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Associations between observed patterns of classroom interactions and teacher wellbeing in lower secondary school



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HIGHLIGHTS

- Systematic observations of classroom interactions identified four teacher profiles.
- The observed profiles were intertwined with teachers' self-reported wellbeing.
- High-quality classroom interactions were associated with higher levels of job satisfaction.
- The observations may serve as a means to facilitate teachers' professional development.

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ABSTRACT

Classroom observations and teacher self-reports were used to examine the relationships between patterns of teacher–student interactions and the wellbeing of Norwegian lower secondary school teachers. Latent profile analysis identified four subgroups. Teacher–student interactions and the teachers' wellbeing were inter-related in that teachers who were observed to be high in all the interaction domains (Emotional Support, Classroom Organization, and Instructional Support) perceived themselves as having high job satisfaction. The results showed that improving teachers' wellbeing has the potential to improve teacher–student interactions and vice versa. The study also discusses the use of classroom observations to facilitate teacher–student interactions in teacher training.

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1. Introduction

Teachers' interpersonal relational support through patterns of interactions with students is a fundamental facet of supporting learning and development in the classroom (Allen et al., 2013; Hafen et al., 2015; Hamre et al., 2013; Kane et al., 2012) regardless of age and grade. Teaching is considered one of the most stressful occupations (Johnson et al., 2005; Kauppinen & Ahola, 2013) with burnout and job satisfaction commonly used indicators of teacher wellbeing (e.g., Parker, Martin, Colmar, & Liem, 2012). While

teachers' emotional involvement with their students has been recognized as a primary reason for high stress levels (Johnson et al., 2005), their relationships with their students may also be positively related to job satisfaction (Grayson & Alvarez, 2008; Sinclair, Dowson, & McInerney, 2006). Consequently, teacher–student interactions are a source of teachers' concerns as well as their happiness (Wubbels et al., 2015). One review (Jennings & Greenberg, 2009) suggested that teacher wellbeing is an important factor for the development and maintenance of supportive teacher–student relationships and effective classroom management. However, given the bulk of evidence showing positive associations between classroom interactions and student outcomes, studies examining how patterns of teacher–student classroom interactions are related to teacher outcomes, such as job satisfaction and emotional exhaustion (see Spilt, Koomen, & Thijs, 2011), are scarce. Furthermore, studies examining within-teacher variations with respect to observed classroom interaction dimensions in

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lower secondary schools are particularly scarce. Thus, little is known about how patterns of classroom interactions are associated with lower secondary school teachers' job satisfaction and emotional exhaustion. Using two data sources, systematic classroom observations and teachers' self-reports, the present study presents results concerning the relationships between teacher-perceived job satisfaction and emotional exhaustion and patterns of teacher–student interactions in lower secondary school. Both sides of teacher wellbeing—job satisfaction and emotional exhaustion—were examined. Negative correlations between these two distinct facets have been reported in the literature (Avanzi et al., 2013; Skaalvik & Skaalvik, 2014).

1.1. Classroom interactions: teaching through interactions framework

Teaching through interactions (TTI; Hamre et al., 2013; Pianta, 2016) is a theoretically based and empirically evidenced framework for conceptualizing and measuring teacher–student and student–student patterns of classroom interactions. TTI is rooted in human development and ecological systems (Bronfenbrenner & Morris, 1998), and it operates in the zone of proximal development—the classroom—where teacher–student interactions are the proximal process through which teachers influence students' learning and development (Allen et al., 2013; Bell et al., 2012; Hafen et al., 2015; Hamre et al., 2013; Kane et al., 2012; Pianta, 2016). TTI not only identifies effective classroom practices (Hamre et al., 2013); it also recommends high-quality classroom interactions, which may be particularly important for high-risk students (Hamre & Pianta, 2005). The TTI framework draws a distinction between universal supportive interactions across content areas and content-specific forms of support aimed at teaching students particular skills and imparting knowledge (Hamre et al., 2013). The present study investigated interactions across subjects and, thus, focused on the universal interactions.

Classroom interactions are captured via 12 dimensions within the three broad domains: Emotional Support, Classroom Organization, and Instructional Support (Hamre et al., 2013). Through these domains, the value of the classroom environment for all students in the classroom is reflected in terms of the quality of interactions in the given setting (Pianta, Hamre, & Allen, 2012). The three domains each cover a distinct set of classroom interactions but are interconnected and possibly interact with each other (Hamre et al., 2013). Besides the three domains, TTI contains a single dimension, student engagement, which taps the extent students are involved in learning activities. Therefore, it is viewed as a student-level outcome measure in studies applying the Classroom Assessment Scoring System (CLASS; Bell et al., 2012; Hafen et al., 2015). However, the present study focused on teacher outcomes; thus, student engagement is not included in the study.

1.2. Patterns of classroom interactions

Classroom interaction is a multifaceted construct (Pianta, Hamre, & Mintz, 2012), and teachers interact with their students in patterned ways (Ertesvåg, 2011; Walker, 2008; Wubbels & Brekelmans, 2005). TTI provides concepts and a structure with which to identify relevant facets of classroom interactions and characterizes high-versus low-quality practices within each facet. Halpin and Kieffer (2015) examined patterns of classroom interactions using TTI and the CLASS in secondary classrooms (Grades 6 through 8). The authors found four profiles, which uniformly showed high, low, or intermediate levels of classroom interaction dimensions. Mean level differences by profile were found in some but not all dimensions of the classroom interactions.

Studies that have applied other versions of the CLASS (e.g., Salminen et al., 2012) or a combination of the CLASS and a survey questionnaire (Hu, Chen, & Fan, 2018) have identified three to four profiles of classroom interactions. Pianta (2016) suggested that to manifest the positive effects of instruction in student outcomes, certain thresholds in the quality of each classroom interaction may need to be met. Thus, the associations between the quality of classroom interactions and desired student outcomes may not be linear. Rather, interactions must be frequent and consistent, but they must also meet certain quality thresholds to positively affect student outcomes. Further investigation is necessary to gather evidence of such thresholds (Pianta, 2016). This, however, implies at least two teacher–interaction profiles: teachers who reach the thresholds and those who do not.

Studies focusing on teacher–student relationships from either the teachers' (e.g., Claessens et al., 2016; Ertesvåg, 2011) or students' perspectives (e.g., den Brok, Levy, Brekelmans, & Wubbels, 2005) provide much of the evidence on patterns of classroom interactions. High-quality teacher–student relationships are described in the literature as those characterizing empathy and mutual respect while simultaneously setting clear expectations (Wubbels et al., 2015). Depending on the context, various meta-level labels have been suggested to describe interpersonal behavior (see Wubbels et al., 2015). In the educational context, teacher behavior has been examined along the two main dimensions of influence and proximity, which can be further analyzed in terms of eight interpersonal profiles. In general, higher student outcomes are related to interpersonal profiles characterized by a high degree of teacher influence on and proximity to students. From the teacher–student interaction perspective, however, a highly influential teacher may evoke submissive reactions from students, while a teacher who conveys high levels of proximity will likely invite warm reactions from students, which, in turn, influence the teacher's behavior (Wubbels & Brekelmans, 2005; for a review of students' evocative impact on teacher instruction and teacher–child relationships, see; Nurmi & Kiuru, 2015). It is also recognized that teacher–student (macro-level) relationships are attached to (micro-level) interactions between teachers and students (Wubbels et al., 2015) with one potential mechanism being mental models that teachers construct of their relationships with their students (see Spilt et al., 2011).

Another tradition to describe patterns of teacher–student interactions is to focus on teaching styles. Drawing on Baumrind's (1966) parenting styles, four teaching styles with varying amounts of responsiveness and demandingness are suggested: authoritative, authoritarian, permissive, and neglectful. Authoritative teachers are simultaneously highly responsive and demanding. They monitor students and know how to scaffold students who need it. Their teaching style is characterized by warmth and control, stressing both social and cognitive goals in their teacher–student interactions (Walker, 2008). Generally, an authoritative teaching style is related to higher levels of students' academic and motivational outcomes (e.g., Walker, 2008; for an exception, see; Dever & Karabenick, 2011); thus, it is of interest to teacher trainers. A highly demanding teaching style in the absence of warmth and responsiveness is known as authoritarian. Finally, the permissive style consists of a high level of warmth without high demands, and the neglectful style is neither highly demanding nor highly caring (Ertesvåg, 2011). Importantly, teaching styles are not fixed teacher characteristics. A teacher may apply different styles with different groups of students or over time due to varying stress levels. A teacher's teaching style may also change as a result of intervention.

1.3. Teachers' job satisfaction

Teachers' job satisfaction is a sense of fulfillment and pride felt by those who enjoy their work (Caprara, Barbaranelli, Borgogni, & Steca, 2003; Klassen, 2010; Klassen, Usher, & Bong, 2010; Locke, 1976). Given that job satisfaction is positively associated with motivation to teach (Skaalvik & Skaalvik, 2011) and involvement in professional development work (Durksen, Klassen, & Daniels, 2017), and negatively associated with motivation to quit the teaching profession (Skaalvik & Skaalvik, 2017), it is associated with higher levels of job performance (Judge, Thoresen, Bono, & Patton, 2001). Importantly, job satisfaction is positively related to teachers' self-reports on the quality of teacher–student relationships (Spilt et al., 2011; Veldman, van Tartwijk, Brekelmans, & Wubbels, 2013), classroom management skills, and a learner-centered teaching style (Opdenakker & Van Damme, 2006). Teachers' job satisfaction has also been shown to play a mediating role in the relationship between school climate and both emotional exhaustion and depersonalization (Grayson & Alvarez, 2008). Malinen and Savolainen (2016) showed negative correlations between teachers' job satisfaction and emotional exhaustion. The same study also indicated that teachers' self-reports of general school climate and self-efficacy in managing students' classroom behavior were predictive of job satisfaction (for a similar result, see Klassen & Chiu, 2010). Teachers' job satisfaction may be particularly important for supporting students in low-ability classes as it moderates the association between classroom composition and instructional support (Opdenakker & Van Damme, 2006); that is, teachers who are satisfied with their job give more instructional support to their low-level classes than teachers who are not satisfied with their job. To summarize, teachers' job satisfaction is a factor that is associated with their actual performance in the classroom (see also Jennings & Greenberg, 2009; Roeser, Skinner, Beers, & Jennings, 2012). Improving classroom interactions has the potential to improve teachers' job satisfaction and vice versa, and ultimately positively influence students' learning and development.

1.4. Teachers' emotional exhaustion

Emotional exhaustion is characterized by a loss of energy, debilitation, chronic fatigue, and feeling worn out (e.g., Pines & Aronson, 1988; Schwarzer, Schmitz, & Tang, 2000; Skaalvik & Skaalvik, 2017). It is commonly conceptualized as a core element of burnout (Maslach & Leiter, 2017). Teachers' emotional exhaustion is negatively correlated with job satisfaction, engagement (Skaalvik & Skaalvik, 2014), teacher–student relations (Grayson & Alvarez, 2008), and positively correlated with motivation to quit the teaching profession (Skaalvik & Skaalvik, 2016). Given that teacher attrition rates, particularly for beginning teachers (see Chang, 2009; Hong, 2010; Ingersoll, 2012), are a worldwide issue (Dicke et al., 2014; Organisation for Economic Cooperation and Development, 2005; Smith & Ulvik, 2017), emotional exhaustion is a potential contributing factor. High rates of teacher turnover may, in turn, prevent educational systems from offering high-quality education to all students (Van Maele & Van Houtte, 2012).

A substantial amount of previous research has investigated the negative consequences of emotional exhaustion on job performance in various occupations, including teaching (e.g., Cropanzano, Rupp, & Byrne, 2003; Halbesleben, 2010; Halbesleben & Bowler, 2007; Klusmann, Richter, & Lütcke, 2016). According to a review by Maslach, Schaufeli, and Leiter (2001), emotional exhaustion is related to lower productivity and less effectiveness at work. They also hypothesized that emotional exhaustion is not just passively experienced; rather, it prompts individuals to actively distance themselves from their work both emotionally and cognitively. The

Virtanen et al. (2017) showed that teacher-perceived teaching stress and exhaustion at work are negatively associated with observed classroom organization, thus potentially affecting student behavior and learning (see Montgomery & Rupp, 2005 for a meta-analysis on teacher stress). In summary, prior research has shown that teachers' emotional exhaustion is not only associated with multiple teacher outcomes, including burnout, satisfaction, engagement, and motivation to quit the teaching profession, but also their actual classroom performance and, ultimately, their students' engagement and learning (Jennings & Greenberg, 2009; Pianta et al., 2012).

This study investigates how teacher-perceived wellbeing (i.e., job satisfaction and emotional exhaustion) is related to patterns of classroom interactions observed in lower secondary school classrooms. We aim to fill the following gaps in the previous literature. First, the focus in prior studies has been on the relationships between classroom interactions and students' learning, engagement, and development (e.g., Allen et al., 2013). Therefore, little is known about how classroom interactions are associated with teachers' job satisfaction and emotional exhaustion (see Spilt et al., 2011). Second, observed classroom interactions using TTI have not been applied in studies using person-centered methods for lower secondary school teachers (for an exception, see Halpin & Kieffer, 2015). The present study's results add to the current research on classroom interactions as follows. Instead of examining variations between teachers in their classroom interactions with students, the present study applies a holistic, interactionist, and system-oriented view (Bergman & Andersson, 2010; Magnusson, 2001) and focuses on within-teacher configurations in the classroom interaction dimensions. Thus, this study contributes to the knowledge base concerning how teachers' classroom interactions, job satisfaction, and emotional exhaustion are intertwined. Second, the present study adopts a practical stance by examining teachers' job satisfaction and emotional exhaustion conjointly with their actual practices, rather than solely teacher- or student-reported classroom practices. The results may contribute to enhancing teachers' wellbeing and their classroom interactions and, thus, students' learning. Third, profiling classroom interactions provides diagnostic information that can support teachers' professional development by facilitating the creation of interventions targeted at the individual's needs (Halpin & Kieffer, 2015).

1.5. Context of the study

The study was conducted at schools participating in a school-wide national initiative to develop lower secondary schools. All Norwegian lower secondary schools (Grades 8–10, students aged 14–16) participated in this initiative in groups at the beginning of each of five consecutive academic years, starting in 2012. Each school participated for 1.5 years. The initiative addressed improving students' basic skills (reading, writing, numeracy) and teachers' classroom-management skills. Each school focused on one or two of these areas. In addition, all schools addressed their organizational development, and each school received support (workshops, seminars, etc.) and supervision from a teacher-training institution.

The present study was part of a larger study that comprised questionnaires administered to all teachers and students, focus-group interviews, video observations of a subsample of classrooms, and digital logs of the teachers in those classrooms. Teachers in the study taught various subjects. Typically, Norwegian teachers in lower secondary schools teach the same subject to multiple grade levels. Accordingly, they usually teach in the same classroom for more than one academic year.

1.6. The present study

The following research questions and hypotheses were set:

Research question 1. Based on the profiles of observed classroom interactions, how many and what types of subgroups emerge in the sample of Norwegian teachers?

On one hand, prior studies have shown variances in teachers' classroom interactions (e.g., Virtanen et al., 2017; Westergård, Ertesvåg, & Rafaelsen, 2018). On the other hand, teachers are known to interact with their students in patterned ways (Ertesvåg, 2011; Walker, 2008; Wubbels & Brekelmans, 2005). We, therefore, expect to find differences in the patterns of teacher–student classroom interactions. The only previous study (Halpin & Kieffer, 2015) examining profiles based on the CLASS in secondary classrooms identified four profiles. Based on theoretical reflections and the results of prior studies, particularly of Halpin and Kieffer (2015), we expect to find four distinct profiles of classroom interactions (Hypothesis 1a).

Regarding the differences among these profiles, we hypothesize that some profiles are high or low in all dimensions (Halpin & Kieffer, 2015: Hypothesis 1b), and some profiles are characterized by high levels in some dimensions combined with low levels in others (Walker, 2008; Wubbels & Brekelmans, 2005: Hypothesis 1c).

Research question 2. Based on the profile of observed classroom interactions, how are the subgroups associated with teachers' self-reported job satisfaction and emotional exhaustion? We expect that profiles characterized by high levels in classroom interaction dimensions will be associated with high levels of job satisfaction (Judge et al., 2001; Opdenakker & Van Damme, 2006; Roeser et al., 2012: Hypothesis 2a) and low levels of emotional exhaustion (e.g., Cropanzano et al., 2003; Halbesleben, 2010; Halbesleben & Bowler, 2007; Klusmann et al., 2016: Hypothesis 2b).

2. Method

2.1. Participants

2.1.1. Classroom observation sample

The classroom observation sample comprised 79 Grade 5 through Grade 10 teachers from 13 schools in 3 counties in Norway. All teachers at these 13 schools were invited to participate in the study. Participation was voluntary, and 4–9 teachers from each school chose to participate. The sample included both experienced and inexperienced teachers and both men and women. The current sample was drawn from schools that began the national initiative in 2014, 2015, or 2016 and that chose classroom management as their area of focus. The teachers' ages, of whom 69.6% were female, varied between 24 and 63 years ($M = 42.4$ years, $SD = 9.7$ years), and their teaching experience ranged from 1 to 35 years ($M = 14.5$ years, $SD = 9.0$ years).

2.1.2. Teacher questionnaire sample

Of the 79 teachers observed, 65 (82.3%) filled in the questionnaire items concerning job satisfaction and emotional exhaustion. We tested whether the observed classroom interaction dimensions and teachers' background information varied between the 65 teachers who answered the teacher questionnaire and the 14 who did not. A series of independent sample t-tests and chi-square tests of independence were conducted. No statistically significant differences were found between the two groups with respect to the observed classroom interaction dimensions (including student engagement) and the domain (Emotional Support, Classroom Organization, and Instructional Support) mean scores, teaching experience, gender, age, the number of students in the observed

classroom, and the level of collaboration with other teachers (all p values were $>.05$). Little's (1988) missing completely at random (MCAR) test showed that the mechanism of missingness among the teachers who answered the questionnaire was completely random: $\chi^2(98) = 96.29$, $p = .530$. In sum, the group of teachers ($n = 14$) who did not respond to the teacher questionnaire was a random sample of the 79 teachers whose classrooms were subjected to observations. Moreover, the missing values in the data of the 65 teachers whose lessons were both observed and who replied to job satisfaction and emotional exhaustion statements were completely random.

The students and teachers were allowed to withdraw from the study, and written consent to participate in the study was required from the students and their parent(s). A total of 1608 students participated in the classroom observations. The majority of the students attended Grade 8 (35.6% of the sample students) followed by Grade 10 (27.9%), Grade 9 (26.1%), Grade 6 (5.0%), Grade 5 (4.4%), and Grade 7 (1.1%).

2.2. Procedure

2.2.1. Raters' training

Eight classroom interaction raters were certified according to the CLASS-Secondary (CLASS-S) manual (Pianta et al., 2012). The comprehensive certification process consisted of a two-day training course where the coders, following the guidelines presented in the CLASS-S manual, rated several videos on classroom interactions, received feedback about their coding, and clarified coding criteria when discrepancies were observed. The course was followed by a test of observer agreement with the master codings, and this agreement exceeded 80%, as required by the CLASS-S manual (Pianta et al., 2012). Given that the language of the CLASS-S training course was English, the raters additionally scored classroom interactions in Norwegian before conducting the ratings for the purposes of the present study (for further details, see Westergård et al., 2018).

2.2.2. Video recordings

Teachers were video recorded four times within the first academic year of the initiative to develop lower secondary schools (twice in the fall and twice in the spring). The camera was positioned to capture the classroom interactions during typical class instruction. The first half hour of each lesson (Joe, McClellan, & Holtzman, 2014) was divided into two 15-min segments (Pianta et al., 2012). At the end of each segment, the observers assigned scores for each dimension based on the behavioral anchors provided in the CLASS-S manual (Pianta et al., 2012). In order to guarantee the independence of the scorings of the segments, the observers did not rate consecutive within-lesson segments in a given classroom. Instead, they continued rating interactions video recorded in classrooms taught by other teachers. All 79 teachers' classroom interactions with their students were scored once by one of eight raters, and 20% of the segments (126 segments) were double-scored to calculate the percent within one (PWO) inter-rater agreement. PWO is the percentage of the scores of two independent raters' scores falling within ± 1 point of each other, and it is the calculation of inter-rater reliability that is used most often in studies that apply the CLASS (e.g., Allen et al., 2013; McCaffrey, Yuan, Savitsky, Lockwood, & Edelen, 2015; Pianta, Hamre, & Allen, 2012; for further details, see; Westergård et al., 2018). The inter-rater agreement on the classroom-interaction ratings was acceptable. The PWO ranged from 69 to 75 for Emotional Support, 85–97 for Classroom Organization, and 60–76 for Instructional Support (Ur, 2018). In addition, four lesson test-retest reliabilities for the domain-level composite scores (two segments per lesson

aggregated at the lesson level and dimensions aggregated at the domain level) varied between 0.51 and 0.70 for Emotional Support, 0.61 and 0.75 for Classroom Organization, and 0.41 and 0.70 for Instructional Support. All test-retest reliabilities were statistically significant at $p < .001$.

A total of 310 lessons and 620 segments were recorded and coded. The average number of students in the recorded lessons was 24 ($SD = 4.5$ students). The vast majority (87%) of the observed lessons were theoretical (e.g., English, math, and science) with the remaining lessons practical and/or elective, such as physical education, arts, and home economics.

2.2.3. Teacher questionnaires

Job satisfaction and emotional exhaustion questionnaires were administered to all teachers in the sample schools three times: at the beginning of the initiative (the start of the school year), at the end of the same academic year, and after the school's participation in the initiative ended. The present study drew from data collected at the beginning of the initiative.

2.3. Measures

2.3.1. Observed classroom interactions

CLASS is an observation instrument that operationalizes the TTI framework. Several studies have validated the CLASS three-domain categorization (i.e., Emotional Support, Classroom Organization, and Instructional Support) in various cultural contexts and various levels of children's education and schooling (Allen et al., 2013; Leyva et al., 2015; Pakarinen et al., 2010; Reyes, Brackett, Rivers, White, & Salovey, 2012; Sandilos & DiPerna, 2014; Virtanen et al., 2017; Westergård et al., 2018). The CLASS domains are multilevel in that each domain is further operationalized into dimensions, indicators, and finally, detailed behavioral markers, which are the focus of classroom observations (Pianta et al., 2012). The CLASS-S version was the instrument employed in the present study. CLASS-S is a theoretically sound and psychometrically well-validated instrument (Hafen et al., 2015; Virtanen et al., 2017; Westergård et al., 2018) for observing classroom interactions in secondary schools.

Drawing from attachment (Bowlby, 1979) and self-determination theories (Connell & Wellborn, 1991), emotional support highlights the importance of creating an emotionally supportive classroom context sensitive to the students' academic, behavioral, and affective needs (Hamre et al., 2013). In the Emotional Support domain, CLASS-S (Pianta et al., 2012) introduces the dimensions of positive climate, teacher sensitivity, and regard for adolescents' perspectives. The second CLASS domain, Classroom Organization, refers to effective behavior management and maximal use of instruction time through clear expectations, routines, and rules along with smooth transitions to learning activities (Gettinger & Walter, 2012; Pianta et al., 2012). The Classroom Organization domain encompasses the dimensions of behavior management, productivity, and negative climate. Finally, Instructional Support draws from cognitive learning theories (Yilmaz, 2011) and theories on children's cognitive and language development (Hafen et al., 2015). Classrooms with high levels of instructional support are characterized by interactions that focus on facilitating students' higher level thinking skills by emphasizing key ideas and a broad framework. Feedback consists of feedback loops that deepen students' understandings of the subject matter rather than the simple initiation-response-evaluation pattern of talk. Instructional Support comprises the dimensions of instructional learning formats, content understanding, analysis and inquiry, quality of feedback, and instructional dialogue.

Dimensions were anchored in specific observable instructional

practices provided in the CLASS-S manual (Pianta et al., 2012) and were scored on a seven-point rating scale (1–2 = low range, 3–5 = middle range, and 6–7 = high range). Given that teachers' instructional practices vary from lesson to lesson (Kane et al., 2012), we followed a typical procedure in modelling the subgroups in the data. The CLASS-S observational instrument was repeatedly administered to the same teacher, and the dimension-level scores were aggregated to the teacher level (Halpin & Kieffer, 2015). The dimension of negative climate was reverse coded.

Of the 79 teachers, 75 were filmed the desired four times, while three teachers were filmed three times and one teacher one time. The reasons for the missing lessons (1.9%) were unrelated to the study.

2.3.2. Teacher questionnaires

Job satisfaction (Smith, Kendall, & Hulin, 1969) and emotional exhaustion (Maslach, Jackson, & Leiter, 1996) were teacher-reported scales. We followed Starnaman and Miller (1992) and used five items with six-point Likert-type response options (0 = Completely disagree; 5 = Completely agree) for both scales. Job satisfaction measured teachers' perceptions of fulfillment and the pride they experience in their work (e.g., *I experience my work as satisfying, I perceive my work as useful*). Emotional exhaustion, the core dimension of burnout, tapped the teachers' levels of energy, debilitation, chronic fatigue, and the feeling of being worn out from the work (e.g., *I feel emotionally drained from my work, I feel burned out from my work*). Job satisfaction and emotional exhaustion showed acceptable internal consistency estimates ($\alpha = 0.73$ and $\alpha = 0.88$, respectively). Composite scores were computed with higher scores indicating higher levels of job satisfaction and emotional exhaustion.

2.4. Analysis strategy

We applied latent profile analysis (LPA) to extract teacher subgroups based on the mean values of the 11 classroom interaction dimensions. LPA highlights relationships between individuals in order to sort them into mutually distinctive subgroups where within-group variances in indicator means are small (Lubke & Muthén, 2005). Instead of assuming one distribution where individuals are placed along a single dimension, data are assumed to consist of different probability distributions that characterize unobserved heterogeneity (i.e., subgroups; Marsh, Lüdtke, Trautwein, & Morin, 2009). This is particularly important in studies utilizing the TTI framework because classroom interactions are recognized as a multi-dimensional construct. Consequently, teachers may demonstrate different patterns of strengths and weaknesses (Walker, 2008; Wubbels & Brekelmans, 2005). We modelled highly restrictive LPA with the means of the latent profile indicators freely estimated, but the variances were held equal across profiles and the within-profile variable error correlations were specified as orthogonal (locally independent). Because of orthogonal error correlations, categorical latent variables capture systematic differences in classroom interactions (Halpin & Kieffer, 2015). The number of latent profiles was determined based on the following statistical criteria: log-likelihood (LL), Akaike information criterion (AIC), Bayesian information criterion (BIC), entropy, and Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR). Smaller values in AIC and BIC indicate a better fit between the model and the data (Nylund, Asparouhov, & Muthén, 2007). High values of entropy reflect better distinctions between latent profiles and, thus, small measurement error variance, which indicates the extent to which an individual is misclassified (Halpin & Kieffer, 2015). The VLMR tests a $k-1$ profile model (H_0) against a k -profile model with a low p value, suggesting that the estimated model fits the data statistically

significantly better than the model with one less profile (Lo, Mendell, & Rubin, 2001). Moreover, we considered models that made sense in relation to theory and substantive findings (Halpin & Kieffer, 2015; Marsh et al., 2009) as well as models without extremely sparsely populated profiles of which replicability can be questioned.

LPA was conducted using Mplus version 8 (Muthén & Muthén, 1998–2017). Due to the non-independence of observations at the school level (teachers clustered within 13 schools), we corrected standard errors by using maximum likelihood estimation with robust standard errors and the mixture complex type of analysis available in Mplus. Teachers' self-reports of their levels of job satisfaction and emotional exhaustion were related to the profiles found by means of multinomial logistic regression analysis. The full information maximum likelihood (FIML) estimation was used to handle missing data (Enders, 2010).

Because teacher's work experience and classroom size may be associated with teacher–student interactions, job satisfaction, and emotional exhaustion (Allen et al., 2013; Grayson & Alvarez, 2008; Klassen & Chiu, 2010; Mahmood, Nudrat, Asdaq, Nawaz, & Haider, 2011; Virtanen et al., 2017), along with the teacher's gender, they were introduced as statistical controls in an analysis linking the profiles to teacher-perceived job satisfaction and emotional exhaustion. However, they are not the focus of the present study and, therefore, are not discussed.

3. Results

3.1. Descriptive analysis

Table 1 reports the correlations between classroom interaction variables. In general, within domain correlations are greater than across domain correlations. The majority of correlations are significant at $p < .001$. The dimension of regard for adolescents' perspectives does not correlate with any dimension belonging to the Classroom Organization domain but has moderate to large correlations (Cohen, 1988) with Instructional Support dimensions.

Interestingly, emotional exhaustion correlated negatively with only the three dimensions included in the Classroom Organization domain and were statistically significant (ranging from -0.29 to -0.37 , $p < .05$). In general, teachers observed at the high end of the aforementioned classroom interaction dimensions reported higher levels of job satisfaction and lower levels of emotional exhaustion than teachers observed at the low end in classroom interactions.

3.2. Profile enumeration

LPA was conducted in order to answer the first research question regarding the number of subgroups that emerged in the sample of Norwegian teachers based on their profiles of observed classroom interactions. A series of models with an increasing number of profiles was estimated. The fit indices of the models are presented in Table 2. Except for BIC between six- and seven-profile solutions, LL, AIC, and BIC improved when a model with one more profile was estimated.

Entropy values were above 0.90 in all estimated models, indicating accurate profile separation (small measurement error variance). The VLMR likelihood ratio test did not statistically differentiate models with k profiles from models with $k-1$ profiles. Based on entropy values, the profile solution was made between models with four to seven profiles. Models with six and seven profiles included a profile with a very small number of teachers (five and two), which suggests that the solution may not be replicable. We chose the four-profile solution as the final solution because it was more parsimonious than the five-profile solution. Moreover, it was similar to the five-profile solution with the exception that the biggest profile in the four-profile solution ($n = 30$) was split into two in the five-profile solution ($n_1 = 20$ and $n_2 = 10$).

3.3. Interpretation of the profiles

Further, the first research question concerned the types of subgroups that emerged in the sample of Norwegian teachers. Table 3 presents the entire sample and the profile-specific raw means, standard deviations, and partial eta-squared effect sizes for the classroom-interaction dimensions. Profile 1 applies to 35.4% of teachers, who showed high values in all classroom-interaction dimensions (Halpin & Kieffer, 2015), leading the profile to be called *High in All*. Profile 2 applies to 38.0% of teachers, whose classroom interactions were patterned (Ertesvåg, 2011; Walker, 2008; Wubbels & Brekelmans, 2005). They were high in the dimensions depicting classroom organization but low in other dimensions, leading this profile to be called *Low in Emotional Support and Instructional Support and High in Classroom Organization*. Profile 3 applies to 15.2% of teachers, who perform highly regarding adolescents' perspectives but average or low in the other dimensions (Ertesvåg, 2011), leading this profile to be called *High in Regard for Adolescents' Perspectives*. Profile 4 applies to 11.4% of teachers, who are low in all dimensions compared to other teachers (Halpin &

Table 1
Correlations between classroom interaction variables used in latent profile analysis.

	PC	TS	RAP	BM	P	NC	ILF	CU	AI	QF
Emotional Support										
PC										
TS	.83***									
RAP	.68***	.52***								
Classroom Organization										
BM	.45***	.49***	.20 ^{ns}							
P	.32**	.35**	.06 ^{ns}	.65***						
NC	.34**	.31**	.02 ^{ns}	.76***	.69***					
Instructional Support										
ILF	.61***	.66***	.32**	.53***	.55***	.50***				
CU	.54***	.48***	.44***	.39***	.62***	.38***	.57***			
AI	.49***	.42***	.49***	.20 ^{ns}	.32**	.07 ^{ns}	.36**	.72***		
QF	.54***	.46***	.48***	.37**	.58***	.39***	.55***	.87***	.65***	
ID	.57***	.40***	.67***	.21 ^{ns}	.28*	.11 ^{ns}	.34**	.69***	.81***	.64***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$, ns = nonsignificant. Correlations are two-tailed. PC = Positive Climate, TS = Teacher Sensitivity, RAP = Regard for Adolescents' Perspectives, BM = Behavior Management, P = Productivity, NC = Negative Climate, ILF = Instructional Learning Formats, CU = Content Understanding, AI = Analysis and Inquiry, QF = Quality of Feedback, ID = Instructional Dialogue.

Table 2
Goodness-of-fit statistics and group sizes for the estimated unconditional latent profiles.

No. Of profiles	No. Of free parameters	LL	AIC	BIC	Entropy	pVLMR	Group sizes
2	34	−887.73	1843.47	1924.03	.91	.359	48, 31
3	46	−811.94	1715.87	1824.87	.93	.322	15, 36, 28
4	58	−762.82	1641.64	1779.07	.97	.496	12, 30, 9, 28
5	70	−726.77	1593.54	1759.41	.97	.634	9, 20, 10, 12, 28
6	82	−694.59	1553.17	1747.47	.98	.634	9, 11, 12, 19, 23, 5
7	94	−674.43	1536.86	1759.59	.97	.586	9, 12, 10, 2, 10, 18, 18

Note. LL = Log-likelihood. AIC = Akaike information criterion. BIC = Bayesian information criterion. pVLMR = Vuong-Lo-Mendell-Rubin likelihood ratio test.

Table 3
Whole sample and profile-specific raw means, 95% confidence intervals, standard deviations, and effect sizes for classroom assessment scoring system-secondary dimensions.

	Whole sample			Profiles												η^2	
				High in All			Low in Emotional Support and Instructional Support and High in Classroom Organization			High in Regard for Adolescent Perspectives			Low in All				
	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD		
Emotional Support																	
Positive Climate	4.94	4.74, 5.13	0.87	5.74	5.55, 5.93	0.48	4.63 ^a	4.38, 4.88	0.66	4.86 ^a	4.63, 5.10	0.36	3.56	3.27, 3.86	0.38	.64	
Teacher Sensitivity	5.05	4.85, 5.25	0.88	5.66 ^b	5.45, 5.86	0.53	4.87 ^a	4.56, 5.18	0.83	5.19 ^{a,b}	4.97, 5.41	0.34	3.59	3.31, 3.87	0.36	.51	
Regard for Adolescent Perspectives	3.67	3.49, 3.86	0.83	4.43 ^a	4.25, 4.61	0.46	3.06 ^b	2.89, 3.24	0.47	4.10 ^a	3.79, 4.42	0.50	2.76 ^b	2.39, 3.12	0.47	.68	
Classroom Organization																	
Behavior Management	6.13	5.93, 6.34	0.92	6.47 ^a	6.29, 6.65	0.47	6.53 ^a	6.35, 6.72	0.49	5.69	5.27, 6.10	0.65	4.34	3.52, 5.16	1.07	.59	
Productivity	5.64	5.46, 5.83	0.84	6.04 ^b	5.82, 6.27	0.58	5.95 ^b	5.74, 6.16	0.57	4.97 ^a	4.58, 5.37	0.61	4.30 ^a	3.78, 4.82	0.68	.53	
	Whole sample			High in All			Low in Emotional Support and Instructional Support and High in Classroom Organization			High in Regard for Adolescent Perspectives			Low in All			η^2	
	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD		
Negative Climate	6.70	6.60, 6.79	0.41	6.83 ^a	6.73, 6.93	0.26	6.96 ^a	6.93, 6.99	0.08	6.22 ^b	6.03, 6.41	0.28	6.04 ^b	5.77, 6.31	0.35	.70	
Instructional Support																	
Instructional Learning Formats	4.66	4.45, 4.86	0.91	5.29	5.07, 5.51	0.57	4.71	4.41, 5.02	0.82	4.03 ^a	3.68, 4.38	0.55	3.34 ^a	3.03, 3.66	0.41	.49	
Content Understanding	3.67	3.48, 3.85	0.84	4.46	4.24, 4.67	0.56	3.37 ^a	3.14, 3.60	0.62	3.18 ^a	2.84, 3.52	0.54	2.86 ^a	2.40, 3.31	0.59	.53	
Analysis and Inquiry	2.37	2.20, 2.53	0.73	2.97	2.71, 3.24	0.68	1.96 ^a	1.79, 2.14	0.47	2.28 ^a	1.87, 2.69	0.64	1.94 ^a	1.61, 2.28	0.44	.41	
Quality of Feedback	3.33	3.15, 3.50	0.77	4.04	3.80, 4.27	0.61	3.06 ^a	2.86, 3.25	0.52	2.88 ^a	2.54, 3.21	0.53	2.63 ^a	2.30, 2.95	0.42	.51	
Instructional Dialogue	2.62	2.43, 2.81	0.86	3.36	3.08, 3.64	0.73	2.09 ^a	1.88, 2.31	0.58	2.73	2.40, 3.06	0.52	1.94 ^a	1.54, 2.34	0.52	.49	

Note. Profile comparisons of the study's key variables were conducted with one-way analysis of variance with Bonferroni multiple-comparison correction. Profiles sharing a superscript in a row for a variable are not different at $p < .05$. η^2 = Eta-squared effect size.

Kieffer, 2015), leading this profile to be called *Low in All*.

As Table 3 shows, the mean differences among the profiles are large, as indicated by the range in the sizes of the partial eta squared effects sizes. These mean difference indicate that 41–70% of the total variance in the dimension scores can be accounted for by group membership. Particularly, the dimensions of negative climate and regard for adolescents' perspectives separated the profiles, as 70% and 68%, respectively, of the mean differences in these variables could be explained by profile membership. The four-profile solution with standardized values ($M = 0$, $SD = 1$) in observed classroom interactions is presented in Fig. 1.

3.4. Associations between the profiles and teachers' job satisfaction and emotional exhaustion

Our second research question concerned how the subgroups were associated with teacher-reported job satisfaction and emotional exhaustion. The results are shown in Table 4. The most job-satisfied teachers were those in the *High in All* profile while teachers in the *Low in All* ($M = 3.88$, $SD = 0.18$) profile teachers reported the lowest levels of job satisfaction. The mean difference between the two groups is statistically significant at $p < .05$, with a

Cohen's d effect size of 2.28 (95% CI [1.04, 2.79]), which indicates a large difference.

The highest levels of emotional exhaustion were reported by teachers belonging to the *High in Regard for Adolescents' Perspectives* profile followed by teachers in the *Low in All*, *Low in Emotional Support and Instructional Support and High in Classroom Organization*, and *High in All* profiles. However, the mean differences between the profiles were not statistically significant. This may be partly due to the relatively small sample size ($n = 65$), which limited the extent to which statistically significant differences between the groups could be found. In terms of effect size, Cohen's d effect size for the difference of the mean values of the profile with the highest level (*High in Regard for Adolescents' Perspectives*) and the lowest level (*High in All*) of emotional exhaustion was 0.54 (95% CI [-0.15, 1.22]) indicating a moderate effect (Cohen, 1988). In general, the differences among profiles were large in job satisfaction ($\eta^2 = 0.16$, 95% CI [0.01, 0.29]) but small in emotional exhaustion ($\eta^2 = 0.04$, 95% CI [0.00, 0.13]; Cohen, 1988). More specifically, profile membership explains 16% of the total variation in teachers' job satisfaction and 4% of the total variation in emotional exhaustion.

The multinomial logistic regression results are reported in

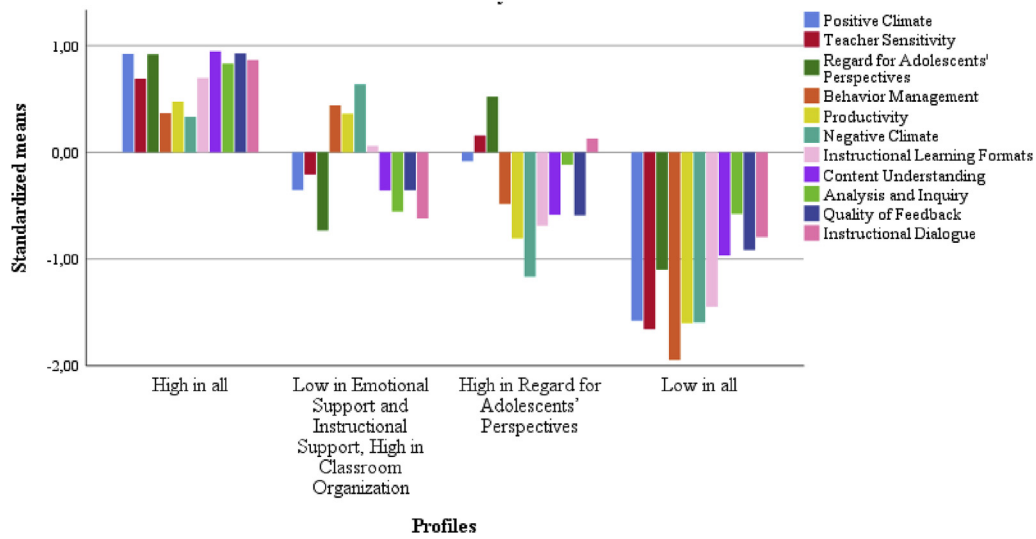


Fig. 1. Profiles based on observed classroom interaction dimensions.

Table 4
Raw means, standard deviations, and effect sizes for teacher emotional exhaustion and job satisfaction.

	Whole sample		Profiles												η^2	
			High in All			Low in Emotional Support and Instructional Support and High in Classroom Organization			High in Regard for Adolescent Perspectives			Low in All				
	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI	SD	M	95% CI		SD
Job Satisfaction	4.42	4.28, 4.55	0.56	4.66 ^a	4.47, 4.85	0.45	4.35 ^{a, b}	4.09, 4.60	0.63	4.28 ^{a, b}	3.94, 4.62	0.47	3.88 ^b	3.66, 4.10	0.18	.16
Emotional Exhaustion	2.39	2.19, 2.60	0.81	2.26 ^a	1.88, 2.63	0.89	2.37 ^a	2.08, 2.66	0.72	2.76 ^a	2.07, 3.45	0.96	2.44 ^a	1.75, 3.13	0.55	.04

Note. Profile comparisons of the study's key variables were conducted with one-way analysis of variance with Bonferroni multiple-comparison correction. Profiles sharing a superscript in a row for a variable are not different at $p < .05$. η^2 = Partial eta-squared effect size.

Table 5
Variables explaining profile membership.

		B	S.E.	OR
High in Regard for Adolescents' Perspectives	Job satisfaction	-1.12	0.93	0.33
	Emotional exhaustion	0.56	0.61	1.75
	Teacher's gender	0.11	1.01	1.12
	Work experience	-0.06	0.06	0.94
	Classroom size	0.03	0.11	1.03
Low in Emotional Support and Instructional Support, High in Classroom Organization	Job satisfaction	-1.57	0.72	0.21*
	Emotional exhaustion	-0.45	0.46	0.64
	Teacher's gender	0.63	0.70	1.88
	Work experience	0.01	0.03	1.01
	Classroom size	0.01	0.07	1.01
Low in All	Job satisfaction	-3.43	1.32	0.03**
	Emotional exhaustion	-0.66	0.85	0.52
	Teacher's gender	-0.02	1.24	0.98
	Work experience	-0.03	0.06	0.97
	Classroom size	0.09	0.15	1.10

Note. Reference profile is High in All. Reference category for teacher's gender is male. B = Multinomial logistic regression coefficient. S.E. = Standard error. Df = Degrees of freedom. OR = Odds ratio. ** $p < .01$, * $p < .05$.

Table 5. The level of job satisfaction explained the profile memberships while emotional exhaustion did not. Teachers in the Low in Emotional Support and Instructional Support, High in Classroom Organization profile were less likely to report high levels of job satisfaction compared to teachers in the High in All profile. When job satisfaction increased by one unit, the log-odds of belonging to

the Low in Emotional Support and Instructional Support, and High in Classroom Organization profile decreased by 1.57 units in reference to the High in All profile, while all other variables in the model remained constant. Furthermore, low levels of job satisfaction explained belonging to the Low in All profile, compared to the High in All profile. Emotional exhaustion, teacher's gender, work

experience, and classroom size did not explain profile membership.

4. Discussion

This study reported the results of classroom observations and teachers' self-reports drawn from a sample of lower secondary school teachers. The study showed that four profiles based on observed classroom interactions could be extracted: *High in All* (35.4%), *Low in Emotional Support and Instructional Support and High in Classroom Organization* (38.0%), *High in Regard for Adolescents' Perspectives* (15.2%), and *Low in All* (11.4%). Moreover, teachers in the *High in All* profile reported more job satisfaction than teachers in the *Low in All* profile, and no statistically significant profile differences in emotional exhaustion were detected. The sample means in classroom interactions aligned well with a study conducted in a relatively similar Finnish educational context (Virtanen et al., 2017), increasing the reliability of the results. When the present study's classroom interaction results are compared with two US studies that employed slightly different versions of the CLASS-S, the mean levels of classroom interactions were generally higher in other dimensions, except for analysis and inquiry and quality of feedback (Allen et al., 2013), and content understanding and quality of feedback (Bell et al., 2012).

Confirming Hypotheses 1a–1c, variations were found in teachers' classroom interactions (e.g., Virtanen et al., 2017; Westergård et al., 2018). Specifically, four classroom interaction profiles were found with one showing uniformly high (*High in All*) and one uniformly low (*Low in All*) levels of classroom interaction quality in all dimensions (Halpin & Kieffer, 2015). Moreover, two were characterized by high levels in some dimensions combined with low levels in others (Ertesvåg, 2011; Walker, 2008; Wubbels & Brekelmans, 2005). Given the evidence that the quality of classroom interactions is positively associated with students' learning and development (Allen et al., 2013; Bell et al., 2012; Hafen et al., 2015; Hamre et al., 2013; Kane et al., 2012; Pianta, 2016) and the large profile differences in the means of classroom interaction dimensions as shown in this study, not all students have access to high-quality educational opportunities.

Linking the profiles to teaching style typologies (Ertesvåg, 2011), teachers belonging to the *High in All* profile show a pattern of interactions characterized by high responsiveness and control. They perform high in monitoring students, are attentive to cues from students (see Pianta, 2016) and, therefore, are able to identify those struggling emotionally and academically. In brief, the classroom practices of teachers in the *High in All* profile are a combination of high levels of warmth (proximity) and control (influence), along with effective scaffolding for students to achieve both social and cognitive goals in their learning and development. This teaching style establishes high standards and has high expectations for socially responsible behavior. Those using this style enforce rules and standards firmly and consistently, while employing corrective strategies when necessary and promoting autonomy by encouraging student participation in decisions about their behavior (Brophy, 1996; Hughes, 2002; Kounin, 1970). This combination aims to prevent problems and also serves the dual purpose of managing behavior in the short term and developing students' responsibility in the long term (Hughes, 2002; Pellerin, 2005).

Consequently, in these classrooms, students' academic and motivational outcomes are likely to be higher than those who are taught by teachers with a less than optimal combination of classroom interaction dimensions (Walker, 2008; Wubbels et al., 2015). Interestingly, *High in All* teachers' within-profile relative scorings were lower in Classroom Organization dimensions than in the dimensions included in the Emotional and Instructional Support domains (see Fig. 1). This may be an optimal combination given that

teacher behavior that is very high in influence may invite passive reactions from lower secondary school students (Wubbels & Brekelmans, 2005). This should not pose a risk when classroom organization is combined with a high level of proximity, which is likely to evoke positive reactions from students.

Teachers in the *Low in Emotional Support and Instructional Support and High in Classroom Organization* profile performed particularly high in the dimensions included in the Classroom Organization domain. These teachers are capable of setting clear expectations for students' behavior, effectively managing it, promoting high productivity for classroom work, and creating a classroom atmosphere without negativity. High-quality classroom organization is not, however, combined with high responsiveness to students' emotional needs and effective instructional support, implying features of the authoritarian teaching style (Ertesvåg, 2011). With respect to student outcomes, these teachers may also be effective. Among a sample of middle and high school students, Dever and Karabenick (2011) showed high levels of teacher demandingness for students' efforts and the provision of high expectations and challenges (authoritarian style) were associated with higher levels of interest and achievement on average for all students. High levels of influence combined with low levels of emotional and instructional support may, however, carry a risk of student resistance, which is not balanced by teacher proximity (Wubbels & Brekelmans, 2005). This may cause a negative circle of student resistance, which in a transactional manner, escalates to negative teacher behavior and coercive classroom interactions.

High in Regard for Adolescents' Perspectives is characterized by high levels on the Emotional Support domain, namely teachers who take into account students' perspectives in their mutual interactions. They are student-centered in that they foster students' autonomy and allow them to contribute to decision-making. It has been well-established in previous literature that teachers' emotional support is positively associated with multiple student outcomes (e.g., Virtanen, 2016).

Teachers in the *Low in All* profile were observed as being particularly low in the dimensions included in the Emotional Support and Classroom Organization domains. Compared to other teachers in the sample, they struggled with addressing students' academic and socioemotional needs and structuring the lessons. As classroom interactions between teachers and students constitute the process through which teachers' value-added is manifested in students' learning and development (Allen et al., 2013; Bell et al., 2012; Hafen et al., 2015; Hamre et al., 2013; Kane et al., 2012; Pianta, 2016), this teacher profile is most in need of tailored support for interaction skills along multiple dimensions. My Teaching Partner Secondary (MTP-S) is an instrument for developing teachers' classroom interaction skills. The theoretical and conceptual basis for the MTP-S corresponds with the TTI framework and the CLASS-S measurement (Gregory et al., 2017). It includes a number of cycles in which video-based classroom observations are analyzed by a coach who is familiar with the TTI framework. The coach selects short clips with specific behavioral examples of interactions from the observed lesson, comments on them, and sends them to the teacher to guide his or her preparation before the coaching session. Over time, the cycles are dedicated to various interactional domains. This professional development strategy is rooted in the teachers' actual classroom practices and monitors whether the practices improve.

There is evidence of MTP-S' effectiveness, and it has the potential for generalizability of the teacher's improved interaction skills to his or her multiple classrooms (Gregory et al., 2017). For example, Allen, Pianta, Gregory, Mikami, and Lun (2011; see also, Allen, Hafen, Gregory, Mikami, & Pianta, 2015), using randomized controlled trials, showed that secondary school students' enhanced

academic gains across content areas and diverse settings were mediated by changes in the quality of teacher–student interaction that MTP-S specifically targeted.

Our second research question concerned how classroom interaction profiles are associated with teacher-reported job satisfaction and emotional exhaustion. Aligning with Hypothesis 2a, after controlling for teachers' gender, work experience, and classroom size, this study found memberships in the *Low in Emotional Support and Instructional Support, High in Classroom Organization and Low in All* profiles explained by lower levels of job satisfaction compared to belonging to the *High in All* profile. This result concurs with prior literature, indicating that teachers' job satisfaction is associated with their actual teaching performance (Jennings & Greenberg, 2009; Judge et al., 2001; Roeser et al., 2012); that is, teachers who are satisfied with their jobs report higher quality teacher–student relationships (Spilt et al., 2011; Veldman et al., 2013), classroom management skills, and more learner-centered teaching styles (Opdenakker & Van Damme, 2006) than those with lower job satisfaction. Moreover, given that teacher's job satisfaction develops in moment-to-moment reciprocal teacher–student interactions (Wubbels et al., 2015), it is not only job satisfaction that has the potential to improve classroom interactions but also vice versa. Therefore, identifying and addressing the areas of classroom interaction skills to improve will most likely improve teachers' job satisfaction, resulting in a positive circle whereby job satisfaction, in turn, contributes positively to classroom interactions. Importantly, since all students' learning and development are supposed to be enhanced by high-quality classroom interactions (Allen et al., 2013; Bell et al., 2012; Hafen et al., 2015; Hamre et al., 2013; Kane et al., 2012; Pianta, 2016) and teachers' job satisfaction (Opdenakker & Van Damme, 2006; Spilt et al., 2011; Veldman et al., 2013), students in low-ability classes may particularly benefit from high-level classroom interactions and teachers' improved job satisfaction. There is evidence that in the early school grades, the risk of student failure may be moderated by high-quality classroom interactions. In one study (Hamre & Pianta, 2005), achievement scores for at-risk students placed in classrooms offering strong instructional and emotional support were commensurate with their low-risk peers. Moreover, teachers with high job satisfaction are likely to give more instructional support to their low-level classes than teachers with low job satisfaction (Opdenakker & Van Damme, 2006). Together, improving teachers' job satisfaction and classroom interaction skills has great potential for enhancing the instructional quality of classes, particularly those of students in the low-ability range.

Contrasting Hypothesis 2b (Cropanzano et al., 2003; Halbesleben, 2010; Halbesleben & Bowler, 2007; Klusmann et al., 2016), emotional exhaustion did not explain the memberships in the four classroom interaction profiles. However, a moderate mean difference was found (in terms of *d* effect size) between the profiles with the lowest (*High in All*) and the highest (*High in Regard for Adolescents' Perspectives*) levels of emotional exhaustion. This result indicates that teachers who provide emotional support in terms of opportunities for student autonomy and leadership may be vulnerable to emotional exhaustion when combined with low levels of classroom organization skills. Keeping in mind that teachers' emotional exhaustion correlates negatively with multiple positive outcomes, including job satisfaction, engagement (Skaalvik & Skaalvik, 2014), and teacher–student relations (Grayson & Alvarez, 2008), it may not only be a prerequisite for teachers' motivation to quit the profession (Skaalvik & Skaalvik, 2016), but it may also diminish their productivity and effectiveness at work (Maslach et al., 2001). Lower quality classroom performance is then related to weakened student engagement and learning (Jennings & Greenberg, 2009; Pianta et al., 2012). Several dimensions organized

into three domains constitute classroom interactions (Pianta et al., 2012), and interventions to improve teachers' abilities to orchestrate classroom interactions should clearly be aimed at achieving high standards in each of the dimensions.

The present study showed that teachers' job satisfaction is more strongly related to their classroom interactions than emotional exhaustion. Job satisfaction is partly built in moment-to-moment reciprocal teacher–student interactions (Wubbels et al., 2015) and, thus, is sensitive to what happens in the classroom on a daily basis. In contrast, emotional exhaustion develops over a longer period of time (Maslach & Leiter, 2017). Low levels of emotional exhaustion may not hamper the quality of classroom interactions.

In summary, the present study's results indicate that the quality of classroom interactions may impact both students and teachers. The impact of high-quality classroom interactions on student learning is evident (e.g. Allen et al., 2013; Bell et al. 2012; Kane et al., 2012). The large profile differences found in the present study indicate that not all students have access to high-quality teaching. Kane et al. (2012) illustrated such consequences in a large-scale study by showing an association between observations scores, using CLASS and three similar observation tools, and value-added scores. Students in classrooms with observation scores in the top quartile moved ahead of comparable students by 1.5 months within a school year. The present study's results indicate that the quality of classroom interactions are also associated with teachers' job satisfaction. The opportunity to work with students is strong motivation for entering the profession (e.g., Watt & Richardson, 2007). Klassen, Perry, and Frenzel (2012) found that teachers' optimal functioning is strongly influenced by their level of relatedness with students even in secondary school. Consequently, the day-to-day effect of low-quality teacher–student interactions may lead to teachers' inability to relate to their students, and to lower levels of enjoyment and job satisfaction. Kunter et al. (2008) connected teachers' motivation to teachers' and students' perceptions of teacher enthusiasm and interest. Teachers who were more enthusiastic about teaching showed higher quality instructional behavior. It is likely that teachers with high job satisfaction are enthusiastic about their work and, thus, give more instructional support to both high- and low-ability students. Moreover, those with high job satisfaction feel that they are successful teachers and believe that all students have the ability to learn. Consequently, they invest effort in their low-ability students and classes and, in return, receive positive affirmation of their beliefs and impressions (Opdenakker & Van Damme, 2006).

4.1. Limitations and strengths

The first limitation of this study is its small sample size, since the number of teachers with both classroom observations and self-reported wellbeing data was 65. Large samples provide more information, making it possible to find more profiles (Marsh et al., 2009). Moreover, large samples make it easier to find statistically significant profile differences in teacher wellbeing measures. Second, the sample was nonrandom. Teachers participated on a voluntary basis; thus, the generalizability of the results may be limited to the most active teachers who were willing to participate in the classroom observations. Third, within-teacher variations may be better captured by modelling segments rather than teachers (see Halpin & Kieffer, 2015). However, since we were interested in the associations between teachers' actual classroom interactions and their wellbeing, a teacher as the unit of analysis was the optimal choice. Taken together, further replications of the present study's results are needed.

The study has several strengths. First, both first- and third-person measures were applied in that teachers' self-reports were

linked to external classroom observations by trained coders. So, common-method variance was controlled by using the multi-method approach. Second, instead of assuming that teachers can be placed on a single continuum of classroom quality, the study employed a person-centered method that enabled examination of various within-teacher patterns of classroom interactions. Third, multiple lessons per teacher were observed at multiple time points during an academic year. Thus, observers did not rate consecutive within-lesson segments in a given classroom. Furthermore, efforts were made to improve the reliability of the results by controlling the various times in the academic year when classroom interactions were observed and to maintain the independence of the ratings of the observed segments. Finally, the language of the observer training was English. Therefore, the raters were required to score classroom interactions in the local Norwegian school setting before being eligible to code the interactions in this study.

4.2. Implications for teacher education

The present study has several implications for teacher education internationally. This study showed that teachers' classroom interactions and job satisfaction are intertwined, calling for measures to improve both. Classroom observations are a common tool in pre-service and in-service teacher education to view classroom interactions through the lenses of external observers. Teachers need to be made aware of the core dimensions of classroom interactions by unpacking the black box of teaching. Further, they must be educated on how to systematically and intensively conduct appropriate classroom practices that facilitate valued student outcomes (Pianta, 2016). Regarding what happens in a classroom, teachers' and students' perceptions (see e.g., Veldman et al., 2013) and teachers' perceptions and external observations (Grossman, Loeb, Cohen, & Wyckoff, 2013) do not necessarily coincide. Therefore, to facilitate teachers' positive professional development, objective judgments in terms of classroom observations may be needed. In-service teacher observations could be facilitated using video-based coaching (see Gregory et al., 2017). This would enable tailored teacher interventions to improve actual classroom interactions.

Classroom interactions, along with teacher education, may strongly depend on the given educational context. Therefore, observation instruments intended for teachers' professional development should capture core classroom interactions of teaching independent of the context. This would enable teacher educators to identify strengths and areas in need of improvement in various teacher education contexts. For example, the present study revealed that in Norway, teachers' instructional support is an area particularly in need of improvement compared to teachers in the US (Allen et al., 2013; Bell et al., 2012). Moreover, teacher education could include instruction on teacher wellbeing, its effects on the quality of classroom interactions, and how to maintain it throughout a teacher's in-service career.

4.3. Future studies

First, future studies could examine the causal ordering of teacher wellbeing and classroom interactions by disaggregating within- and between-person processes (see Curran, Howard, Bainter, Lane, & McGinley, 2014). This could provide insights needed to design effective professional development. Second, the profiles found in this study could be linked to student outcomes. Third, the stability of the within-teacher configurations across classroom student compositions could be examined to see whether teachers show stable patterns of interactions in classrooms consisting of various student compositions. Fourth, following teachers

from the beginning of their careers could provide insights into factors that affect professional development and wellbeing by enabling the accumulation of data to determine if teachers move from one profile to another over time and how this relates to their wellbeing. Finally, an interesting and important topic to discuss in future research is the role, means, and structure of society. For example, the implications of student teacher intake, teacher education, and professional development on classroom interactions should be further elaborated.

5. Conclusion

Using person- and variable-centered methods and two sources of data collection techniques, the present study examined observed classroom interaction profiles and teachers' self-reports on their wellbeing. Four distinct profiles were identified, and job satisfaction was intertwined with the profiles. Specifically, among the observed teachers, those with high classroom interactions self-reported higher levels of job satisfaction than those with low classroom interactions. As teachers' classroom interaction skills and job satisfaction are intertwined, improving one has the potential to improve the other and, ultimately, students' learning. Systematic classroom observations of pre-service and in-service teacher training are a promising means to facilitate teacher-orchestrated classroom interactions.

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