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Preventing Problem Behavior in School through School-Wide Staff Empowerment: Intervention Outcomes

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Abstract

The aim of this study was to examine the effects of the universal "Preventing Problem Behavior in School" (PPBS) intervention on both establishing high-quality learning environments and increasing the use of positive teaching strategies to prevent student problem behavior. PPBS was developed and piloted in Norway as an abbreviated version of the School-Wide Positive Behavior Support Model (SWPBS) and includes a four-day in-service training program for a school's entire staff. Seventeen primary schools (Grades 1-7) implementing PPBS and 20 control schools engaging in "practice as usual" were compared using a three-wave measurement design. Multilevel analyses based on staff ratings indicated significant positive main effects of PPBS in the moderate range on the level of school behavior problems, positive behavior management, and perceived staff efficacy. Moreover, school size, implementation quality, proportion of unqualified staff members, and program training dosage moderated the intervention outcomes. Student ratings did not, however, support the staff ratings. The results are discussed in relation to the outcomes of the full-scale SWPBS model, meta-analyses of school-wide interventions, and measurement issues. Study limitations, strengths, practical implications, and future directions are highlighted.

Keywords

problem behavior, school-wide intervention, multi-level analysis, non-randomized experiment

1. Introduction

Aggressive and disruptive behaviors such as bullying, fighting, and arguing, along with a cluster of activities that disturb learning such as unrest, talking out loud and "mental absence" during lessons, have been rated by Norwegian school leaders as among the greatest challenges in today's schools (e.g., Ogden, Sørlie, Arnesen, & Meek-Hansen, 2012). Problematic student behavior reduces the quality of the learning environment, inhibits positive social relationships with classmates and teachers, and reduces the time teachers spend teaching, which in turn negatively affects students' academic performance, school attachment, and social well-being (e.g., Houts, Caspi, Pianta, Arseneault, & Moffitt, 2010; Simonsen et al., 2012). Moreover, there is ample empirical evidence that children showing high levels of externalizing behavior problems in primary school are at significant risk of

developing a persistent antisocial and maladaptive path, particularly if they have additional academic problems (e.g., Mytton, DiGuiseppi, Gough, & Logan, 2007; Duncan & Magnuson, 2011).

Research also indicates that teachers' beliefs in both their own efficacy (self-efficacy) and their collective efficacy are positively related to student learning and teaching performance while negatively and bi-directionally related to problematic student behavior (e.g., Bandura, 1997; Goddard, 2002; Klassen & Tze, 2014; Skaalvik & Skaalvik, 2007; Sørlie & Torsheim, 2011). It has been observed that teachers who express lower self-efficacy are less tolerant of problem behavior, more likely to use punitive and reactive discipline, and more likely to exclude challenging students (Jordan & Stanovich, 2003). The ability of teachers to organize classrooms and to manage student behavior is related not only to student outcomes but also to high perceived teacher efficacy and perseverance (Gibbs & Powell, 2011). Therefore, the ability of school-based interventions to increase teachers' efficacy perceptions should be an important indicator of effective practice in the prevention and reduction of student problem behavior.

For more than 40 years, Norway's primary school-political objective has been to fully include all students and to reduce the use of segregated special education. But between 2007 and 2011, training in segregated settings increased by 30% and students with externalizing behavior problems have proven particularly difficult to include (Ogden, 2014). Although the level of problem behavior now appears to be declining slightly (e.g., Sørlie & Ogden, 2014; Wendelborg, 2011), more effective, systematic, inclusive, and preventive school interventions are necessary (e.g., NOU 2015, p. 2). Numerous intervention models and treatment programs have been validated by research, few of them have, however, been widely disseminated to organizations and users eligible for those interventions (Glasgow, 2009). In search of new initiatives to successfully mainstream special needs students, in general, and students with emotional and behavioral difficulties, in particular, the Norwegian Center for Child Behavioral Development (NCCBD) found that the School-Wide Positive Behavior Support (SWPBS) model matched the principles of inclusive education and a promising approach to the prevention of student misconduct.

Concerns about the underutilization of empirically supported interventions and their modest ability to reach potential target groups have been expressed by several scholars (e.g., Fixsen, Naoom, Blasé, Friedman, & Wallace, 2005; Palinkas & Soydan, 2012). In a recent article, Rotherham-Borus, Swendeman and Chorpita (2012) claimed that many of the existing intervention programs may "overserve" the majority of users and that users' essential needs could be met by alternatives that are both less time-consuming and less expensive. The large-scale implementation of evidence-based or empirically supported interventions in schools—such as the SWPBS model—is primarily focused on preventing student problem behavior, and this model may be both simplified and more broadly adapted in less time and at a lower cost. Since 2002, the SWPBS model (called PALS in Norway) has been implemented in 215 of 2,886 Norwegian elementary and secondary schools (7.5%). Thus, although there is a greater potential for full-scale implementation of the SWPBS/N-PALS model, some schools

can most likely manage with a model that is less comprehensive but nevertheless beneficial to both staff and students. With reference to Rotheram-Borus et al. (2012); Jones and Bouffard (2012, p. 13) have argued that such innovations have "rarely replaced the more intensive options but instead reached a wider population, particularly those who would not traditionally have been served". To investigate whether an abbreviated version of the N-PALS model could be sufficient for some schools, the universal "*Preventing Problem Behavior in School*" (PPBS) intervention was developed at NCCBD (Arnesen & Meek-Hansen, 2011) and tested in a non-randomized experiment. In this paper, we present results of the effects of the PPBS intervention for both staff and students.

1.1 School-Wide Interventions

Unlike individually oriented approaches to misconduct and academic problems, which restrict their focus to small groups or individual students at high to moderate risk of conduct problems, school-wide interventions such as the SWPBS/N-PALS model typically have a universal focus and prioritize on changing the social and organizational aspects of entire schools to promote positive student outcomes and prevent problem behavior. These interventions also differ from interventions that focus solely on classrooms, for example, classroom management, in which the focus is restricted to what takes place in class. Several meta-analyses of school-based interventions emphasize the relevance and preventive effects of universal school-wide approaches (e.g., Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Weare & Nind, 2011), of which SWPBS has the greatest catchment area.

More specifically, the SWPBS/N-PALS model can be described as a structured and comprehensive (but flexible) system-level approach not only to prevent and reduce student problem behavior but also to promote a positive and inclusive school environment that can facilitate teaching, optimal learning, and psycho-social functioning for all students (Arnesen & Meek-Hansen, 2011). It focuses on systematic, supportive, collective (school-wide), proactive, and inclusive practices (Ogden et al., 2012; Sugai & Horner, 2009). The *full-scale* intervention model has a multilevel structure and takes 3-5 years to fully implement. Based on assessments of student risk levels and the school's needs, the staff successively implements a continuum of evidence-based interventions at the universal level (targeting all students and staff), the selected level, and the indicated level. Interventions at the selected level are designed for the 5-10% of students at moderate risk of conduct problems and school failure who barely respond to interventions at the universal level (Muscott, Mann, & LeBrun, 2008). The indicated level targets the 1-5% of high-risk students who require more intensive and comprehensive interventions than the interventions offered at the first two levels.

The core components of the full-scale SWPBS/N-PALS model are as follows: 1) school-wide positive behavior support strategies, including the teaching of 3-5 positively formulated school rules and systematic praise and encouragement of positive behavior; 2) monitoring of student behavior in all areas of the school using a Web-based assessment and evaluation tool (School-Wide-Information System, SWIS); 3) collectively applied school-wide corrections of problem behavior with mild and immediate consequences (response cost); 4) time-limited small-group instruction or training in

academic or social topics; 5) individually tailored interventions and support plans; 6) classroom management skills for teachers; and 7) parent information and collaboration strategies. The core components, basic training, and implementation features are the same in the USA and Norwegian versions. Except for minor adaptations of the training materials, no changes were made to the original model when SWPBS was transported to the Norwegian context (for more details, see Arnesen, Meek-Hansen, Ogden, & Sørlie, 2014; Ogden et al., 2012).

1.2 Research on SWPBS

Numerous studies of the effects and challenges of the implementation of the SWPBS model have been conducted, primarily in the USA. Overall, the findings after one to two years of implementation indicate several benefits: a) reduced office-discipline referrals, suspensions, tardiness, aggression, and concentration problems (e.g., Bradshaw, Mitchell, & Leaf, 2010; Bradshaw, Pas, Goldweber, Rosenberg, & Leaf, 2012; McIntosh, Bennet, & Price, 2011; Waasdorp, Bradshaw, & Leaf, 2012); b) increased prosocial behavior and emotional regulation (e.g., Bradshaw et al., 2012); and c) improved school climate, as indicated by positive teacher-student relations, student relations and increased school safety (e.g., Backenson, 2012), particularly in schools with high implementation-quality scores (e.g., Dix, Slee, Lawson, & Keeves, 2012).

With respect to the outcomes of the full-scale SWPBS/N-PALS model in Norway, research findings indicate moderate to substantial positive effects on a) the occurrence of severe and moderate problem behaviors within and outside classrooms after two years (Sørlie & Ogden, 2007) and three years of implementation, respectively (Sørlie & Ogden, 2015); b) social skills and academic performance in students with immigrant backgrounds (Ogden, Sørlie, & Hagen, 2007); c) classroom climate； d) inclusion (Sørlie & Ogden, 2015). Additionally, recent analyses have revealed positive effects on school employees'； e) perceived self-efficacy； f) collective efficacy, and g) behavior-management practices (Sørlie, Ogden, & Olseth, in review).

Two user surveys support the results of the effectiveness studies. In one study, 90% of all principals with one to nine years of experience with N-PALS expressed great satisfaction and reported positive outcomes (Sørlie, Ogden, Arnesen, Olseth, & Meek-Hansen, 2014) although some principals reported that N-PALS was a comprehensive and demanding intervention model to implement. The second survey showed that compared with schools implementing other evidence-based programs (e.g., the Olweus bullying prevention program; Olweus & Limber, 2010), the N-PALS schools expressed significantly higher user satisfaction (Eriksen, Hegna, Bakke, & Lyng, 2014).

Valid evidence of positive and multiform effects of the SWPBS model is demonstrated across countries and continents. On the other hand, limited diffusion, and feedback indicating that the model is too comprehensive or demanding for some schools inspired the development and testing of a less-exigent version (PPBS).

1.3 The PPBS Intervention Versus the N-PALS Model

The PPBS intervention was based on the same principles as the full-scale N-PALS model. But, unlike the three-level N-PALS model, the abbreviated PPBS intervention focused only on the universal level including school-wide positive behavior support strategies with 3-5 positively formulated expectations, systematic praise and encouragement of positive behavior, and collectively applied school-wide corrections of problem behavior. More precisely, the key features were 1) a school-wide approach and differentiated evidence-based practices, 2) systematic positive reinforcement of expected pro-social behavior, 3) corrections (mild consequences) following problem behavior, 4) good directions, and 5) establishing a functional support system. The PPBS included a 30-hour in-service training program for school staffs that lasted four full days (two in the autumn and two during the spring semester) and was locally organized with 1-7 schools per site. The entire school staff was included in the program training (i.e., the principal, teachers, assistants, special education teachers, social workers, after-school personnel, and representatives of the school's psychological service), which was provided free of charge. The participants were provided with an intervention manual, and all of the training materials could be downloaded from the Internet. The standardized training sessions were led by the program developers and were composed of a combination of lectures, demonstrations, training, coaching and "homework".

By comparison, in the full-scale version (N-PALS), an internal school-implementation team (5-7 persons) is locally trained by a certified coach for 40 hours over two years, followed by two one-day booster sessions per year. This team is responsible for the developmental work at their school and for informing and training their colleagues in key model features. In addition, unlike in the full-scale version, the PPBS schools did not have access to the SWIS component or received external supervision, training in interventions relevant for students at risk, or any technical support. Different from N-PALS schools, the PPBS schools did not use systematic data on discipline referrals or functional behavioral assessments to determine appropriate interventions. Nor did they have access to either measures of the implementation quality or Web-based information to evaluate their outcomes and progress.

1.4 Research Questions

The research questions of the current study were: a) To what extent does the PPBS intervention affect the prevalence of student problem behavior and the classroom climate (as rated by staff and students) over time?; b) To what extent does the PPBS intervention affect the school staff's disciplining practices (i.e., use of positive behavior supports and behavioral corrections as rated by staff and students) and their perceived self-efficacy and collective efficacy?; c) To what degree are the intervention outcomes moderated by school size, proportion of unqualified staff, program training dosage, and implementation quality?

2. Method

Intervention outcomes were evaluated using questionnaire data from principals, school staffs, and students in a three-wave, nonrandomized experiment in which 17 intervention schools and 20 control schools continuing their "regular practice" participated. An open-cohort design was applied, enabling the enrollment of new staff and students at each measure point. Participants who changed (or left) schools or began junior high school during the study were not followed.

2.1 Participants

2.1.1 School and Student Characteristics

The mean school size was 338 students (varying from 89 to 780). At baseline (T1), there were 11,367 students in 1st to 7th grades (PPBS=5,606, 49% boys; control=5,761, 52% boys), of whom 12% had minority backgrounds. Approximately 5% received special education services (national level 5.5%), 4% had been referred to educational-psychological services, and fewer than 2% had been referred to child-welfare or mental-health services. Few students had been expelled from school (0.3%), transferred to another school or class (0.2%), or reported to the police (0.2%) because of their challenging behavior.

2.1.2 Staff Characteristics

At baseline, there were 675 employees in the intervention group and 658 in the control group. Seventy-three percent were employed as teachers. The rest of the staff members were assistants, after-school personnel and school administrators. Eighty percent were female, and most were middle-aged (73% older than 35 years). The teachers were experienced (only 19% had worked at the school for fewer than five years) and well educated. Four percent had no formal training, and 11% had special education training. Seventy percent worked full time.

2.1.3 Baseline Comparisons

Unconditional analysis at baseline showed that the control group reported significantly higher perceived collective efficacy than the PPBS group, $F(1,957)=23.81$, $p<0.05$, whereas the level of problem behavior occurring outside the classroom, $F(1,899)=10.87$, $p<0.05$, school size, $F(1,972)=150.49$, $p<0.05$, and number of unqualified staff, $F(1,972)=44.53$, $p<0.05$, were higher in the PPBS group. The baseline comparisons indicated that initially, the situation in the intervention schools was more challenging than in the control schools. Nevertheless, the group differences were in the small-to-moderate range, and by controlling for initial variation on observed variables, the outcome analyses allowed for meaningful group comparisons.

2.2 Procedures

The schools were recruited from two strategically selected pools of municipalities. Schools actively implementing other school- or community-wide programs, such as the Olweus bullying-prevention program (Olweus & Limber, 2010) or the TIBR program (Kjøbli & Sørlie, 2008), were excluded as potential participants to avoid program contamination. Recruitment into the intervention group was conducted by an open invitation to all elementary schools in Norway's northern and southern

municipalities. The eligible sample was composed of 48 schools, of which 17 agreed to participate. A random sample of 44 of the 126 eligible schools located in western municipalities was invited as controls; 20 agreed to participate. Comparing the refusing and participating schools by reference to nationally standardized achievement scores (math, reading and English performance, 5th grade) and data from 7th graders related to school learning environments (annual Student Survey) revealed no group differences.

Data for the current study were collected in three waves: Time-point one (T1, baseline, staff only) was at the end of the school year prior to the implementation of the PPBS. Time-point two (T2) was six months later, at the beginning of a new school year and close to the initiation of the intervention. Time-point three (T3, post-test) was at the end of the school year and four months after the program training; we expected the schools to require some time to implement the intervention. Questionnaires were completed during ordinary class or working time and were available both on the Internet and on paper. Written instructions were presented to standardize the assessment procedures, and consent from both staff and parents were obtained in advance. Only staff who were in daily and direct contact with a group of students were asked to participate, resulting in an actual sample of N=1,266. The school leaders participated at T1 only by completing a questionnaire about their schools' structural and organizational characteristics.

2.3 Measures

2.3.1 Problem Behavior

Student problem behavior was measured by staff ratings using two British scales (Grey & Sime, 1989) "Problem Behavior in the School Environment" (15 items) and "Problem Behavior in the Classroom" (20 items). The staff reported how many times they had observed negative incidents inside and outside the classroom during the week prior to assessment (i.e., a random week). Item examples include "Running in corridors" and "Physical attacks on students". A 5-point Likert scale was applied, with scores ranging from 1 (*not observed*) to 5 (*observed several times per day*). The scales have shown satisfactory psychometric properties in prior Norwegian studies (e.g., Sørlie & Ogden, 2007; Kjøbli & Sørlie, 2008). The Cronbach's alphas in the present study ranged from α .81 to .88 across assessment points. Factor analysis revealed two underlying sub-factors for each measure: "*Severe problem behavior*" (6 and 12 items) and "*Moderate problem behavior*" (9 and 8 items). The sub-factors had acceptable internal reliability (α=.72 to .89), except for "Severe problem behavior in common areas" (α=.43 to .48).

2.3.2 Classroom Climate

The "Classroom Environment Scale" (CES; Moos & Trickett, 1974) was used by staff members to assess the quality of the general learning conditions in class. The CES is a 14-item scale (α ranged from .82 to .83) that includes statements such as "The students in this class help each other" and "Usually, the students finish ordered working tasks". An equivalent 22-item student scale (Sørlie & Nordahl, 1998) assessed the students' perceptions of the psychosocial learning conditions in their

classrooms (α ranged from .86 to .88). A 4-point rating scale (1=*does not fit*, 4=*fits completely*) was used. Satisfactory psychometric properties have been shown in prior Norwegian studies (e.g., Sørlie & Ogden, 2007, 2015; Sørlie & Nordahl, 1998).

2.3.3 Collective Efficacy and Self-Efficacy in Schools

Perceived staff collective efficacy was measured with a 12-item scale developed by Goddard (2002). Cronbach's alpha ranged from .95 to .96 across assessment points in the current study. Items were rated on a 5-point scale ranging from 1 (*never*) to 5 (*very often*) and included statements such as "Teachers here are confident that they will be able to motivate their students" and "Teachers in this school are able to get through to difficult students". **S**elf-efficacy *was* measured with a 30-item scale (Sørlie & Ogden, 2015; α ranged from .95 to .96). The employees rated how competent they felt in managing and preventing problem behavior and promoting academic skills. The rating scale ranged from 1 (*Highly incapable*) to 7 (*Highly capable*) on items such as "To stop aggressive student behavior", and "To be present in the classroom when the lesson begins". Factor analysis unveiled the expected two-factor structure: "Ability to prevent problem behavior" (9 items, α from .86 to .88) and "Ability to bring about student learning" (21 items, α from .94 to .95).

2.3.4 Behavior Management

Strategies to promote prosocial behavior and manage problem behavior were assessed using a 17-item staff scale and an equivalent 23-item student scale (Sørlie & Ogden, 2015). For both scales, factor analysis revealed a two-factor structure: "Positive behavior support" (staff: 9 items, α from .74 to .76; students: 16 items, α from .88 to .91) and "Behavioral correction" (staff: 8 items, α from .61 to .63; students: 5 items, α from .53 to .64). The staff reported how many times they had used strategies such as "Praised and encouraged expected positive student behavior" and "Deliberately ignored undesirable behavior" during the previous month on a scale ranging from 0 (*0 times*) to 6 (*more than 20 times*). The students reported how often in the previous month they had experienced teacher practices such as "The teacher praises me when I do as she/he says during lessons" and "The teacher says what will happen if we violate the rules" (1=*never*, 4=*usually*).

2.3.5 Implementation Quality

Implementation quality was measured in the PPBS schools at post-test with a 15-item short version (α=.74) of "The Effective Behavior Support Self-assessment Survey" (EBS-SAS), developed by Sugai, Horner, and Todd (2009). The EBS-SAS has shown satisfactory psychometric qualities in several prior evaluation studies (e.g., Bradshaw et al., 2012; Sørlie & Ogden, 2015). The staff was asked how various statements (e.g., "Expected student behavior is consequently encouraged and positively acknowledged", "A few (3-5) school rules are positively and clearly defined", "Problem behavior is consistently addressed with mild and predictable negative consequences", and "The staff members who have inspection actively supervise the students in all arenas outside the classroom context") corresponded with the situation at their schools on a 3-point scale (1=*fits completely*, 3=*does not fit*).

2.3.6 Dosage

PPBS training dosage refers to the intervention school's mean training attendance score. The score was calculated on each staff member's participation across the four training days and was aggregated at the school level. The correlation between implementation quality and dosage was significant, but in the moderate range with r=.24 ($p<.01$).

2.4 Analytic Strategy

A longitudinal, multilevel model was used to examine differences in change over time between the control and intervention groups. The Mixed Linear procedure in IBM SPSS statistics (version 20) was used to accommodate the hierarchical data structure (level 1, T1, T2, T3; level 2, staff or students; level 3, schools). The control group was established as the reference group and T1 as the reference time point, whereas T2 and T3 were included in the analyses. Because of the nonrandomized design, selection bias may represent a threat to internal validity; i.e., it can be questioned whether observed changes in outcome variables over time are caused by the intervention (Shadish, Cook, & Campbell, 2002). To reduce initial school variance, school size, portion of unqualified staff, proportion of special education students, and proportion of students with foreign backgrounds were included as covariates at the school level. To reduce multicollinearity, all covariates were centered (Graham, 2003), and non-normally distributed variables were log-transformed. An unstructured residual covariance structure was chosen for the level 1 residuals, whereas at the school level, random intercepts were estimated using a scaled-identity covariance structure. Missing data were estimated using the direct-likelihood method assuming a missing at-random mechanism (MAR, see below) (Beunckens, Molenbreghs, & Kenward, 2005). Main effects were investigated by adding a Time x Group interaction to the models. Moderating effects were investigated by adding the three-way interaction terms Time x Group x School size and Time x Group x Portion of unqualified staff or the two-way interactions Time x Dosage and Time x Implementation quality. In all of the analyses, the lower-order terms were included to ensure balanced regressions equations. One PPBS school had an exceptionally low mean training dosage (32.3%), and two control schools resigned from the study prior to T2 and T3 because of task overload. However, all of the schools were included in the analyses in accordance with the intention-to-treat (ITT) principle. Effect sizes (Cohen's d) were calculated according to Feingold's (2013) recommendations.

3. Result

3.1 Attrition

At the time of the first assessment, 77% of staff members in the PPBS and control schools were participating. Overall, 1,308 staff members participated at one or more time points. The pre-post attrition was attributable to a) two schools withdrawing from the study (n=89), b) change of workplace (n=246), c) short-term leaves of absence (n=84), d) no longer working with groups of students (n=71), and e) unwillingness to participate (n=36). Comparing the participants at baseline with those missing at post-test revealed no differences in age, gender or class level. Fewer in the missing group were trained

as teachers compared with those who participated, F (1,997)=21.97, p<0.01, and more participants in the missing group were less experienced, F(1,993)=-2.58, p<0.01. Overall, there were 6,172 students (PPBS=3,087, control=3,085) in grades 4-7; the parents of 14% of those students did not allow them to participate; 9.9% never returned the consent form.

Evenly distributed across grades, 4,687 students contributed to the study at pre-test and 4,630 contributed at post-test. The response rates were high (95.5% and 91.5%). By post-test, 221 students were missing because two control schools withdrew from the study, 102 were new students, 117 had changed schools, and consent was withdrawn for four students. Except for somewhat lower pre-test ratings of the teacher's use of positive behavior support among those missing at post-test (M=54.83 compared with 55.91, t=-2.27, p=.023), no significant differences between the missing and participating students were identified.

In conclusion, attrition in this study was modest and reflects its open-cohort design, two schools dropping out, normal fluctuations in the staff and student populations, and few differences between participants and non-participants were identified. Accordingly, missing data were estimated using the direct-likelihood method (Beunckens et al., 2005).

3.2 Indications of Main Intervention Effects

To simplify the results of multilevel analysis, which are often difficult to read, the estimates of the fixed effects in Table 1 are shown as group differences in change across measure points. Effect sizes (Cohen's *d*) with 95% confidence intervals are specified. A positive *d* signifies a positive (desired) intervention effect. The intervention effects were in the small to modest range, with *d* from .10 to .41.

Table 1. Main Effects of PPBS. Change Across Time within and between the PPBS and Control Group. Fixed Effects Estimates and Effect sizes (Cohen's d) with Confidence Intervals

Change within groups		
	PPBS	Control
Variable	Pre -post	Pre -post
Problem behavior on common areas	-2.95	-0.42
- Moderate problem behavior	-2.43	-0.20
- Serious problem behavior	-0.50	-0.21
Problem behavior in classroom	-2.98	-1.81
- Moderate problem behavior	-2.15	-1.40
- Serious problem behavior	-0.81	-0.35
Classroom climate (S)	0.70	0.30
Classroom climate (St)	-1.78	-2.12
Collective efficacy	1.25	0.46
Self-efficacy	3.06	1.22

Positive behavior support (S)	1.95	-0.95
Positive behavior support (St)	-0.29	-0.11
Behavioral correction (S)	-0.97	-0.66
Behavioral correction (St)	-0.01	-0.06

Difference between groups			
		ES	
Pre -post	Sign.	*d*	*d* 95% CIΔ
-2.50	.000	0.38	0.375- 0.385
-2.23	.000	0.41	0.405 - 0.415
-0.28	.020	0.18	0.175 - 0.185
-1.17	.058	0.13	0.125 - 0.135
-0.75	.121	0.11	0.105 - 0.115
-0.46	.037	0.15	0.145 - 0.155
0.40	.288	0.08	0.066 - 0.074
0.34	.172	0.04	0.039 – 0.040
0.79	.063	0.12	0.124 - 0.116
1.84	.062	0.10	0.104 - 0.096
2.90	.000	0.41	0.414 - 0.406
-0.18	.570	0.02	0.019 – 0.021
-0.31	.163	0.09	0.094 - 0.086
0.05	.681	0.02	0.019 – 0.021

Note. Estimates (enhanced values) based on Satterwaite's (1947) approximate degrees of freedom. All covariates and the Group x Time interaction are accounted for in the estimates of change. S=staff, St=student.

Indications of a main effect of the PPBS intervention (i.e., effect for all schools) were observed in staff-reported problem behavior in common school areas (T1-T3 diff=-2.50, *p*=.000). There was a decrease across time in both groups (PPBS T1-T3 change=-2.95, control T1-T3 change=-0.42); however, a significantly greater reduction occurred in the intervention group than in the control group. This effect was true both for severe (T1-T3 diff=-0.28, p=.020) and moderate problem behaviors (T1-T3 diff=-2.23, p=.000). The prevalence of problem behaviors observed in the classrooms was also substantially reduced during the intervention period (PPBS T1-T3 change=-2.98, control T1-T3 change=-1.81), and indications of a marginally significant PPBS effect were found (T1-T3 diff=-1.17, *p*=.058). This reduction across time was primarily related to reduced occurrence of severe problem behaviors (T1-T3 diff=-0.46, *p*=.037). No main effect on the classroom climate was found, either as

rated by staff or as rated by students.

That notwithstanding, the multilevel analyses based on staff reports indicated a significant main effect on disciplinary practices in the schools. The staff at the PPBS schools increased the number of positive behavior supports from baseline to post-test more than did their colleagues in the control schools (T1-T3 diff=2.90, p=.000). Although there was a general decrease in the use of behavioral corrections, no significant group difference was found. Likewise, student ratings of the teachers' behavior management showed no significant group differences. However, the analysis indicated a marginally significant main effect on collective efficacy (T1-T3 diff=0.79, p=.063). A more positive change was registered in the intervention schools (T1-T3 change=1.25) than in the control schools (T1-T3 change=0.46. During the study period, there was also a general increase in perceived self-efficacy (PPBS T1-T3 change=3.06, control T1-T3 change=1.22); however, the analysis only indicated a marginally significant more positive trend in the PPBS group than in the control group (T1-T3 diff=1.84, p=.062).

3.3 Indications of Differential Effects

Parameter estimates from the additional moderation analyses are shown in Table 2. School size and program-training dosage significantly moderated the intervention effects on three outcome variables, and the portion of unqualified staff and implementation quality moderated the effects on two outcome variables. No moderation effects were found on student-rated variables.

To investigate the differential effects of PPBS more closely, we divided the schools into three groups according to Norwegian school size (small=n<200 students, medium=201-350 students, large=351-780 students) and two groups according to proportion of unqualified staff, program training dosage, and implementation scores (1=high, i.e., above the mean, 2=low, i.e., below the mean). In Norway 29.3% of the schools have 300 or more students, 40% have between 100 and 299 students, and 30.7% have less than 100 students.

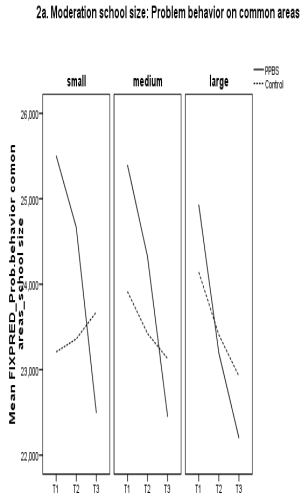
Table 2. Significant Moderating Effects on PPBS Outcomes of School Size, Portion of Unqualified Staff, Program Training Dosage, and Implementation Quality

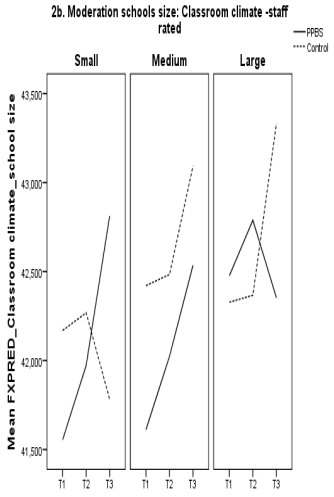
Outcome variable	Moderation variable	Estimate (SE)	df	t	Sign.
Problem behavior on common areas	School size	.012 (.005)	884.17	2.40	.017
	Dosage	-.037 (.012)	478.80	-1.91	.057
Classroom climate (S)	School size	-.013 (.004)	915.93	-3.41	.001
	Unqualified staff	.126 (.052)	903.12	2.44	.015
	Implementation quality	.182 (.063)	398.05	2.91	.004
Collective efficacy	School size	-.018 (.005)	844.49	-4.01	.000

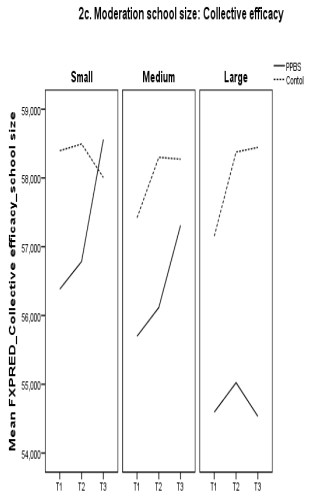
	Dosage	.074 (.017)	453.75	4.41	.000
	Implementation quality	.174 (.071)	388.05	2.46	.014
Positive behavior support (S)	Unqualified staff	.171 (.071)	856.01	2.43	.016
	Dosage	.052 (.022)	466.88	2.39	.017

Note. Estimates (enhanced values) based on Satterwaite's (1947) approximate degrees of freedom. The covariates time (T1,T2,T3), total number of students, portion of students with foreign background, portion of special education students, and portion on unqualified staff, program dosage, implementation quality and relevant two and three 3-way interactions were accounted for.

The analyses indicated that when compared with control schools of the same size, the small-to-medium PPBS schools benefited more than larger schools in terms of reduced problem behavior in common school areas, better classroom climate, and higher perceived collective efficacy (Figure 1a-c).







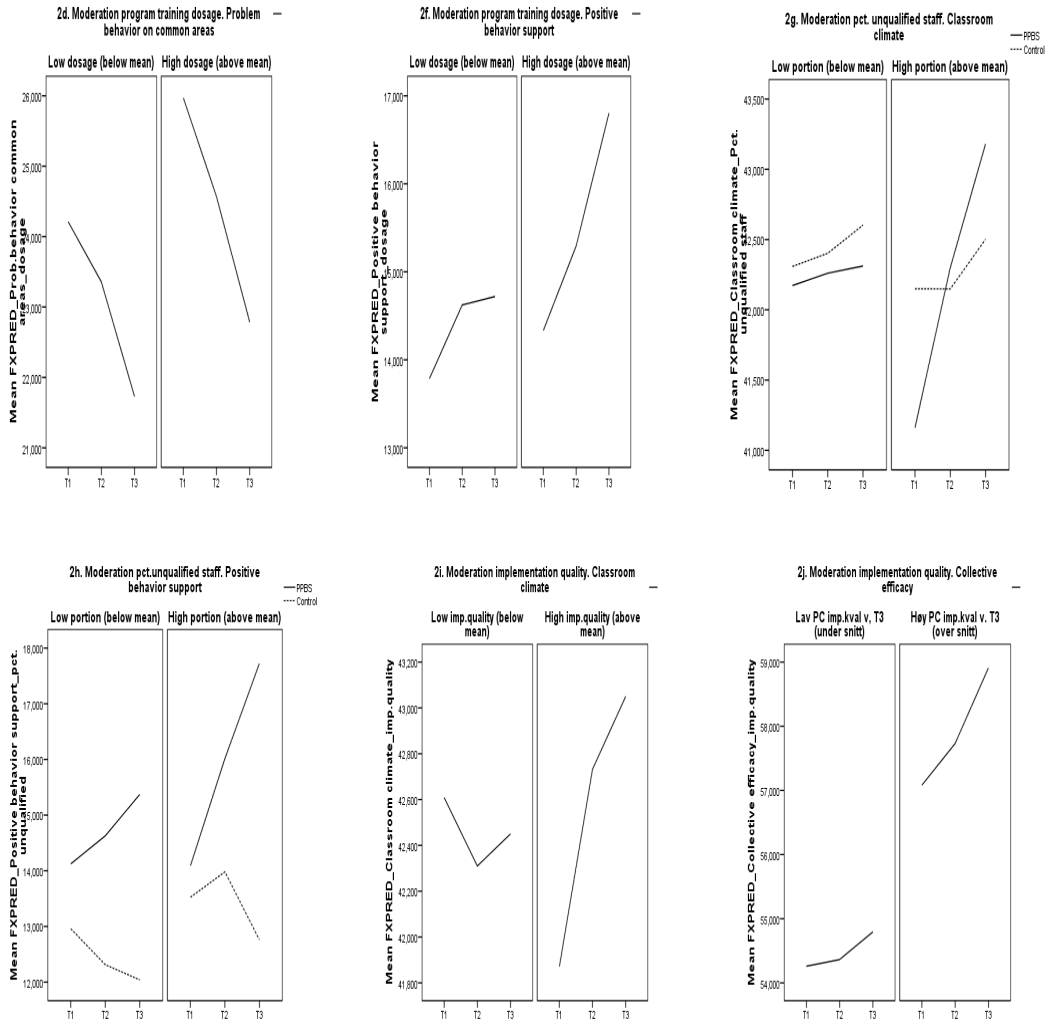


Figure 1. (a-c). Moderating Effects of Schools Size, Portion of Unqualified Staff, Program Training Dosage, and Implementation Quality

Moreover, PPBS schools with a high mean training dosage demonstrated a significantly greater reduction in student problem behavior than schools with a low dosage (Figure 1d). Greater increases in collective efficacy were also found in the schools with the highest program dosage (Figures 1e-f). Likewise, intervention schools with high implementation quality showed greater improvement in classroom climate and positive behavior supports from PPBS than did schools with low fidelity scores (Figures 1i-j). Compared with control schools that had varying proportions of unqualified staff, the positive changes across time in both the quality of the learning conditions in classrooms and the staff's use of positive discipline were significantly greater in PPBS schools with high proportion of staff members who lacked formal training as teachers than in schools with lower proportions (Figures 1g-h).

4. Discussion

The primary purpose of the current study was to test the immediate effectiveness of the universal school-based *Preventing Problem Behavior in School* (PPBS) intervention. The aim of this school-wide approach is to prevent and reduce student problem behavior by empowering the entire school staff and motivating them to use more positive, efficient, and co-joint behavior management practices. The PPBS is derived from the multilevel SWPBS model (called PALS in Norway) and was developed as an abbreviated alternative for schools that have neither the need nor the capacity to implement the full model. Multilevel analyses of change across three measurement points in which the 17 intervention schools were compared with 20 schools conducting "practice as usual" indicated interesting main and differential effects of PPBS.

4.1 Effects on Student Behavior

As measured four months after program training and compared with the control schools, the PPBS schools reported substantial reductions in negative behavior incidents occurring *outside* the classroom context, such as in stairways, corridors, bathrooms, dining areas, gymnasiums, and playgrounds (d=.38). Intervention impacts were evident both for less severe problem behaviors—such as unrest while waiting, rude comments to teachers, and lack of care for others (d=.41)—and for more severe problem behaviors—such as theft, vandalism, and physical attacks (d=.18). Moderation analyses indicated greater decreases in student misconduct in small and medium schools than in large schools. It should be mentioned that due to the decentralized structure of the Norwegian school system, a "large" primary school is a school with 300 or more students. The moderation analyses also indicated greater decreases in student misconduct in schools with a high than low program training dosage. A marginally significant main effect was also found for problem behaviors occurring *within* the classroom context (d=.13), and this effect was closely related to decreases in severe problem behaviors (d=.15). None of the context and process variables tested moderated the classroom-related changes.

4.2 Effects on Classroom Climate

No main effect of the PPBS was observed for the quality of the classroom climate as rated by staff or students. However, although not all intervention schools experienced more positive and less conflictual social relations in class following the implementation of the PPBS, the moderation analyses indicated that *some* schools did: schools that implemented the intervention with high fidelity, schools with a larger number of unqualified staff members, and small to medium-sized schools.

4.3 Effects on Staff Behavior

Significant improvements in employees' behavior management following the PBBS were observed, as expressed by staff reports of increased use of behavior-supporting practices such as giving praise, acknowledgement and proactive instructions. The schools with the highest implementation scores and proportion of unqualified staff appeared to benefit most from the intervention. However, according to student reports, no significant group differences in change across time occurred in the staffs' disciplinary practices.

4.4 Effects on Perceived Efficacy

Furthermore, a more positive development in perceived collective efficacy in the intervention group indicated that the staff in the PPBS schools, compared with their colleagues in the control schools, perceived greater confidence in their mutual ability to motivate and support student learning, to reach difficult students, and to prevent and manage problem behavior. The greatest change was observed in the small to moderately sized schools, the schools with the highest fidelity scores, and the schools with the highest program-training dosage. Likewise, a marginally significant main effect was observed in the staff members' self-efficacy beliefs, but there were no differential effects.

4.5 Discrepancies in Staff- and Student-Rated Outcomes

The promising, even modest efficacy indications based on staff ratings were not supported by the students' ratings. Modest between-rater agreement (e.g., between student, teacher and/or parent ratings of child problems) is a familiar phenomenon across studies and countries (Rescorla et al., 2013). Informant discrepancies are also often reported in intervention trials (De Los Reyes, 2011). Whether the discrepancies observed in the present study reflect measurement error, inconsistent intervention effects, inflated staff-based effect estimates, and/or yield useful information for future refinements of the PPBS intervention is unclear. For example, we cannot discount that the more positive staff than student ratings may partially mirror some exaggerated enthusiasm among the staff concerning immediate changes following the implementation of the intervention (i.e., positive response bias). Second, it may be that many students did not experience the institution of more uniform school rules and consequent disciplinary practice as unconditionally positive. Clearer expectations of how to behave in school may feel more restrictive to some students, whereas for other students more frequent positive feedback may feel embarrassing or unfair, particularly early in the implementation and among well-adapted students. Third, we speculate that the students were not particularly sensitive to changes in the *amount* of behavioral feedback they received and that the 0-effects observed in the students' ratings may partially be caused by measurement problems. The reliability of younger students' ratings (9-12 years) can be questioned with respect to how many positive and negative behavioral responses they experienced over a 30-day period, particularly when rated retrospectively, as in this study.

4.6 Contextualization of Results

The significant effect sizes in the current study were in the range of d=.15 to .41, and thereby large enough to be of practical significance. In a prior study, 20 schools implementing the full-scale N-PALS model were compared with the same control group on the same outcome variables as in the present study (Sørlie & Ogden, 2015; Sørlie et al., in review). Four months impacts of the abbreviated PPBS intervention on the level of problem behavior in schools appear relatively equal to three years impacts of N-PALS, whereas the full-scale model appears to "outperform" the abbreviated version concerning effects on the learning conditions in classrooms and on staff outcomes (i.e., on collective efficacy, self-efficacy, and behavior management). The ES-values for PPBS seemed somewhat higher than the ES-values reported for SWPBS in the USA (d=.08 to .17) by Bradshaw et al. (2012). It shold,

however, be noted that the values are not completely compareable in that the American values are based on teacher reports of student behavior as measured at the individual level while the Norwegian ES-values are based on teacher reports of student problem behavior as measured at the class and school level.

Moreover, the outcomes of the PPBS intervention match relatively well with results reported in prior controlled studies with respect to other types of in-service training programs for teachers aimed at improving the social, emotional and behavioral outcomes of primary-school students through improved classroom-management practices (e.g., Whear et al., 2012). The magnitude of the PPBS intervention effects on problem behavior in schools also is consistent with the effects reported in meta-analyses of universal school programs, in which the mean ES-value across a large number of studies is identified as *d*=.20 (Durlak et al., 2011; Wilson & Lipsey, 2007).

4.7 Strengths and Limitations

The primary strengths of the study are the testing of intervention effects within ordinary school settings at no extra cost (free training, materials, location and feeding), a large sample of schools, inclusion of entire school staffs as participants, an experimental double pretest-posttest design, measurement of key constructs using the appropriate units of analysis, multiple informant groups, and the use of multilevel analysis to account for nesting in data. To assess the effects of a school-wide, universal intervention, we found it more relevant to measure school-level than individual- or class-level outcomes.

Because the respondents were not blind to which research condition they had been assigned, the pre-post relations between outcome variables may be inflated because of shared variance from reports of the same informants. Accordingly, we cannot exclude the possibility of biased assessments because of the so-called Hawthorn Effect or because of novelty effects (Shadish et al., 2002). Another limitation relates to the non-randomized design. Although the school groups were more similar than different at baseline, significant group differences on a few observed variables indicated possible selection bias. However, we have intentionally attempted to reduce threats to this study's validity by adding more than one pretest, securing sufficient statistical power to detect small intervention effects, using active and focal controls, and controlling the outcome analyses for initial school variance and potential confounders (Sørlie & Ogden, 2014).

4.8 Conclusions

Considered together, the outcome analyses indicated that PPBS has promising, immediate effects. The analyses suggest greater impacts on problem behavior occurring in common school areas than on problem behavior occurring within the classroom. The analyses also suggest greater impacts on the staff's collective efficacy perceptions than on their individual efficacy beliefs and greater impacts on their use of positive behavior management practices than on their use of correctional strategies to prevent and manage student misconduct. The outcomes may be attributed to the strong emphasis on school-wide and universal components in the PPBS intervention, greater attention to common school premises, and the importance of establishing mutual practices rather than focusing on individual staff

members' adherence to the intervention. It may also be that there is genuinely less potential to change student and employee behavior inside of the classroom than outside of it.

The moderation analyses indicate that to be optimally effective, high attendance by a school's entire staff during training sessions is required and the PPBS intervention must be implemented with high fidelity across all school settings. The moderation analyses also indicate that it is most likely more difficult to induce school-wide changes in large schools than in smaller schools and that more comprehensive implementation supports may be required to "turn large schools around". Moreover, the results indicate that PPBS may positively contribute to increasing school staff's competence and practical skills in the prevention and handling of student problem behavior—particularly among those staff members who do not have formal training as teachers.

Based on the indicative intervention effects, we argue that the PPBS intervention may be appropriate as a basic approach to facilitate the development of school-wide or more-common attitudes and strategies related to the prevention of behavioral misconduct. Earmarking four days to promote effective positive teacher practices should be practicable for most schools. For some schools (e.g., large schools, schools facing stable high levels of problem behavior), although the PPBS may be insufficient, it can function as a "springboard" to more comprehensive and adequate approaches such as the N-PALS full-scale model.

Since the PPBS program is an abbreviated version of N-PALS that was transported from the USA across the Atlantic with only cosmetic adjustments to the original SWPBS model-and also proven effective in Norway as a non-English speaking representative of the Europe countries (Sørlie & Ogden, 2015; Sørlie et al., in review), likely the PPBS can be successively implemented in other contexts and cultures than ours (e.g., USA, Scandinavia). The results must, however be replicated, preferably in randomized controlled studies, before firmer conclusions regarding intervention effects and transportability can be drawn. Additionally, whether the observed intervention effects can be sustained over a longer time span is an open question.

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Conflict of Interest

The authors declare that there is no conflict of interest. None of the authors has been involved in the development, training, or implementation of the N-PALS and PPBS interventions

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