



Teacher's use of praise, clarity of school rules and classroom climate: comparing classroom compositions in terms of disruptive students

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Received: 1 May 2018 / Accepted: 31 July 2019 / Published online: 12 November 2019
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Abstract

Clarity of school rules and teachers' use of praise are strategies suggested to facilitate a positive classroom climate. Studies indicate difficulties for teachers to use such approaches in classrooms with higher levels of disruption. To study (1) if student-rated clarity of school rules, use of praise, and classroom climate differ between students in classes with lower numbers of disruptive students versus classes with higher numbers, (2) if clarity of school rules and teacher's use of praise are longitudinally associated with classroom climate, (3) if the possible longitudinal association differs between groups, classes ($n = 109$) in school grades 5–7 were divided into two groups, based on head teacher ratings of disruptive students in class. Baseline and 12-month follow-up responses collected within a Swedish trial were used to perform multiple regression analysis, to compare groups and to investigate possible longitudinal associations. Students in classes with less disruption rated all variables more positively. Classroom climate deteriorated over time in both groups, even if the low disruption group perceived their climate as more positive at follow up. Clarity of school rules did not substantially contribute to classroom climate longitudinally, whereas teacher's use of praise to some extent did. The difference in longitudinal associations between groups was marginal, hence our hypothesis on weaker associations in the high disruption group could not be confirmed. Clarity of school rules is not longitudinally associated with classroom climate, but teachers may positively influence the learning environment by giving praise, regardless of level of disruption.

Keywords Classroom climate · Teacher's use of praise · Rules · Classroom composition

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1 Introduction

Children's socio-emotional development depends on complex interactions between and within the different social systems which surround them (Bronfenbrenner 1979). The school is a system with great influence, where children and youth spend most of their time outside home (Toren and Seginer 2015; Wang et al. 2016). Feeling connected to the school and being supported by teachers promote students' possibilities to develop in positive ways, both socially and academically (Kearney 2008). On the other hand, punitive strategies, poor teaching, classes perceived as uninteresting, and bad teacher–student relationships characterize a less supportive environment, associated with non-compliant behaviours in class (Kearney 2008; Pas et al. 2015) and with future emotional and behavioural problems (Kearney 2008; Somersalo et al. 2002). Especially students with externalizing behaviours are at higher risk for developing further problems in such non-supportive environments (Cavanaugh 2013; Kearney 2008). Given this, teachers play an important role in children's development and have a unique possibility to shape a supportive social classroom climate (Beaman and Wheldall 2000; Luckner and Pianta 2011; Pas et al. 2015), by transferring societal norms and governing the classroom interactions (Farmer et al. 2011).

1.1 Classroom climate

There is a lack of an overall definition of the concept of classroom climate (Evans et al. 2009). However, it is often referred to as the social-psychological environment for learning (Rowe et al. 2010; Toren and Seginer 2015), containing student and teacher perceptions, attitudes, behaviours and interactions in the classroom (Johnson 2009). Although the classroom climate often affects students' development in more indirect ways, it has also been linked to a variety of outcomes such as students' engagement, academic values and psychological health (Holas and Huston 2012; Toren and Seginer 2015). According to Toren and Seginer (2015) classroom climate can be divided into three dimensions. (1) Teacher–student relationships, i.e. teachers' emotional and academic responses, shown to influence students' pro social behaviours and academic achievement. (2) Peer relationships, i.e. peer support, relationships and interactions. Perceiving support from peers has been found to facilitate fulfilling of social and academic goals as well as psychological adjustment. Conversely, lack of peer support is connected to low self-esteem, depression and problem behaviours. (3) Educational atmosphere refers to learning opportunities, classroom organization, instructional support, and behaviour management strategies (Toren and Seginer 2015). Even though a lack of congruence on the definitions of the concept complicates the possibility to compare studies, the social climate of the classroom has been shown to play a role in shaping the development of students' future. In the present study, the classroom climate is mainly conceptualized as teacher–student and peer relationships. Aspects of educational atmosphere are included in the form of behavioral management strategies (see methods and measurements for the description of items used).

1.2 Classroom management

When students in class act in disruptive ways, it affects learning and peer interactions for all students. High levels of disruptive behaviours may even create a classroom climate where disruption becomes a behavioural norm (Pas et al. 2015) with increased levels of office referrals or suspensions as consequences (Skiba et al. 2016). However, teachers who have a focus on pro-social values, cooperation and being supportive can improve students' behaviours and attitudes towards the school (Christle et al. 2007; Jessor et al. 1998; Koth et al. 2008), and even promote a healthy development among children at risk (Sabol and Pianta 2012). During the past decades and within the field of behavioural school psychology, a set of classroom management (CM) strategies have been identified as effective in creating a positive classroom environment (Simonsen et al. 2008; Skiba et al. 2016). Maximizing structure, teaching and reinforcing behavioural engagement, and using a continuum of behavioural response strategies are approaches found to be effective (Simonsen et al. 2008). Behavioural expectations/rules and teacher's use of praise are elements of positive behavioural support interventions at the classroom-level as well at the school-level, as further described below.

1.3 Behavioural expectations

The concepts of rules and expectations are often used interchangeably (Gable et al. 2009). Behavioural expectations refers to the use of a limited number of concretely and positively stated rules that include the desired behaviour (Simonsen et al. 2008), and has been found to decrease problems such as student victimization and delinquency (Gottfredson et al. 2005). In a review of evidence-based classroom management strategies, five studies regarding expectations are discussed (Simonsen et al. 2008). The review indicates that setting up, teaching, and reviewing expectations and providing feedback decreases disruptive behaviours and increases academic engagement among students. Further, effective expectations need to be positively stated and broadly enough formulated to include all desired behaviours (such as "be safe", "be respectful"), and taught to students in a systematic way (Simonsen et al. 2008). Also, pre-defined consequences are suggested to be used in conjunction with behavioural expectations in order to reinforce desired behaviours. That is, students should know beforehand what kind of feedback to expect, when meeting or violating expectations (Gable et al. 2009; Simonsen et al. 2008).

1.4 Teacher praise

The definition of teacher praise varies, but usually includes positive verbal or non-verbal attention to students' behaviour. It is often conceptually divided into general, i.e. any given praise, and behaviour-specific praise, which refers to praising a specific behaviour (Gable et al. 2009). Within behavioural school psychology, the use

of contingent and specific praise is a way of rewarding appropriate behaviours, other examples being group reinforcement contingencies, written behaviour contracts, and token economies (Simonsen et al. 2008).

Earlier studies show that general praise is more frequently used than behaviour-specific praise (Beaman and Wheldall 2000), but there is a lack of recent systematic studies on the rates of behaviour-specific praise (Jenkins et al. 2015). Nevertheless, research suggests that behaviour-specific praise is more effective than general praise (Gable et al. 2009; Hattie and Timperley 2007; Jenkins et al. 2015; Spilt et al. 2016) and that it promotes both learning and positive student–teacher relationships (Simonsen et al. 2008; Skiba et al. 2016). Also, in the growing body of research on behaviour-specific praise and disruptive behaviours, associations as well as a functional negative relationship between behaviour-specific praise and problem behaviours have been established (Jenkins et al. 2015).

As noted by Gable et al. (2009), several studies of the use of rules/expectations and teachers' use of praise were conducted during earlier decades, however recent research indicates a need for further studies of single CM strategies in themselves (Spilt et al. 2016). Also, most research on CM strategies has been conducted in whole school settings rather than in classrooms (Pas et al. 2015) and are often based on teacher reports rather than on students' own ratings (Sabol and Pianta 2012).

1.5 School-wide positive behavioural support interventions

The school wide positive behaviour support (SWPBS) is a comprehensive model built on behavioural science which aims at creating a positive social climate in schools at large, and at preventing problem behaviours and a negative development among students. SWPBS has been widely spread in the US (Horner et al. 2014) and in Norway with the PALS programme (Sørli and Ogden 2015). In SWPBS, CM strategies are suggested to be used together and in conjunction with other more school-wide structural features, such as school leadership teams, teacher training, and coordination (George et al. 2009). The use of behavioural expectations/rules and rewards (including praise) are SWPBS core features (Horner et al. 2014), used also in the Swedish school intervention Prevention in School (PS) (Sundell et al. 2007).

1.6 Study context and rationale

The present study is part of a larger research project evaluating the Swedish PS programme. Our previous research indicated no effects of PS on classroom climate and problem behaviours in class (Bodin et al. 2016), and also illuminated a variety of barriers to implementation of the programme (Ingemarson et al. 2014, 2016). Findings from the qualitative studies showed how some teachers found it difficult to use the programme strategies, especially in classrooms with groupings of disruptive students (Ingemarson et al. 2016). These findings seem to be in line with a recent study which identified different kinds of classroom compositions and revealed a link between students' behavioural patterns and teachers' management strategies. In classrooms with noncompliant students the most reactive teacher strategies were

used, whereas in classrooms with positive behaviours teachers communicated less disapproval (Pas et al. 2015). Earlier research has also shown that the greater the proportion of problem students in class, the less positively students perceive their school environment (Koth et al. 2008). Due to these findings, the questions were raised whether the levels of praise and clear expectations/rules might differ depending on the level of disruption in class, and if the significance of those strategies differ between classes with different numbers of disruptive students.

2 Study aim

The aim of the present study was threefold: (1) to investigate if levels of student-rated clarity of rules, use of praise and classroom climate differ between students in classes with lower versus higher numbers of disruptive students, (2) to investigate whether clarity of school rules and teacher's use of praise, as perceived by students, are longitudinally associated with classroom climate and, (3) to investigate if the possible longitudinal association between clarity of school rules and teacher's use of praise and classroom climate differs between classes with higher and lower numbers of disruptive students. We hypothesized that a longitudinal association would be weaker in groups with higher numbers of disruptive students.

3 Methods

3.1 Participants and recruitment

The data in the present study is based on questionnaire responses from a quasi-randomized trial of the Swedish school programme Prevention in School (PS), reported in more detail in a previous publication (Bodin et al. 2016). Twenty-three schools with 3207 students in 156 classes in grades 5–7 participated at the baseline measurement (T1). Follow-ups took place after 12 months and 24 months. Eligible schools for the trial were schools with grades 4–9 that had at least two classes in each of grades 5–7, had school leaders and teachers who clearly agreed to participate, and were situated in Stockholm County and commuter cities nearby. The students and their head teachers filled in paper questionnaires on site in the classroom or in larger groups in canteens or auditoriums. Teachers who were unable to attend could return the questionnaires by ordinary mail. The first author together with a research assistant attended these occasions to answer any student questions and to collect questionnaires, and class teachers assisted to keep order.

For the aim of the present study, 379 students in 22 classes from three schools were excluded from the original sample since they could not be connected to a specific head teacher's rating of number of disruptive students (see Sect. 3.4 below).

Another 562 students in 25 classes, with two head teachers who made incongruent ratings of the number of disruptive students in class, were also excluded. The final study group consisted of 2266 students in 20 schools and 109 classes. All included schools were public schools. The grade point average (GPA) from 2011

was 207.31, which is slightly lower than the 2011 nationwide GPA of 217.5 for Swedish public schools (Swedish National Agency for Education 2011).

3.2 Missing data

For the 2266 students who participated in the present study, 1964 (87%) provided a full response and 302 (13%) a partial response to the items of the Classroom Climate Scale at T1. For the 22 individual scale items, non-responses varied between 1.2 and 2.4%. Of all participants, 2148 (95%) provided a full response and 118 (5%) a partial response on the items of Teacher's use of praise. For the four items of teacher praise, non-responses varied between 1.2 and 2.0%. On Clarity of school rules, 2189 (97%) provided a full response and 77 (3%) a partial response. On the 5 individual items, non-responses varied between 0.8 and 1.1%.

At T2, non-attending students were 429, and 249 of those had changed school. Hence there were 1837 attending students (i.e. 81% of the baseline participants) at follow up, and 1603 (71%) of those provided a full response to the 22 items of the Classroom Climate Scale. The partial non-response rate varied between 1.2% and 2.9%.

None of the 2266 students was excluded due to missing data. All missing data was handled in the analysis (see Sect. 3.4).

3.3 Measures

Eight items from the 15-item scale *Behaviour problem students in class this year* (Ogden 1998) were used. Head teachers were asked how many students in the class exhibit externalizing problem behaviour that make teaching or learning difficult, for example fighting with others or being interruptive. The questions had four response categories: 1=0 students, 2=1–2 students, 3=3–7 students, 4=8 or more students.

The 22-item student version of the *Classroom Climate Scale* was used to measure the students' perceptions of the psychosocial learning conditions in class. It was developed by Norwegian researchers (Sørli and Ogden 2007) with the Classroom Environment Scale (Trickett and Quinlan 1979) as a model. The Classroom Climate Scale covers two dimensions: teacher–student relationships and peer relationships. It has earlier demonstrated good psychometric properties in terms of internal consistency and factorability (Sørli and Ogden 2007). The scale includes peer-relationship statements such as “The students in this class are good friends” and “Students in this class collaborate well when we are asked to”. It also includes teacher-relationship statements such as “The teacher cares about me”, “I have a good relationship with my teacher”, and “The teacher makes no difference between boys and girls”. All items were student-reported and contained the response alternatives 1=Strongly disagree, 2=Disagree, 3=Agree, 4=Strongly agree. The total sum range from 22 to 88 ($\alpha=0.93$ at T1 and 0.92 at T2).

For student reports of *Clarity of school rules*, items from the PS programme survey (Hellqvist and Sundell 2007) were used. Clarity of school rules was reflected by five items: “I know the rules of this school”, “My parents know what goes on

at school”, “I care about what teachers say”, “Teachers explain what we can and cannot do”, and “If I saw another student writing/drawing graffiti at school I would tell the student not to”. All items were student-reported and contained the response alternatives 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree. The total sum ranged from 5 to 20 ($\alpha=0.68$ at both T1 and T2).

Four items from the PS programme survey (Hellqvist and Sundell 2007) reflected *student-reported teacher praise*: “When I accomplish something at school I get praise from teachers”, “Teachers often praise and encourage us”, “If there’s something you don’t understand you quickly get help from teachers”, and “Teachers let my parents know when I do well at school”. All items were student-reported and contained the response alternatives 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree. The sum ranged between 4 and 16 ($\alpha=0.78$ at T1 and 0.77 at T2).

3.4 Operationalization and statistical analysis

To be able to compare classes with lower numbers of disruptive students with classes with higher numbers, head teachers’ ratings of students with externalizing problem behaviour in their class were dichotomized. They were divided into (a) 2 or less students with problem behaviours in class, and (b) 3 or more students with problem behaviours in class (see Sect. 3.3 above). This way the study sample was divided into two groups with 1351 students in 63 classes (56%) with lower numbers of disruptive students in class, and 915 (44%) in 46 classes with higher numbers.

Firstly, ratings of clarity of school rules and teachers use of praise at T1 and classroom climate at T1 and T2 were compared between the two groups, by using bivariate regression analyses on original data. The intra-correlation coefficient (ICC) was calculated to measure lack of independence between classes clustered at the schools and students clustered at classes. Whenever the ICC value is 0.05 or more, adjusting for lack of independence is necessary (Acock 2014). The calculation of standard error of the mean was adjusted for the lack of independence between classes belonging to the same school. T-values obtained from the regression output are reported as test statistics (see Table 2). The correlation coefficient values were interpreted as .10 indicating a weak, .30 a moderate and .50 a strong effect (Acock 2014).

Secondly, multiple regression analyses of potential longitudinal associations between predictor variables and the outcome variable were conducted. To handle missing data, multiple imputation using a Markov Chain Monte Carlo (MCMC) procedure was performed with 40 imputations as recommended by Newman (2014). The intra correlation coefficient (ICC) was calculated to measure lack of independence between students clustered in classes (Acock 2014). The multiple regression analysis was stratified on classes with lower versus higher levels of disruptive students, and conducted on imputed individual-level data, with Clarity of school rules and Teacher’s use of praise as predictors of classroom climate at T2. Classroom climate at baseline and classroom clustering were adjusted for. The three predictors were centered around their means to be able to relate to the value zero in a meaningful way, and to handle the risk for a high degree of multi-collinearity.

Standardized coefficients (β) were calculated based on Fisher's transformation. Beta weight (β) assessments of effect sizes were based on: .10 = weak, .30 = moderate and .50 = strong (Acock 2014). In all analyses violations of the assumptions of linearity, independence of residuals, homoscedasticity, and normality were handled by using a sandwich estimator for the calculation of robust standard errors that assumes independence between but not within class clusters.

4 Results

4.1 Baseline background data

Descriptive baseline data on gender and spoken language among the 2266 students in different grade levels are described in Table 1 below. In the group of students with lower numbers of disruptive students in class, 53% were girls, compared to 47% in the higher-number group. In both groups, 76% reported that they spoke only Swedish at home, and 24% reported they used a foreign language at home (not shown in table).

4.2 Group comparisons of predictors and outcome

The ICC for classes clustered at the school level was .178, which means that about 18 percent of the variability in classroom climate was explained by differences between schools. The group with fewer disruptive students in class scored higher on all three variables (Table 2).

The magnitude of difference in classroom climate between the two groups at baseline was moderate (correlation coefficient = .09), and small at follow up (correlation coefficient = .04). Also, the difference was small both for Clarity of school rules (correlation coefficient = .03) and Teacher's use of praise (correlation coefficient = .03).

Further, both groups of classes had a negative change in classroom climate between T1 and T2. The classes with lower numbers of disruptive students had a mean score reduction of -2.8 points, $t = -4.57$ ($p < .001$) and classes with higher

Table 1 Baseline data: grades, gender and language spoken at home

Grade	Gender <i>n</i> (%)		Language <i>n</i> (%)		Sum
	Girls	Boys	Swedish	Foreign or mixed	
5	366 (49.2)	378 (50.8)	581 (78.2) ^a	162 (21.8) ^a	744
6	361 (49.5)	368 (50.5)	541 (74.2)	188 (25.8)	729
7	413 (52.1)	380 (47.9)	593 (74.8)	200 (25.2)	793
	1140 (50.3)	1126 (49.7)	1715 (75.7)	550 (24.3)	2266

^a"Mixed" language referring to foreign language together with Swedish

^aOne missing value

Table 2 Mean values (and standard error of mean) of three scales measured at T1 and classroom climate at T2 for classes with higher versus lower number of students with disruptive behaviours in class

	T1		T2		<i>T</i>
	<i>M (SE)</i>		<i>M (SE)</i>		
	Lower number (<i>n</i> =63)	Higher number (<i>n</i> =46)	Lower number (<i>n</i> =63)	Higher number (<i>n</i> =46)	
Classroom climate	65.56 (1.15)	61.42 (.85)	62.80 (.89)	60.65 (.78)	5.25***
Clarity of school rules	16.22 (.18)	15.78 (.26)	–	–	1.76 ^{n.s.}
Teacher's use of praise	11.16 (.23)	10.66 (.18)	–	–	2.35*

Analysis conducted on non-imputed data. Adjusted for school clustering

n.s. not significant

****p* < .001; **p* < .05

numbers of disruptive students had a mean score reduction of $-.8$ points, $t = -.79$ ($p = .441$). The difference in reduction between the two groups was non-significant ($p = .08$).

4.3 Longitudinal associations

The ICC for class-level clustering of students' individual ratings of classroom climate was .20. The models were significant for both groups and all variables added significantly ($p < .001$) to the prediction of classroom climate, except Clarity of school rules which was non-significant for classes with higher number of students with disruptive behaviours. Beta weights (β) indicated moderate longitudinal associations (data not shown) between classroom climate at baseline and follow-up in both groups ($\beta = .37$ for classes with lower number of disruptive students and $\beta = .40$ for classes with higher numbers of disruptive students, data not shown).

Clarity of school rules in both groups had a very weak association with classroom climate at T2, and the association was not significant for classes with higher numbers of disruptive students. Teacher's use of praise in both groups showed a larger effect size, but still a weak association with classroom climate at T2. The differences between groups with regards to longitudinal associations between predictors and outcome must be judged as negligible, even if the beta weights were slightly lower in the higher number group (Table 3).

5 Discussion

The present study investigated clear school rules and the teacher's use of praise as strategies to create a positive classroom climate. Classes with lower numbers of disruptive students were compared with classes with higher numbers. Overall students in classes with less disruption were more positive in their ratings, especially regarding the classroom climate. The classroom climate also deteriorated over time in both groups. However, the difference between groups in ratings of classroom climate had evened out at follow up, even if the low disruption group still perceived their climate as more positive. Regarding

Table 3 Multiple regression analysis. Classes with lower/higher number of students with disruptive behaviours

Predictors	Coefficient	SE	<i>t</i>	<i>p</i>	β
Lower number					
Clarity of school rules	.31	.15	2.05	.045	.07
Teacher's use of praise	.59	.16	3.64	.001	.14
Higher number					
Clarity of school rules	.13	.18	.69	.495	.03
Teacher's use of praise	.40	.16	2.48	.018	.10

Analyses made on imputed data on the student level with adjustment for clustering at class level

Standardized coefficients (β) based on Fisher's transformation

longitudinal associations, our findings suggest that clarity of school rules does not substantially contribute to the classroom climate, whereas use of praise to some extent does. The difference in longitudinal associations between the two groups was marginal, and our hypothesis regarding weaker associations between the CM strategies and classroom climate in classes with more disruption was not supported.

The deterioration in classroom climate over time is a tendency observed also by other researchers (Burnett 2002; Sørliie and Ogden 2015; Way et al. 2007). This might perhaps be explained by more distant relationships between teachers and students in the higher grades (Lynch and Cicchetti 1997), and students being divided in different classes with different subject teachers (Hargreaves 2000). Earlier studies have also found that students in higher grades perceive teachers as less supportive than in lower grades (Davis 2003; Feldlaufer et al. 1988; Lynch and Cicchetti 1997) and that teachers tend to actively distance themselves from adolescent students (Davis 2003; Hargreaves 2000). It has been pointed out, however, that close relationships and emotional understanding are crucial to high quality learning also in the higher grades (Hargreaves 2000). Especially disruptive students may benefit from well-functioning relationships with their teacher, and positive teacher–student relationships have also been found to lower the level of disruption in classes in later grades (Gregory and Ripski 2008). This suggests that attention needs to be paid to teacher–student relationships and classroom climate also when students enter higher grades.

The students' perceptions of less clear rules and lower levels of teacher praise in classes with more disruption, may be explained by difficulties among teachers to use CM strategies in noisy classrooms, as suggested in our prior qualitative study (Ingemarson et al. 2016). This is also in line with a study by Pas et al. (2015), where associations were found between students' behavioral patterns and teachers' use of classroom strategies. Other studies also indicate associations between student behaviors and classroom climate. A study by Koth et al. indicated that the greater the proportion of disruptive students in class, the less positive the school environment was perceived by the students (Koth et al. 2008). Also, a meta-analysis shows that teachers perceive less closeness in their relationships with students who exhibit externalizing problem behaviours (Nurmi 2012).

The present findings indicate that teacher's use of praise is linked to classroom climate, in line with an earlier study by Burnett (2002). As noted before, the type of given praise may be of importance. In the Burnett study, no relationship between general praise and student-rated classroom environment was found, whereas ability feedback (e.g. "You seem very smart to me") and effort feedback (e.g. "You are a hard worker") were found to affect the classroom environment positively (Burnett 2002). Unfortunately, the present study provides no answers regarding which types of praise were used by the teachers, most likely a mix of different kinds of praise was captured by our measure. More precise measures would have been optimal, but nevertheless our findings provide some support that praise in a wider sense may enhance the classroom climate.

6 Implications for practice

Though clear rules/expectations have been shown to positively affect student behaviors (Simonsen et al. 2008), it was not a significant predictor of classroom climate in this study. On the other hand, the present results indicate that teacher's use of praise contributes to a positive classroom climate. Since classroom climate ratings tend to deteriorate over time, teachers may profitably pay attention to how often (or seldom) they give praise, especially in the higher grades. However, it is not self-evident that praise will always be appreciated by all students.

Studies indicate that it is important that praise is perceived as honestly meant (Burnett and Mandel 2010) and that praise at times can be perceived as embarrassing (Evans et al. 2009). Further, younger students appreciate ability praise more than older students, who tend to prefer effort praise (Burnett and Mandel 2010). Therefore, it may be important for teachers to reflect on both how and when they give praise.

7 Implications for research

Further research on different kinds of praise is needed, both on general praise and behaviour-specific praise as suggested by Jenkins et al. (2015), and on ability and effort feedback like in the Burnett (2002) study. In the present study, classroom climate was conceptualized as teacher- and peer-relationships while the third dimension (i.e. educational atmosphere) defined by Toren and Seigner (2015) was not included. Future research would benefit from clear definitions and operationalization and more of consensus around the concept of classroom climate, in order to facilitate comparisons between studies. Further studies of how teacher relationships and peer relationships are interrelated, and of other potential factors that might affect the classroom climate are of interest, to understand the decline in rated classroom climate over time and why groups with more disruptive students have a lower decline.

8 Strengths and limitations

The use of multiple imputation is a study strength since it increases the power and reduces the risk for biased estimates. The adjustments for clustering of classes in schools and students in classes lower the risk of Type-I error. Using student reports is another strength, since teacher ratings of their own performances might be affected by a social desirability to perform well (Cook et al. 2012).

Unlike the Classroom Climate Scale, the items measuring Clarity of school rules and Teacher's use of praise have not been tested in terms of validity, which is a study weakness. Also, a more specific measure of praise could provide information on different kinds of praise and how they affect the relationships in the classroom.

Further, the Clarity of school rules measure had relatively low internal consistency ($\alpha=0.68$), and lacks precision with regards to rule definitions. Again, a more precise measure could have been beneficial.

In the present study, classroom climate at baseline was statistically adjusted for in the longitudinal analyses, a common strategy to decrease Type I error risk, i.e. obtaining false positive findings. It has been discussed, however, whether such adjustments might provide biased estimates, and increase the risk of Type II error (Glymour et al. 2005). That is, the outcome variable at baseline could be affected by predictors being active before baseline. Following this logic, praise and rules prior to baseline could have affected classroom climate at baseline. When conducting analysis without baseline adjustments, the correlations between clear rules and use of praise at baseline and classroom climate at follow up were indeed stronger in both groups (data not shown).

However, due to the prevailing rule of thumb that Type I is a more serious error than Type II, we chose analyses which included baseline adjustments. It is worth noting however, that the alternative analysis may further strengthen the claim that the studied management strategies affect classroom climate over time.

9 Conclusion

Working actively to create a positive classroom climate is an important teacher task, not only in terms of creating a harmonious learning environment, but also in terms of facilitating a positive future development among children (Kearney 2008; Toren and Seginer 2015).

The present study adds to previous research with its focus on student reports and a longitudinal design. The findings indicate that clarity of school rules is not longitudinally associated with classroom climate, but that teachers may positively influence the learning environment by giving praise. The use of praise can also be of benefit in all classes, regardless of composition in terms of disruption. The study also lends support to previous research, by showing that students in higher grades perceive their classroom climate as less positive than the younger ones. These are notable findings, since well-functioning relationships (between teacher and students and among peers) have been found to lower the level of disruption in class and to facilitate learning also in the higher school grades.

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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