and that they are not able to control student performance (Skaalvik & Skaalvik, 2017b). When teachers perceive high-performance goals in their work setting, it might be conceived as an additional job demand, which can increase their stress levels and lead to burnout. In a study among 760 Norwegian teachers, Skaalvik and Skaalvik (2017b) found evidence for a positive relationship between performance goal structure and burnout. Therefore, it was also expected to see a positive relation between performance goal structure and teacher burnout, and as shown in Fig. 1 the following hypothesis was proposed:

Hypothesis 1. Performance goal structure will be positively related to burnout.

2.3. Linking teacher burnout to bullying in class

Teachers play a significant role in establishing a positive classroom environment that contributes to academic and social and emotional development among students (Hamre & Pianta, 2010), and teacher well-being has been considered the most important antecedent for a healthy classroom climate (Jennings & Greenberg, 2009). However, when teachers are burned out, this will naturally decrease their well-being, which again might potentially deteriorate the social and emotional climate in the classroom, resulting in increased levels of bullying. Bullying has been defined by intentionality, repetition, and an imbalance of power, with abuse of power being a primary distinction between bullying and other forms of aggression (e.g., Vaillancourt et al., 2013).

Teacher burnout may be related to bullying among students for several reasons. First, evidence suggests that teacher burnout affects the quality of the teacher-student relationship negatively. When teachers are suffering from burnout, they become emotionally detached from their students and are more prone to developing negative attitudes towards them (Maslach et al., 1996). For instance, Cano-García et al. (2005) found that teachers who were burned out were less interested in maintaining good relationships with their students, and Dietrich and Cohen (2019) found that the quality of the student-teacher relationship is poor, bullying among students is more prominent. Positive teacher-student relationships have also been found to relate to less bullying among students because of stronger anti-bullying attitudes (Wang et al., 2015). Further, Troop-Gordon and Kopp (2011) found in a longitudinal study that when students had close relations with their teacher, the students were less aggressive, both physically and relationally. Positive associations have also been shown between student-teacher conflict and peer victimization (Reavis et al., 2010). The importance of the student-teacher relationship as a protective factor against bullying can also be understood in the framework of social determination theory (Deci & Ryan, 2000), which proposes that individuals will tend to internalize values and regulations to the social groups to which they belong. More specifically, this implies that when students perceive positive relations with their teacher, they are more prone to internalizing their teacher's values and desist from taking part in bullying behaviors (Wang et al., 2015). However, evidence also indicates that teachers may act passively towards bullying intervention programs due to self-perceptions of learned helplessness because of burnout (Swift et al., 2017).

A second explanation for the link between teacher burnout and bullying in class can be understood within a phenomenon referred to as nonverbal leakages (Ekman & Friesen, 1969), which implies that teachers' negative emotions eventually leak into the classroom through their nonverbal expressions (Babad, 2009) and can negatively affect the social and academic climate (Babad et al., 1989; Rosenthal & DePaulo, 1979). Disrespectful and cruel behaviors are relational (Dietrich & Cohen, 2019) and bullying taking place in the classroom is specifically related to relations between students. Thus, when the socioemotional relations between students are poor, there will also be higher levels of bullying. To the best of my knowledge, the direct association between burnout and bullying in the classroom has not been investigated. However, empirical support for the association between teacher burnout and a poor classroom climate defined as the social interactions taking place between students has been demonstrated in a recent study in which the same sample as in the current study was applied (Jensen & Solheim, 2020). The authors concluded that teachers who are burned out might demonstrate less emotional affection towards their students, which again has a negative spillover on the social and emotional interactions between students. Based on the

previous negative associations found between burnout and poor interactions between students, it can be assumed that teacher burnout will relate to higher levels of bullying in the classroom. Thus, the following hypothesis was proposed:

Hypothesis 2. Teacher burnout will relate positively to bullying.

2.4. Direct and indirect associations of performance goal structure on bullying

A high focus on performance goals in the school setting can be experienced as stressful for teachers (Skaalvik & Skaalvik, 2017c). According to stress-contagion theory (Wethington, 2000), stress can spill over from one individual to other individuals within a shared social context, a process that also has been referred to as crossover (Staines, 1980). It has been suggested that stress crossover transfers through different paths in a group setting, and if one person is exposed to stressors, this might again have an objective impact on other members in that group (Wethington, 2000). As such, one might hypothesize that when teachers experience stress due to working in an environment with a high focus on performance goals, this may have a direct association with student behaviors in the classroom. To the best of my knowledge, the specific relation between teachers' perceptions of a performance goal structure and bullying in the classroom has not been investigated. However, previous studies revealed that when students perceived schools as performance-oriented, higher negative affect in the form of boredom, anger, frustration, and more disruptive behaviors was observed (Kaplan & Maehr, 1999). A more recent study by He et al. (2015) also found a positive association between performance goals and disruptive behaviors among students. Similar results were confirmed in a longitudinal study, where students who showed aggressive behaviors had higher odds of belonging to the high-performance goal trajectory (Duchesne et al., 2014). Considering these findings, one might expect that when each classroom teacher experiences performance goals to be high, this will be directly associated with higher levels of bullying behavior in the classroom. Thus, the third hypothesis, as shown in Fig. 1, was as follows:

Hypothesis 3. Performance goal structure will relate positively to bullying.

In addition to a direct association between performance goals and bullying, performance goals may relate to bullying indirectly through teacher burnout. The process through which stress and burnout from teachers relate to negative outcomes for students has been referred to as a burnout-cascade (Oberle & Schonert-Reichl, 2016), implying that the stress perceived by students and teachers is cyclically associated. More specifically, this implies that when teachers are overwhelmed by high work demands and a lack of resources, occupational stress increases, leading to negative affect as emotional exhaustion. In line with the stress-contagion theory (Wethington, 2000) and the phenomenon of nonverbal leakages (Ekman & Friesen, 1969) referred to previously, students can capture the negative emotions of the teacher through nonverbal cues, which again negatively affects student behavior in the classroom. When students behave negatively, this puts additional stress on the teacher, resulting in even higher stress and burnout levels and a negative cycle referred to as a burnout-cascade develops. Thus, the following was hypothesized:

Hypothesis 4. A performance goal structure will relate indirectly to bullying through teacher burnout.

2.5. Pupil-teacher ratio and the association between teacher burnout and bullying

Studies have shown that when the pupil-teacher ratio is high, bullying is more prominent (Waasdorp et al., 2011). Children were found to be more aggressive and negative towards each other in classrooms with a high pupil-teacher ratio (Finn et al., 2003). Generally, most studies on pupil-teacher ratio have been concerned with class-size reduction as a means of improving the classroom environment and students' learning outcomes. However, the pupil-teacher ratio can also be reduced by increasing the number of teachers in the class (Solheim & Opheim, 2018). In a recent study, it was demonstrated that in classes with only one teacher, teacher burnout was negatively related to the socioemotional relations between students. However, in classrooms in which two teachers were present, the negative association between burnout and the socioemotional relations between students disappeared (Jensen & Solheim, 2020). In the same manner, it can be assumed that having an additional teacher in the classroom may weaken the relation between teacher burnout and bullying. For the class teacher, having a second teacher to rely on in the classroom might be perceived as a form of social support. Previous studies found that collegial support helped teachers manage children's problem behaviors (Howard & Johnson, 2004), and teachers were shown to intervene less in bullying behaviors when support from colleagues was low (Song et al., 2018). When teachers experience burnout, they become less involved in the classroom (Maslach & Leiter, 1999), which may increase the likelihood of bullying. However, if a second teacher is available, this may moderate the negative consequences of teacher burnout on bullying behavior. This led to the final hypothesis:

Hypothesis 5. The pupil-teacher ratio moderates the association between teacher burnout and bullying.

3. Method

3.1. Context

The data in the present study were retrieved from a Norwegian project referred to as the "Two Teachers Project" (Solheim et al., 2017). The core aim of the project was to examine the effects of increasing the teacher ratio in the classroom on student outcomes across 150 schools and 300 classes (two classes from each school). The schools were mainly located in the southern part of Norway. The classes at each school were randomly assigned to an intervention or control class. The intervention classes were given an extra teacher resource during the first school year, whereas the control classes had no extra teaching resource. In the intervention classes, the extra teacher resource was available eight Norwegian lessons per week, and the duration of each lesson was 45 min. In addition to the extra teacher intervention, the Two Teachers project also comprised initiatives related to the professional development of the teachers. The project was approved by The Norwegian Social Science Data Service, and ethical guidelines of the National Committee for Research Ethics in the Social Sciences and Humanities were followed. For more information on the Two Teachers project, see Solheim et al. (2017).

3.2. Sample

One of the aims of this study was to examine the moderating effect of an extra teacher resource on the association between teacher burnout and bullying in the class. However, as referred to above, additional interventions related to the professional development of the class teachers were also part of the Two Teacher

project (see Solhiem et al., 2017). Thus, a preliminary analysis was conducted, including the variable related to professional development intervention as a control variable in a structural equation model (SEM). Results showed that the interventions related to professional development for class teachers were not associated with any of the variables applied in the present study. Thus, it was decided to include all 300 class teachers in the final sample.

The teacher sample included 300 class teachers (97.6% females) and consisted of class teachers in both intervention and control classes related to the extra teacher resource. At the time of the study, the teacher sample was class teachers for students in the first grade. The response rate for the teacher sample was 100%. In terms of age, the majority were between 30 and 39 years old, and the average experience for teaching was 14 years. A more detailed overview of sample demographics is shown in Table 1. The extra teachers in the intervention classes were not included in the sample of the current study.

3.3. Procedure

The teachers who took part in the study responded to self-report questionnaires related to the performance goal structure of the school, burnout, and the extensiveness of bullying in their respective classes. The teachers responded to the questionnaire approximately 1 school year after the extra teacher resource was introduced. The intervention was introduced at the start of the school year in the middle of August 2016, whereas the teachers responded to the questionnaire in May 2017. Each class teacher was given an identity code, which enabled each class teacher to be linked to their respective classes.

3.4. Measures

Performance goal structure was assessed as teacher perceptions related to the degree their respective schools emphasized performance measures. The scale comprised three items measured on a 5-point Likert-type scale (1 = totally disagree to 5 = totally agree). Sample items were, "At this school, the teachers are evaluated based on the achievements of the students." and "Student's scores on achievement tests, are heavily emphasized at this school." (Skaalvik & Skaalvik, 2017b).

The emotional exhaustion dimension from the Maslach Burnout Inventory, General Survey (Maslach et al., 1996) was utilized to measure teacher burnout, as this dimension is considered the core component of burnout (Cordes et al., 1997). The measure was applied previously on the same teacher sample in a different study (Jensen & Solheim, 2020) and displayed good validity. The emotional exhaustion scale included five items measured on a 7-point Likert scale (0 = never to 6 = every day). Sample items were, "I feel used up at the end of the workday." and "Working all day is really a strain for me."

Table 1
Characteristics of participating teachers.

	Teachers
N	300
Male (%)	2.4
Female	97.6
25 years old (%)	2
25–29 years old (%)	11
30–39 years old (%)	24.1
40–49 years old (%)	34.4
50–59 years old (%)	21.4
60 years old or more (%)	7
Mean years of teaching	14

Bullying in the classroom was assessed by four items. The questions were retrieved from the Social Integration Classroom Climate and Self-Concept of School Readiness scale originally developed by Rauer and Schuck (2003). The questions were further validated and applied by Holen et al. (2013) in a sample of Norwegian teachers working with first graders and were, therefore, suitable for the present study. Sample items were, “The pupils make fun of some of the other children.” and “Some pupils amuse themselves at the expense of classmates.”

4. Analyses and results

4.1. Model fit indices

Several fit indices were applied to evaluate the various models in the current study: The root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker Lewis index (TLI), and standardized root mean residual (SRMR). Acceptable model fit is indicated by RMSEA values of 0.06 or less, SRMR values of 0.08 or less, CFI values of 0.90 or more, and TLI values of 0.95 or above (Hu & Bentler, 1999).

4.2. Descriptive statistics and confirmatory factor analysis

First, the reliability of constructs, correlations, and descriptive statistics was calculated (Table 2). As shown in Table 2, the reliability of all constructs was found to be satisfactorily ranging from 0.84 to 0.90. Second, a confirmatory factor analysis (CFA) was conducted applying Mplus 8.4 to verify the fit of the data to the proposed study model. Three latent constructs were included in the CFA, including performance goal structure (three items), burnout (five items), and bullying in class (four items). However, the output from the first CFA revealed high modification indices between two error terms in the burnout construct (42.137), specifically the items, “I feel emotionally drained from my work.” and “I feel used up at the end of the workday.” Modification indices can be utilized to determine misfit (Jøreskog & Sörbom, 1988), and generally correlating error terms within the same construct is acceptable (Hooper et al., 2008). Thus, a new CFA was conducted in which a correlation between the two error terms in the burnout construct was included in the model. To determine whether including the specific correlation significantly improved model fit, a chi-square difference test was conducted. Since the regular chi-square difference test is not recommended for use with clustered data (Muthén & Muthén, 2012), the Satorra-Bentler chi-square difference test (S-Bx2) was applied. Results revealed that adding the correlation between the two burnout questions significantly improved model fit, Satorra-Bentler value = 23.15, $df = 1$, $p = .000$. The final measurement model exhibited a satisfactory and good fit to the data and is referred to as the measurement model in Table 3.

4.3. Structural relationships and hypothesis testing

After testing the model fit of the measurement model, the next step was to test the hypothesized associations in the proposed

Table 2
Means (M), standard deviations (SD), correlations and reliability (Cronbach's α on the diagonal) for the study variables.

Variable	N	M	SD	1.	2.	3.
1.Performance goals	291	2.67	0.96	(.85)		
2.Burnout	293	3.04	1.07	.22*	(.90)	
3.Bullying	293	1.70	0.62	.07	.19*	(.84)

* $p < .01$.

theoretical model applying SEM. Maximum likelihood estimation with robust standard errors (MLR) was applied. The construct performance goal structure is a school-level variable, as the items refer to how teachers perceive the goal structure at their respective schools. Thus, it was considered necessary to control for school cluster effects. This was achieved by applying the “cluster” and the “type = complex” function in Mplus, as these functions correct the standard errors and consider nonindependence of observations and the unequal probability of selection (Muthén & Muthén, 2012). The structural model demonstrated a good fit to the data. The fit indices can be found in Table 3 where the model is referred to as the “structural model.”

Hypothesis 1 predicted that teachers' perceptions of a performance goal structure relate positively to burnout. As shown in Fig. 2, performance goal structure was significantly and positively related to teacher burnout, $\beta = .26$ $p < .000$, implying that Hypothesis 1 was supported. Hypothesis 2 predicted that teacher burnout would relate positively to bullying in class. This association was also significant, $\beta = 0.18$ $p < .01$, and is shown in Fig. 2. Thus, Hypothesis 2 was supported. Further, Hypothesis 3 predicted that performance goal structure would relate significantly to bullying in class, but this association was not supported, $\beta = 0.04$, $p > .05$. Finally, Hypothesis 4 predicted an indirect association between performance goal structure and bullying in class through teacher burnout. It is recommended to test for indirect associations by applying resampling methods, where the bias-corrected bootstrap approach is considered the most beneficial, as it controls for non-normality in the population (MacKinnon et al., 2004). Accordingly, the hypothesized indirect effect was tested with Mplus version 8.4 applying the function “model indirect” and “bootstrapping confidence interval” (Muthén & Muthén, 2012), using 1000 bootstraps and 95% confidence intervals. Results demonstrated an indirect association between performance goal structure and bullying through teacher burnout, $\beta = 0.05$, 95% CI [0.007, 0.13,], $p < .05$, implying that Hypothesis 4 was supported. Considering the direct association between performance goal structure and bullying was found to be non-significant when testing Hypothesis 3, the support for Hypothesis 4 implies that the relation between performance goal structure and bullying is fully mediated by teacher burnout.

4.4. Does the pupil-teacher ratio moderate the association between teacher burnout and bullying in class? Invariance testing (multigroup CFA) and multigroup moderation path analysis

For latent constructs to be compared across groups, or over time, it is essential that these latent factors are stable, meaning they are invariant (Davidov et al., 2014). Specifically, measurement invariance implies that the instrument applied in a survey measures the same concept in a similar way across different sub-groups of respondents (Meredith, 1993). Lack of measurement invariance can lead to measurement bias and may threaten meaningful comparison between groups. Thus, to determine whether the study model had the same measurement properties in classes with one teacher as classes with two teachers, invariance testing was conducted.

Multigroup CFA was used to test the invariance of models in several stages by comparing factor models in different stages, making the models increasingly restricted (Meredith, 1993; Van de Schoot et al., 2012). The first test was configural invariance, which is the less restrictive model without constraints that tests whether the structure of the model is valid in both groups (Kim & Kamphaus, 2018). If configural variance is established, the next step is to test whether factor loadings between groups are the same, which is referred to as metric invariance. If metric invariance holds, the final step is to examine scalar invariance. Scalar invariance determines if the item intercepts are the same in the two

Table 3
Fit statistics and model comparison for the different models.

Model	Model description	χ^2	df	CFI	TLI	RMSEA	SRMR	Model comparisons	$\Delta S-Bx2$	Δdf	P value
Mmeasurement	Measurement model	96.228	50	.972	.963	.056	.036				
Mstructural	Structural model	96.228	50	.972	.963	.056	.036				
Mconfigural	Configural invariance model	163.157	100	.964	.952	.065	.050	Mconfigural vs Mmetric	10.39	9	0.32
Mmetric	Metric invariance model	175.077	109	.962	.954	.064	.057	Mconfigural vs Mscalar	15.52	18	0.62
Mscalar	Scalar invariance model	179.741	118	.965	.961	.059	.059	Mmetric vs Mscalar	4.32	9	0.89
Mconstrained	Constrained multigroup model	182.055	121	.965	.962	.058	.064	Mconstrained vs Munconstrained	0.86	1	0.35
Munconstrained	Unconstrained multigroup model	181.358	120	.965	.962	.059	.062				

$\Delta S-Bx2$ = Satorra-Bentler chi-square difference test, n = 296.

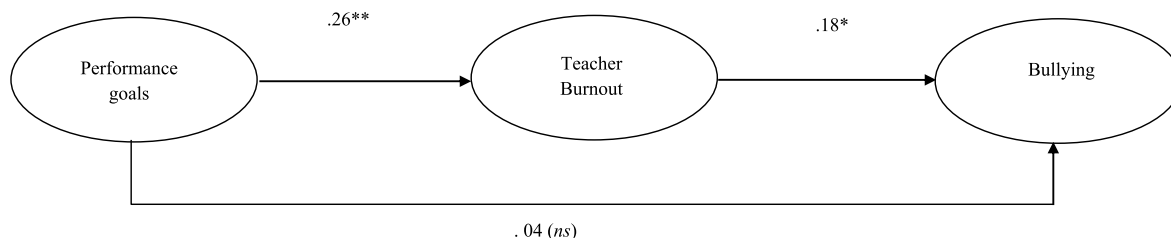


Fig. 2. Structural model $\chi^2 = 96.228$, $df = 50$ CFI = 0.972, TLI = 0.963, RMSEA = 0.056, SRMR = 0.036.

groups being compared (Kim & Kamphaus, 2018). To determine the different types of invariance, the configural model was compared with the metric and scalar models, after which the metric and scalar models were compared using a chi-square test. When comparing models to determine measurement invariance, a nonsignificant p-value implies that invariance holds. If the data are hierarchical and clustered, it is recommended to apply the S-Bx2-test (Satorra & Bentler, 2010) to compare the different models (Muthén & Muthén, 2012). Measurement invariance was conducted in Mplus version 8.4 applying “configural metric scalar” in the analyses model command. As shown in Table 3, the configural, metric, and scalar models demonstrated a good fit to the data. Moreover, the p-value from the S-Bx2 when comparing the different models was not significant (all p-values > .05) indicating that configural, metric, and scalar invariance holds. Hence, results from the multigroup CFA tell us that dividing the data into two groups of one and two teacher classes is acceptable. Thus, the next stage was to investigate if the structural relation between teacher burnout and bullying in class significantly varied between the one and two teacher classes, which is referred to as a multigroup moderation path analysis. The procedure was first to constrain all paths in the model to be equal (referred to as the constrained model in Table 3) and compare this to a model where the path between teacher burnout and bullying was set to vary between the one and two teacher groups (referred to as the unconstrained model in Table 3). As before, a comparison between the constrained and unconstrained models was performed by applying the S-Bx2 test. Results revealed that the standardized estimates between burnout and bullying in class differed between the one and two teacher classes, $\beta = 0.15$, $p < .05$, for the former, and $\beta = 0.07$ nonsignificant, for the latter. Still, as shown in Table 3, results from the S-Bx2 test when comparing the constrained and unconstrained models indicated that although the beta coefficients for the association between burnout and bullying differed between the one and two teacher classes, these differences were not significant. Still, the beta coefficients move in the expected direction, indicating that the association between burnout and bullying is slightly weakened when an extra teacher is present in the classroom. Still, the data did not provide sufficient support for Hypothesis 5.

5. Discussion

The current study aimed to examine direct and indirect associations between a performance goal structure, teacher burnout, and bullying in class. Further, it was investigated whether adding an extra teacher resource in the classroom moderated the relation between teacher burnout and bullying. As expected, findings supported a positive association between performance goal structure and teacher burnout. This finding implies that when teachers perceive that their respective school strongly emphasizes students’ test results, they report higher levels of burnout. Explanations for this association might relate to the fact that when greater emphasis is put on test results, teachers experience increased workload, which further relates to burnout (Skaalvik & Skaalvik, 2012; 2017b). Moreover, it has been suggested that greater emphasis on testing may also cause social comparison and anxiety among teachers, which can be associated with burnout (Skaalvik & Skaalvik, 2017b). Further, as expected, a positive relation was demonstrated between teacher burnout and bullying in the classroom, implying that when teachers are burned out, the levels of bullying were reported to be higher. Positive student-teacher relationships can be considered a protective factor against bullying because of stronger anti-bullying attitudes (Wang et al., 2015) and less aggressiveness among students (Troop-Gordon & Kopp, 2011). However, teacher burnout has been found to negatively affect the teacher-student relationship (Cano-García et al., 2005), which might partly explain the positive association between burnout and bullying in the current study. The current finding may also be understood within the theory of nonverbal leakages (Ekman & Friesen, 1969), suggesting that when teachers are suffering from burnout, negative emotions will leak into the classroom, thereby negatively affecting the socioemotional relations between students.

Building on stress-contagion theory (Wethington, 2000), a positive relation between teachers’ perceptions of a performance goal structure and bullying in the classroom was hypothesized. However, performance goal structure was not found to associate directly with bullying. Still, an indirect association was demonstrated between teachers’ perceptions of performance goals and bullying through burnout. This means that high-performance goals

relate to higher levels of bullying through teacher burnout. Explanations for this finding can be interpreted considering a burnout-cascade (Oberle & Schonert-Reichl, 2016), and the phenomenon of nonverbal leakages referred to above (Ekman & Friesen, 1996). Specifically, when teachers are exposed to high-performance goals, they are more prone to experiencing stress and burnout (Skaalvik & Skaalvik, 2012). Burnout brings about negative emotions that further leak into the classroom, which may negatively affect the relations between students, resulting in bullying behavior.

In the final part of the study, it was examined whether the pupil-teacher ratio moderated the relation between teacher burnout and bullying. Findings revealed that in classrooms with only one teacher, a significant positive association was seen between teacher burnout and bullying. However, in classes with two teachers, the association between burnout and bullying was not significant, indicating that this association was weakened with the presence of an additional teacher. Although the difference in estimates between the one and two teacher classes was not significant at this point, it is an interesting finding because the estimates move in the expected direction. The investigation of this hypothesis was based on a theoretical assumption that having an additional teacher in the classroom may function as a form of social support, as teachers have been found to intervene less in bullying behavior when social support from colleagues is low (Song et al., 2018). Further, when teachers suffer from burnout, they become less involved with students in the classroom (Maslach & Leiter, 1999). Generally, it seems that having an additional teacher to rely on could slightly moderate the negative effects of burnout on bullying behavior. However, this result must be interpreted with caution considering the difference in the association between burnout and bullying in the one and two teacher classes was nonsignificant at the conventional significance level.

6. Conclusions and implications

Taken together, findings from the current study suggest that when teachers perceive performance goals to be high, higher levels of burnout are reported, which again relates to higher levels of bullying in the classroom. Further, increasing the pupil-teacher ratio by adding an extra teacher in the classroom, seems to slightly moderate the association between teacher burnout and bullying. Accordingly, the present study offers several implications. First, school management must consider that increased focus on performance goals in schools may contribute to teacher burnout. In light of the increase of test-based accountability in schools in general, school management must help teachers deal with the additional stress of testing and student performance to prevent burnout from developing. Generally, one recommendation could be that school management should focus more on mastery goals by communicating to both students and teachers that comparing against standardized norms is less important and that making mistakes is a natural part of the learning process. Signaling this to the teachers could help release some of the pressure related to testing and student performance. Second, school managers must be aware that teacher burnout will not only have negative consequences for the individual teacher but may relate to bullying among students as well. It is the school management's responsibility to secure a healthy work environment for their teachers and a healthy school environment for their students. Thus, monitoring teacher burnout and adapting workload to relieve teacher stress is important in the prevention of bullying among students. Third, increasing the pupil-teacher ratio by adding another teacher in the class could buffer the negative consequences of burnout on bullying. However, as referred to previously, evidence regarding this finding should be interpreted with some caution.

7. Limitations of the study and future research

To the best of my knowledge, this study is the first to investigate associations between teacher burnout and bullying among students and the indirect association of performance goals on bullying through teacher burnout. A strength of the study is the expansive approach to how contextual factors in the school and teacher burnout may relate to bullying among students. An additional strength is the randomized control design when measuring the pupil-teacher ratio in the control and intervention classes. Despite the strengths of the study, some limitations should not go unnoticed. First, the present study focuses primarily on bullying in classrooms. However, in many cases, bullying happens outside of the classroom, where teachers are not present. Thus, future research should aim at including various measures of bullying to see how these relate to teacher burnout. Second, theoretically, causal associations are assumed between performance goals, burnout, and bullying in the study model. However, to establish evidence of causality, longitudinal analyses are necessary. Third, the measurement of performance goals, burnout, and bullying in the class are based on teacher self-reports, which may increase the risk of common method biases (Podsakoff et al., 2003). For instance, evidence suggests respondents' moods, such as negative affect, may influence the associations between stressors and strains (Burke et al., 1993). Still, several steps were taken in the analyses to reduce potential problems with common method biases including the development of a well-fitting measurement model and validation of measurement constructs, which are ways to rule out substantial method effects (Conway & Lance, 2010). Conceptual overlap between constructs may bias relationships (Brannick et al., 2010). However, confirmatory factor analysis presented in the study shows that all constructs load on their respective factor, meaning conceptual overlap between constructs is not a concern in this case. Additionally, invariance testing of the structural model across groups, and the fact that the measurement of the intervention included in the study was an objective indicator, support the robustness and quality of measures, meaning there is little concern related to common method bias. Moreover, applying self-reports can be appropriate when measuring factors such as burnout, as burnout can be considered an intrapsychic phenomenon (Crockett et al., 1987). Finally, Lance et al. (2010) concluded from their review that same-method observed score correlations are generally accurate representations of their true-score counterparts and that common method effects are not actually a serious threat to research. Still, in future research, it is recommended to retrieve the studied variables from different sources. One way to accomplish this would be to measure students rather than teacher perceptions of bullying. In the current study, student measures of bullying were not available. Thus, future research should include student measures of bullying in a similar study design to determine whether similar results are achieved.

Acknowledgements

This research was funded by The Research Council of Norway and is part of the Two Teachers project. I also wish to thank the schools, students, and teachers for participating in this research project.

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