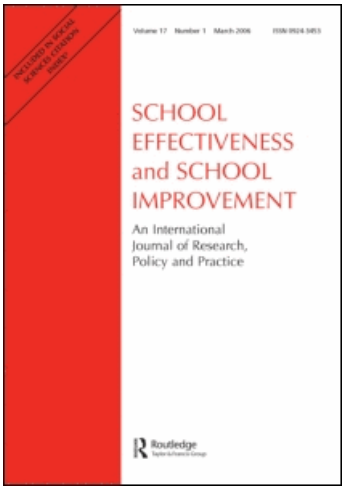

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Multilevel analysis of the relationship between teacher collective efficacy and problem behaviour in school

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The relationship between perceived teacher collective efficacy and student problem behaviour was examined in a two-wave study. Participants were 1,100 teachers in 48 Norwegian elementary schools. Questionnaires were completed with approximately 6 months lag. A variance component model suggested a strong intraclass correlation (ICC2) for collective efficacy (.77), indicating high reliability across raters. Concurrent and prospective relationships between collective efficacy and problem behaviour were tested using multilevel regression models. Conditioning on T1 status of the constructs, positive change in school mean collective efficacy predicted reduction in teacher-reported problem behaviour. Inversely, increase in teacher-reported problem behaviour predicted reduction in collective efficacy. Predictions were robust to controlling for key school and teacher characteristics, including self-perceived teaching competence. The results indicate that perceived teacher collective efficacy and student misconduct are inversely and reciprocally related. This relationship might serve as an important target for prevention of behaviour problems in schools.

Keywords: collective efficacy; problem behaviour; school; multilevel analysis

Introduction

In the endeavour to find more effective ways of dealing with behaviour problems in school, a better understanding of why there are marked variations in the problem behaviour rates across schools is required. Although a number of risk factors outside the school have been identified, such as ineffective parenting (Patterson, Reid, & Dishion, 1992) and low social competence (Sørlie, Hagen, & Ogden, 2008), less is known about how structural and social characteristics of the school context contribute to the development and prevention of behaviour problems among children and youth (Reynolds & Cuttance, 1996; Teddlie & Reynolds, 2000). Prior research indicates that modifiable aspects of the school context such as the policy and practice of the teachers as a group strongly shapes the culture of a school and that the teachers' degree of consensus of opinion significantly affects the students' outcomes (Goddard, Hoy, & Woolfolk Hoy, 2004; Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Hattie, 2009; Welsh, 2003). In the present study, the

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relevance of perceived teacher collective efficacy to problem behaviour in school was empirically tested. We hypothesized that collective efficacy is a stable school-level characteristic with significant impact on student misconduct. Schools with high collective efficacy were expected to have less student problem behaviour than schools with low collective efficacy, both concurrently and over time.

Definition and relevance of collective efficacy

The construct collective efficacy is rooted in social cognitive theory and derived from Bandura's construct self-efficacy (1997). He defines self-efficacy as people's beliefs in their own capability to perform in ways that give them control over events that affect their lives. The observation that individuals within a group do not function as social isolates immune to the influence of those around them inspired the shift from self-efficacy to collective efficacy. *Collective* efficacy refers to the beliefs of the members of a social group concerning the performance capability of a social system as a whole (Bandura, 1997). Social cognitive theory explains "that the control humans exercise over their lives through agentive actions is powerfully influenced by the strength of their efficacy beliefs" (Goddard & Goddard, 2001, p. 807). According to Bandura (1997), perceived efficacy is a key to how agencies operate because individuals and collectives more likely will aspire to choose activities and act in ways they believe they are capable of and that will be successful. He stated that, "changes in perceived efficacy result from cognitive processing of the diagnostic information that performances convey about capability rather than the performances per se" (Bandura, 1997, p. 81). Arising from cognitive and metacognitive processing, perceptions of efficacy are assumed to be important to individual as well as organizational behaviour and change, and collective efficacy is proposed to be a potent way of characterizing the social influence of a school (Goddard & Goddard, 2001). Collective and self-efficacy are strongly related but distinct constructs that vary significantly across groups (Goddard & Goddard, 2001; Goddard et al., 2004). There is, however, some evidence that collective efficacy in school is a construct with a more profound position than self-efficacy. For example, Goddard and Goddard (2001) found that all of the variance among schools in teacher self-efficacy was accounted for by collective efficacy when school-level variables such as portion of students with low socioeconomic status (SES), mean prior achievement in mathematics, school size, and minority concentration were controlled for.

According to Bandura (1997), collective efficacy is important to understand because (a) many of life's challenges are related to problems that require people to work together to solve them and (b) because some positive outcomes (e.g., high-performing schools, winning soccer games, high manufacturing productivity) can be achieved more effectively through collective than individual efforts. That is, the individuals who make up social groups (both formal and informal) such as families, organizations (e.g., schools, factories), neighbourhoods, and communities often must work together to solve problems and to gain good results. It is assumed that the choices and actions the individuals and organizations make (through the behavioural actions of group members) are significantly influenced by this perception of joint capability to meet challenges and attain desired goals (Bandura, 1997).

Applied to schools, collective efficacy can be defined as the teachers' shared beliefs about their combined capability to organize and execute courses of actions

required to produce student success (Goddard et al., 2004). High teacher collective efficacy is expected to imply mutual acceptance of challenging goals and tasks, strong organizational (agency) efforts, and a persistence that leads to better student performance (Bandura, 1997). It has been suggested that teacher collective efficacy probably is an important and stable school contextual factor that varies greatly among schools and a construct that has the potential to contribute to our understanding of the differential effects schools have on students' academic achievement (Goddard, 2001).

Goddard, Hoy, and Woolfolk Hoy (2000) put forward that the mutual beliefs of efficacy in a faculty will shape the normative culture of the school and subsequently have motivational and modulating effects both on the teachers' behaviour and perceived self-efficacy. This will in turn affect student performance. The greater the collective efficacy of a school, the stronger the normative pressure on the teachers to persist in their educational efforts (Goddard, 2001). In other words, it is argued that teacher collective efficacy should be described as a group-level attribute and a significant indicator of the normative environment of a school, influencing both the teachers' individual and joint efforts (i.e., motivation, actions, behaviour) and the achievement of the school (i.e., the student group academic performance). According to social cognitive theory, we find it reasonable however to expect that teacher collective efficacy has effects on multiple conditions in school and student outcomes, including student problem behaviour.

Four sources may be critical in the development of the teachers' collective efficacy perceptions (Bandura, 1997; Goddard et al., 2000). One is ''mastery experience'', which refers to that when teachers as a group experience success, this will contribute to the development of robust collective efficacy beliefs, while failure more likely will produce discouragement and undermine the mutual beliefs in efficacy. A second source is ''vicarious experience'', referring to that teachers' perception of collective efficacy does not build on direct experience alone but also on information about achievements and stories of success and failure in other schools. ''Social persuasion'' relates to the assumption that teachers' perception of efficacy may partly be influenced by well-reflected arguments and feedback from other professionals. The fourth source, ''affective state'', refers to the fact that organizations, just as individuals, have affective states and will interpret and react to stress, crises, and external pressure in more or less adapting and coping ways. Schools with lower collective efficacy beliefs may thus more likely react to such forces in dysfunctional ways, which in turn reinforces their basic disposition for failure (cf. negative cycle). In addition to these four sources, Goddard et al. (2000) suggested two more key elements interacting in the development of teacher collective efficacy: ''analysis of teaching tasks'' and ''assessment of teaching competence''. These sources discuss that teacher collective efficacy is probably also formed by the teachers' analysis of the difficulty of the teaching task (e.g., what is required to attain success, available resources, barriers and limitations to be overcome) and by judgments of the total teaching competency of their school.

Research on collective efficacy in schools

The majority of studies on efficacy in schools have focused on the relationship between teacher self-efficacy and how well students perform academically (Goddard & Goddard, 2001). Results indicate that teachers' beliefs in their own

instructional efficacy are important to student learning and academic performance (Ross, 1992; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Bandura (1993) showed that teacher collective efficacy also is significantly and positively related to school-level achievement. Results from later studies (Goddard, 2002; Goddard & Goddard, 2001; Goddard et al., 2004; Goddard & LoGerfo, 2007; Goddard & Skrla, 2006) support Bandura's conclusion that collective efficacy perceptions represent an important predictor of differences among schools in student-level achievement. Even when controlling for other potent and known variables influencing student achievement (e.g., student demographics and prior achievement) as well as teacher self-efficacy, this conclusion seems to hold true (Goddard, 2002).

We have not been able to identify research studies where the relationship between student problem behaviour and teacher collective efficacy explicitly has been investigated. However, some community-based studies indicate that higher collective efficacy among citizens in urban neighbourhoods deters youth crime and delinquency (Morenoff, Sampson, & Raudenbush, 2001; Sammons, Nuttall, Cuttance, & Thomas, 1995; Sampson, Raudenbush, & Earls, 1997). In fact, Sampson and colleagues (1997) found that collective efficacy functions to mediate much of the effect of community structure variables on youth crime such as residential stability, high prevalence of poverty, portion of young citizens, unemployment, single-parent families, and ethnic heterogeneity. Social cognitive theory perspectives together with prior research on respectively the relationship between collective efficacy and academic performance in schools and collective efficacy and crime in neighbourhoods led us to hypothesize that perceived teacher collective efficacy is systematically related to prevalence of problem behaviour within and among schools.

The present study aimed at testing the hypothesized relevance of perceived collective efficacy to problem behaviour in school. A key assumption is that collective efficacy has a motivational impact that resembles the motivational impact of self-efficacy beliefs as outlined in social cognitive theory (Bandura, 1997). Our assumption is that collective efficacy in a school will enhance teachers' beliefs that they can positively affect the behaviour of all their students and also influence what they choose to do as a group to meet misconduct. High perceived collective efficacy in a school may imply that the school staff will be more pro-active and persistent in their efforts to prevent and manage problematic behaviour and accept personal responsibility not only for student achievement but also for student behaviour. Furthermore, the staff in schools with high collective efficacy may be less discouraged by temporary setbacks, failures, or negative external influences. Low collective efficacy may imply more unclear behavioural expectations among the teachers, less uniform practice, less effort in the handling of school misbehaviour, and a propensity to give up.

More explicitly, we hypothesized that schools with high collective efficacy have less student problem behaviour than schools with low collective efficacy, both concurrently and across time. We expected the two phenomena not only to be correlated when measured at a given time point (cf. concurrent relationship) but also that collective efficacy would function as a predictor (protective factor) of behaviour problems in school over time (cf. temporal relationship). Additionally, we expected collective efficacy to be a stable school-level construct significantly contributing to explain between-school variance in student misconduct. To incorporate a dynamic perspective, we examined bidirectional associations between problem behaviour and

collective efficacy. Experiences of high levels of student problem behaviour might reduce the teachers' sense of collective efficacy. In a school, teachers observing increasing prevalence of student misconduct might attribute the increase to a lack of efficacy to deal with such problems. Observations of increasing behaviour problems thus might cause a reappraisal and downward adjustment of the collective efficacy beliefs. In sum, the following research questions were addressed:

- Do schools with higher perceived teacher collective efficacy scores have lower prevalence rates of student problem behaviour observed both in classrooms and in common school areas than do schools with lower scores on collective efficacy?
- Does perceived teacher collective efficacy predict prevalence of problem behaviour in schools over time when significant characteristics of the school, teacher, and student body are controlled for?
- Does problem behaviour in schools over time predict change in collective efficacy, when significant characteristics of the school, teacher, and student body are controlled for?

Method

This article builds on data collected from more than 1,000 teachers and principals in 48 Norwegian primary schools (Grades 1 to 7) participating in a longitudinal effectiveness study of the school-wide PALS (Norwegian acronym for Positive Behaviour, Support, and Interactions in School) intervention model. PALS is a culturally adapted and extended version of the Positive Behaviour Support model (PBS), developed in the USA (Sprague & Walker, 2005) and tested with promising outcomes in an earlier study (Sørlie & Ogden, 2007). The data were collected in two waves prior to the initiation of PALS. It is thus not likely that the intervention per se represented a confounder to the studied relationship.[1] Time 1 (T1) was at the end of the school year 2006–07 (spring '07) and Time 2 (T2) 6 months later, at the beginning of a new school year (2007–08).

Sample characteristics

School characteristics

Thirty-one of the 48 schools (65%) were considered as large schools (251–525 students), 12 (25%) were of medium size (151–250 students), and 5 (11%) were of small size (77–150 students). The distribution of small, medium, and large schools in this sample corresponds with the national distribution (Statistics Norway, 2009a). At T1, the student body for all schools counted 12,805 students in first to seventh grade (675 classes), of whom 6.4% had a minority background (mainly from Pakistan, India, Somalia, and Eastern Europe). According to the principals, 4.9% of the students received special education (based on individual needs according to law), 4.4% had been referred to the school educational services, and 1.7% had been referred to child welfare or mental health services during the school year 2006–07. Very few students had been expelled from school (0.10%), transferred to another school or class (0.13%), or reported to the police (0.06%) due to challenging behaviour.

Teacher characteristics

At baseline, the total school staff counted 1,814 persons, whereof 67% ($n = 1,211$) were teachers, while the rest were assistants, after-school personnel, and school administrators. Eight out of 10 teachers were females. Nationally, the male–female ratio in primary schools in Norway is 30:70 (Statistics Norway, 2009b). Most participants were middle-aged (76% older than 35 years) and experienced teachers (15% had worked less than 5 years in school). Few teachers had no formal training (5.7%). Twenty-one percent had additional special education training (minimum 1 year). About 67% of the teachers worked full time. Teachers who were in daily and direct contact with a group of students only were asked to complete questionnaires at the two data points. Teachers working with single students or those who were in long-term leave of absence (e.g., due to illness, maternity) were excluded as informants. The school leaders participated at T1 by filling out a ''principal questionnaire''. At the first assessment, 1,074 of 1,211 (89%) teachers participated, while 1,065 of 1,217 (87.5%) participated at the second assessment. All together, 824 (77%) of the T1 sample participated at T2, and 755 (70.4%) of the T2 sample participated at T1. The attrition is attributable to: (a) two schools withdrawing from the study prior to T2 (one due to temporary lack of capacity and one due to lack of motivation to continue as a research school), (b) change of school (workplace) between T1 and T2, (c) short-term leave of absence (e.g., illness), and (d) unspecified personal unwillingness to participate.

Measures

Collective efficacy in school

Perceived collective efficacy in school (key independent variable) was measured using teacher ratings on a 12-item revised and translated version (α T1, T2 = .95, .96) (Goddard, 2001) of the ''Collective Efficacy Scale'' (CES), developed by Goddard and colleagues (2000). The instrument was designed to assess the extent to which a faculty believes in its joint capability to positively influence student learning. The 12-item version had a 5-point scale ranging from 1 (*never*) to 5 (*very often*) and includes items such as, ''Teachers here are confident they will be able to motivate their students'' and ''Teachers in this school are able to get through to difficult students''.

Problem behaviour in school

The prevalence of school problem behaviour was assessed with two measures based on teacher observations (dependent variables). The measures ''Problem Behaviour in the School Environment Last Week'' (15 items, α T1, T2 = .81, .82) and ''Problem Behaviour in the Classroom Last Week'' (20 items, α T1, T2 = .86, .88) were developed by Grey and Sime (1989) and translated into Norwegian (Ogden, 1998). Initial factor analyses (principal axis, oblique rotation) revealed two reliable underlying subfactors for each measure; ''severe behaviour problems'' and ''less severe problem behaviour'' (T1, T2 α = .70 to .91). Unlike most other rating scales used to assess behaviour problems in schools, these scales do not focus on the individual student's behaviour (i.e., problem behaviour shown by a particular

student). Instead, the teachers were asked to report how many times they had observed negative behaviour incidences during a randomly selected week (i.e., the week prior to assessment), respectively in their classroom and in common school areas like hallways and playground. Item examples are: ''Running in corridors'' and ''Physical attacks on students''. A 5-point Likert scale is applied with scoring alternatives ranging from 1 (*not observed*) to 5 (*observed several times per day*). In prior studies, the scales have shown satisfactory psychometric properties (Kjøbli & Sørlie, 2008; Ogden, 1998; Sørlie & Ogden, 2007).

Self-perceived Teaching Competence was measured with a 30-item scale (α T1, T2 = .95, .96) developed for this study and used as an indicator of teacher self-efficacy. It was used as a covariate in the multilevel analyses. The participants were asked to rate how competent (skilful) she or he felt, using a scale ranging from 1 (*highly incapable*) to 7 (*highly capable*) on items like ''To get students to cooperate'', ''To stop student aggressive behaviour'', and ''Be present in the classroom when the lesson begins''.

Additional covariates were prior level of problem behaviour, prior level of perceived collective efficacy, school size, portion of special education students, and portion of ethnic minority students together with teacher gender, age, educational background, and years of school experience.

Procedures

A priori sample size calculation showed that a minimum of 45 schools should be included in the present study to achieve sufficient statistical power. Due to expected problems recruiting schools, a 50% oversampling rate was decided. A randomly selected sample of 52 a priori stratified schools in 17 strategically selected municipalities were carefully informed and invited as intervention research schools. Twenty-eight schools accepted to participate. School size was used as a stratification variable in that school size was expected to be related to variation in intervention outcomes and implementation quality. Schools with fewer than 100 students (one exception due to lack of local alternatives) and schools implementing other school- or community-wide programs were excluded as potential participants.

A matched sample of 44 schools located in the same municipalities were then invited as controls, whereof 20 accepted to participate. This gave a total sample of 48 schools. Prior to invitation, the control group was matched to the intervention group on school size and geographical location (distance to an intervention school). Geographical location was chosen as matching variable in order to minimize the threat of program contamination (i.e., neighbouring schools were not invited). There were two main reasons for schools refusing to participate: either lack of capacity or motivation due to the amount of extra work following a national school reform starting in 2007 or that the school had just finished a similar intervention or research project targeting behaviour problems in school.

Questionnaires were available both on the internet and on paper, and respondents were free to choose whichever format preferred. Written instructions were given in order to standardize the assessment procedures. Assent was obtained when filling in the questionnaire. To secure privacy, a randomly derived ID-code was used as an anonymous substitute for name or e-mail address. To facilitate the data collections, a research contact was elected in each school and trained by the research assistant at the Norwegian Center for Child Behavioral Development.

Statistical analyses

The present study has a hierarchical structure with individual teachers nested within schools. Mixed models were used to accommodate the hierarchical data structure, implying formulation of a variance structure to account for variation within and between schools. Initially, we examined the appropriate level of analysis for the independent and the key dependent variables. To guide the analytical decisions, a variance component model was run, and intraclass correlations (ICCs) 1 and 2 were estimated. The ICC1 reflects the correlation among teachers' reports from the same school. An ICC1 of 1 reflects perfect agreement, whereas an ICC1 of 0 reflects no agreement between teachers. The ICC1 was used as information for determining the appropriate level of analysis for the main dependent variables. If the ICC1 were low, a multilevel analysis would not be warranted. We also estimated the ICC2, which is a measure of the reliability of the group mean of raters (Raudenbush & Bryk, 2002). The ICC2 was used for assessing the reliability of schools' mean level of collective efficacy. The estimated two-level covariance matrix was based on information from all available reports.

Given that the above analyses supported aggregation of perceived collective efficacy to the school level, we then specified a residual-change model with reported problem behaviour in classroom, reported problem behaviour in common school areas, and collective efficacy at T2 as dependent variables. In the first block of analyses, we entered relevant school structural variables, including potential demographic confounding factors, self-perceived teaching competence, and T1 status of the dependent variable. In the second block of analyses, collective efficacy beliefs rated at T1 was entered. Finally, in the third block, change in collective efficacy from T1 to T2 was entered. We used change scores from T1 to T2 to avoid multicollinearity between independent variables. As an indicator of overall prediction, we computed the R-squared based on change in random effects, using a random intercept null model as the reference for calculation (see Hox, 2002, p. 64). To increase the interpretability of fixed effects, we converted nonstandardized regression coefficients to completely standardized regression coefficients, based on sample standard deviation for the relevant variables.

Results

Analysis of selective attrition

To test for selective attrition from T1 to T2, we regressed missing status (1 = missing at T2, 0 = participating at T2) on all relevant study variables. Missing at T2 was unrelated to problem behaviour and collective efficacy at T1. Increasing work experience, however, was associated with higher odds of attrition. Attrition in this context reflected that teachers with long experience were more likely to retire or be off due to age-related illness, and thus less likely to participate in Wave 2. Consistent with this finding, there was a high turnover of teachers from Wave 1 to Wave 2.

Variance components of study variables

When testing the appropriate level of analysis, separate matrixes were estimated for the within-school components and for the between-school components (Table 1).

Table 1. Estimated correlation matrix for main study variables.

	1.	2.	3.	4.	5.	6.
Between schools						
1. Collective Efficacy, T1	*.06*					
2. Collective Efficacy, T2	.94	*.07*				
3. Problem Behaviour School Environment, T1	−.73	−.72	*.01*			
4. Problem Behaviour School Environment, T2	−.64	−.78	.87	*.01*		
5. Problem Behaviour Classroom, T1	−.76	−.80	.97	.94	*.01*	
6. Problem Behaviour Classroom, T2	−.62	−.70	.82	.93	.91	*.01*
Within schools						
1. Collective Efficacy, T1	*.27*					
2. Collective Efficacy, T2	.64	*.28*				
3. Problem Behaviour School Environment, T1	−.18	−.21	*.16*			
4. Problem Behaviour School Environment, T2	−.16	−.23	.55	*.15*		
5. Problem Behaviour Classroom, T1	−.20	−.22	.75	.48	*.20*	
6. Problem Behaviour Classroom, T2	−.13	−.21	.46	.76	.51	*.19*
Mean	4.67	4.73	1.62	1.61	1.81	1.79
ICC1	.18	.19	.07	.07	.06	.06
ICC2	.77	.78	.54	.55	.49	.52

Note: Numbers (italics) on the diagonals are variances. Numbers below the diagonal are completely standardized correlations.

For collective efficacy to be considered an organizational factor, one would expect differences across schools and relatively high stability of ratings across time, at least over a 6-month period.

The diagonals of the matrix represent the estimated variance at each level, whereas the numbers below the diagonals represent completely standardized correlations. At the school level, collective efficacy and problem behaviour showed strong concurrent associations, as indicated by correlations in the range of .70 to .78. Schools with high collective efficacy showed lower levels of problem behaviour. A second notable finding is the between-school correlation between observed problem behaviour in class and on school-wide premises. The correlation was .97 at T1 and .93 at T2, suggesting that schools with high prevalence of problem behaviour in classrooms also experienced a high number of problems in the school yard, in hall ways, and other school areas.

The table also shows that between-school differences in collective efficacy were highly stable across time points. The school-level correlation was above .90 for collective efficacy and problem behaviour observed in classrooms, and .87 for problem behaviour in common school areas. Within school, the stability was somewhat lower, with correlations ranging from .64 to .51.

The strongest ICC2 was observed for collective efficacy, ranging from .77 to .78. The ICC2 values indicate that the mean of teacher-reported collective efficacy could act as a reliable school-level indicator. For the problem behaviour scores, the ICC1 and ICC2 were substantially lower, suggesting that these are phenomena that vary significantly within and between schools but that are not reliable indicators of school-level problems per se. Based on the ICCs, we decided to model problem behaviour as a multilevel construct with individual and school level-predictors.

Testing collective efficacy as predictor of problem behaviour in school: autoregressive models

To test if school collective efficacy predicted teacher reports of problem behaviour in classrooms and in common school areas at later stages, a two-level random intercepts regression model was tested. Table 2 shows the results for each of the dependent variables. Using problem behaviour observed in school environment at T2 as the dependent variable, the first row of Table 2 shows that there was a moderate to strong association between the problem behaviour in school scores at T1 as indicated by a positive regression coefficient of .52. The R-squared indicated that the first block explained about 75.8% of the variance at the school level. After controlling for the T1 levels of problem behaviour, change in collective efficacy was inversely related to problem behaviour at T2 ($B = -0.43, p < 0.05$). The R-squared indicated that after inclusion of change in collective efficacy almost all of the random school-level effects were accounted for. As the R-squared computed from random effects is unbounded, one should interpret this as a strong prediction but not literally as a 100% prediction.

A similar pattern was found using problem behaviour in classroom at T2 as the dependent variable, as shown in the middle rows of Table 2. Controlling for level of problem behaviour observed in the classroom context at T1 and level of collective efficacy at T1, change in collective efficacy had a statistically significant association with problem behaviour in the classroom context at T2 ($B = -0.36, p < 0.05$). The results indicated that teachers in schools with an increase in perceived collective efficacy also experienced a decrease in problem behaviour in classrooms as well as in common school areas.

In a supplementary analysis (not reported in Table 2), we also tested whether the impact of collective efficacy differed with respect to the severity of problem behaviour in school. There was no difference in the overall pattern of association, indicating that collective efficacy predicted both severe and less severe problems.

In line with the last research question, we also tested whether problem behaviour predicted collective efficacy at T2. The lower part of Table 2 shows the results with collective efficacy at T2 as dependent variable. Conditional on collective efficacy at T1 and problem behaviour in school environment at T1, change in observed school problem behaviour from T1 to T2 predicted change in collective efficacy ($B = -0.14, p < .001$).

Discussion

The aim of the present study was to empirically test the relevance of perceived teacher collective efficacy to problem behaviour in school. In this section, we summarize and specify the study results. Next, we discuss our main findings in relation to prior research and hypotheses of underlying mechanisms. Finally, we emphasize limits, strengths, and future implications of the study.

Collective efficacy: a stable indicator of the school culture

In the present study, we hypothesized that perceived teacher collective efficacy is (a) a significant indicator of the school culture (b) with significant impact on student misconduct both concurrently and over time. It was revealed that both

Table 2. Multilevel regression with Time 2 status of problem behaviour and collective efficacy in school as dependent variables.

					R-squared		
	Beta[a]	B[b]	*SE*	*p*	Between Schools	Within School	Combined
	DV: Problem Behaviour School Environment T2						
Block 1: Problem Behaviour School Environment T1	0.52	0.52	0.03	0.001	0.758	0.292	0.321
Block 2: School Mean Collective Efficacy T1	−0.07	−0.12	0.06	0.03	0.767	0.294	0.323
Block 3: Change in Mean Collective Efficacy T1-T2	−0.12	−0.43	0.12	0.001	1.00	0.293	0.336
	DV: Problem Behaviour Classroom T2						
Block 1: Problem Behaviour Classroom T1	0.50	0.51	0.03	0.001	0.62	0.281	0.303
Block 2: School Mean Collective Efficacy T1	−0.05	−0.10	0.07	0.16	0.63	0.282	0.305
Block 3: Change in Mean Collective Efficacy T1-T2	−0.09	−0.36	0.15	0.02	0.762	0.281	0.312
	DV: Collective Efficacy T2						
Block 1: Collective Efficacy T1	0.61	0.61	0.03	0.001	0.839	0.468	0.536
Block 2: Problem Behaviour School Environment T1	−0.13	−0.19	0.04	0.001	0.84	0.475	0.541
Block 3: Change in Problem Behaviour School Environment T1-T2	−0.10	−0.14	0.04	0.001	0.87	0.480	0.550

Note: [a]Completely standardized solution, based on sample estimate. [b]Coefficients at last step. Problem behaviour in classroom and school environment was regressed respectively on school and teacher characteristics, collective efficacy, and change in collective efficacy over time. DV = Dependent variable, Beta = standardized beta, B = unstandardized beta, *SE* = standard error.

perceived teacher collective efficacy and student problem behaviour are phenomena that vary greatly between schools. To be considered a sociocultural organization factor, one should expect both high across-time stability and between-school differences in teacher ratings of collective efficacy. Due to lack of prior studies with a longitudinal design, little is known about the stability of collective efficacy in schools. The data in the present study were consistent with the empirical expectations, indicating that perceived teacher collective efficacy is a significant school-level variable and probably a stable characteristic of a school's organizational culture.

The findings are in line with Goddard and colleagues' suggestions (Goddard et al., 2000) that once established collective efficacy is a stable school contextual variable that most likely requires substantial efforts to change. Even if the across-time stability was found high in the present study, the finding was perhaps not so surprising given the relatively short time span between T1 and T2 (6 months). On the other hand, the two data points were near to the end of one school year (06–07) and the beginning of the next (07–08) with a 2-months summer holiday in between and significant changes in the participating teacher sample due to a rather high turn-over. This might have contributed to lower the stability estimates. Before firm conclusions about the stability of collective efficacy beliefs in schools can be drawn, the results have to be confirmed in studies covering larger time spans.

Predictive relationships

One of the most important contributions from the study is the empirical establishment of a strong inverse, consistent, and reciprocal relationship across time between collective efficacy and problem behaviour in school. The relationship was evident both for problem behaviour observed by teachers in the classroom context and in common school areas. More explicitly, we found that in schools with increased collective efficacy from Time 1 to Time 2, teachers systematically reported lower prevalence of student behaviour problems across time (i.e., less problem behaviour reported at T2 than at T1). In schools with a negative change in the collective efficacy beliefs, the teachers reported higher problem behaviour rates at the second than at the first assessment. The impact of the teachers' collective efficacy beliefs were equally strong on high-frequent and less serious problem behaviour as on low-frequent and more serious types of school problem behaviour. However, we also found a reverse connection to be true: that increases in school prevalence of problem behaviour over time systematically related to decreases in perceived collective efficacy. The predictions were robust to controlling for key school characteristics (such as school size, portion of special education students, portion of students with ethnic minority background) and characteristics of the teachers (gender, age, educational background, years of school experience) and self-perceived teaching competence (rated at T1).

Previous studies have shown school-level associations between perceived teacher collective efficacy and academic achievement (Bandura, 1993; Goddard & Goddard, 2001; Goddard et al., 2004). This study extends earlier research by establishing a relationship to important non-academic school outcomes. Moreover, the study relates to prior research addressing effects of collective efficacy beliefs in neighbourhoods on youth criminal behaviour (Morenoff et al., 2001; Sammons et al., 1995; Sampson et al., 1997). Our findings extend this line of research by

demonstrating a relationship between perceived collective efficacy and child aggressive and noncompliant behaviour, a relationship observed in another context significant to children's and youth's social development and functioning, that is, the school context. Our study also relates to a newer school effectiveness theory that stresses the importance of taking into account the multilevel structure of education (Creemers & Kyriakides, 2006) by conducting multilevel analyses to empirically test if factors operating at different levels (e.g., collective efficacy at school, teacher level) might have a constant (direct or indirect) association with problem behaviour in school.

Mechanisms of cohesion: dynamics of change

The observed inverse association between perceived collective efficacy and behaviour problems in schools might reflect a number of processes. According to a social learning theoretical perspective, problem behaviour is largely a learned phenomenon (Bandura, 1978; Patterson, 1982). In social interactions with others (e.g., parents, teachers, friends), children learn that negative behaviour can be profitable by experiencing and observing social reinforcement of aggressive and norm- or rule-breaking behaviour. Behaviour that often or intermittently is acknowledged and/or experienced as rewarding over time has a tendency to be repeated, while behaviour that is not acknowledged or reinforced has a tendency to disappear (Skinner, 1953).

We find it reasonable to assume that teachers in schools with high teacher collective efficacy more consistently display a positive behaviour support practice than teachers in schools with lower perceived collective efficacy. Teachers in more collectively efficacious schools probably also are more persistent in their efforts to regulate problem behaviour and provide a more common (i.e., school-wide) and uniformly enforced set of school rules (e.g., consequent sanction of rule-breaking behaviour). In schools with low collective efficacy, reinforcement (unintended) of problem behaviour might result from differential standards of expected school behaviour among the teachers, a widespread lack of motivation to enforce regulation of student behaviour, and/or lack of skills in effective and proactive ways to prevent problem behaviour in school.

The reciprocal (bidirectional) relationship across time supports that teacher collective efficacy might function as a predictor (protective factor) of later levels of student problem behaviour. Furthermore, the study results suggest that school staffs with a strong sense that they constitute an effective team capable of bringing about expected positive student behaviour in fact also are more likely to generate socially well-adapted students and to prevent and handle antisocial and rule-breaking behaviour in more effective ways than school staffs with low confidence in their mutual capacity. On the other hand, the reciprocal association indicates that the level of problem behaviour in a school might affect the teachers' future perception of conjoint efficaciousness. If the teachers in a school experience high levels of student problem behaviour, they might see this as a collective defeat and interpret it as: "in our school we are not capable of handling difficult students", which in turn might affect their future actions and beliefs of what they can achieve.

The evidence of stable school differences in perceived collective efficacy and the mutual influence between school problem behaviour and collective efficacy might also reflect, as hypothesized by Bandura (1997), that schools can develop into either a positive or a negative cycle. In schools with low sense of efficacy, development of a

defeating and demoralizing cycle of failure is a conditional probability. Low teacher collective efficacy may lead to student problem behaviour, which in turn may lead to further declines in collective efficacy and escalating problem behaviour rates over time. A strong pressure for positive student behaviour and consequent reactions to norm- and rule-breaking behaviour may reverse such a negative cycle (Hoy & Sabo, 1998). A negative cycle may also be reversed if the principal is responsive to the teachers' concerns and encourages them to try new ideas, strategies, or evidence-based programs, and if the teachers more often encourage each other in the attempts to address risk factors of behavioural conduct. As the occurrence of problem behaviour declines, efficacy beliefs are enhanced, which then further enhances positive student behaviour and restrains problem behaviour, regardless of demographic characteristics of the school, the teacher group, and of the student body. New studies with appropriate designs to empirically test the proposed mechanisms and dynamics of change are needed.

Limits and strengths

A criticism toward previous school studies has been that researchers often have failed to measure key constructs at the appropriate unit of analysis and that results of the ordinary least square regression analyses frequently used can be compromised of aggregation bias, deflated standard errors, and heterogeneity of regression, which typically occur when individual-level variables are aggregated to group level (Creemers & Scheerens, 1994; Sammons et al., 1995). In the present study, we have tried to adapt to this criticism in the choice of key measures and analytic approach.

A critical issue in the present study is the reliability of the teachers' collective efficacy beliefs. In sum, reliability was confirmed in three different ways. First, as expected, there was a strong intra-school correlation in teachers' ratings of collective efficacy. This indicated high agreement between teachers in a school as concerns the collective efficacy. Second, the stability of collective efficacy was high across measurements. This indicates that collective efficacy reflects a relatively stable characteristic of the school. Third, collective efficacy related to student problem behaviour in expected and meaningful ways, in that the constructs were negatively related, and collective efficacy did not seem to predict within-school differences in problem behaviour in dimension. Additional indications supporting the existence of genuine school effects rather than methodological effects are: (1) Larger school-related portion of the variance was found for collective efficacy than for the two measures of problem behaviour; (2) the problem behaviour measures were strongly correlated, both currently and temporarily (i.e., indicating a homogeneous school problem dimension); (3) considerably stronger correlation over time was found for perceived collective efficacy than for problem behaviour at school level; (4) while both were found less stable at teacher level.

Other strengths of the study are the rather large number of schools, repeated measures over time, the aspect of change (cf. reciprocity), the possibility to explore the effects of collective efficacy on student problem behaviour both at the teacher and school level over time, and that perceived collective efficacy was not only studied as a function of aggregated scores of teacher self-efficacy. An additional strength is that the collective effects were controlled for possibly confounding school and teacher characteristics, including the influence of self-perceived teacher competence.

However, despite the evidence of a strong relationship between school problem behaviour and perceived teacher collective efficacy across time, it should be emphasized that our conclusions relate to cross-level main effects only. The relatively short time span between measurements and the observed reciprocity between the two phenomena give reason to stress that the deterrent influence of perceived teacher collective efficacy on problem behaviour in school is tentative only. Another limit is that the potential effects of teacher collective efficacy on individual student behaviour were not explored in this study.

Implications

Assuming that the stable and reciprocal relationships between problem behaviour and perceived collective efficacy in schools are replicable, it appears that promoting and building strong positive collective capability perceptions in school staffs is a highly potent input factor in future efforts to prevent student problem behaviour – as well as a way to improve student achievement (Bandura, 1993; Goddard et al., 2004). Such an approach would be in accordance with Gottfredson and colleagues' (2005) contention that efforts to prevent behaviour problems and to bring about change in child misconduct in the absence of attention to school policies contributing to high levels of misbehaviour may be unproductive or counterproductive.

The study results substantiate the relevance of three possible intervention approaches: (a) efforts to raise the teachers' collective efficacy beliefs, (b) efforts to reduce the feedback loop from student problem behaviour to collective efficacy (e.g., promoting re-attribution), and (c) school-wide efforts to prevent and handle student problem behaviour placing strong emphasis on the enhancement of a positive and predictable school climate by using systematic and explicit strategies to empower faculty collectiveness and conjoint practice. Even if high teacher collective efficacy might contribute significantly to deter the level of problem behaviour in schools, it is not a ''panacea''. In addition to individual-level processes and family factors, there might be other school-related factors not measured in the present study that contribute to school-level variation in misconduct.

There is a need for studies that more thoroughly explore the longitudinal stability of collective efficacy, and in line with Creemers and Kyriakides' (2006) dynamic school effectiveness model, we suggest that the effects of collective efficacy on problem behaviour at school level as well as on individual students should be studied using a three-level approach. To conclude whether there is a causal relationship between student outcomes and collective efficacy beliefs, experimental intervention studies controlling for relevant confounders are however essential. Likewise, there is a need for research that more explicitly focuses on underlying mechanisms as concerns the observed relationship between teacher collective efficacy, school academic achievement, and school problem behaviour. Moreover, initiatives should be taken to explore the potential relevance of teacher collective efficacy to other significant student outcomes like social competence and school drop-out.

Note

1. Description of the PALS model will therefore not be given in this article, but relevant information about core components, methods, and implementation strategy are given in Sørlie and Ogden (2007).

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