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# Immediate Impacts of PALS: A school-wide multi-level programme targeting behaviour problems in elementary school

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The article describes the main outcomes of the intervention programme “Positive behaviour, interactions and learning environment in school” (PALS). PALS is an adapted Norwegian version of the School-Wide Positive Behaviour Support model, developed in the United States with school-wide interventions aiming at the prevention of behaviour problems and the promotion of social competence through a supportive learning environment. The effectiveness was evaluated with a quasi-experimental design in four elementary schools, two years after implementation. An equal number of comparison schools were included in the study. Informants were students ( $n=735$ ) in third to seventh grade and teachers working at least 50% ( $n=82$ ). The immediate reductions in teacher-observed problem behaviour ranged from moderate to large, while the results based on student ratings of social competence and classroom climate were less encouraging. Differential effects were found and implementation quality was together with teacher collective efficacy significantly related to better outcomes. The programme and results are discussed in relation to prior research, limitations of study design, and future implementation and research.

**Keywords:** *Behaviour problem; School-wide intervention; Positive behaviour support; Effectiveness*

## Introduction

School entry is a point in time when early signs of externalising problems might escalate rapidly as children at risk are confronted with the expectations, demands and rules of school (Ogden, 2001; Walker & Severson, 2002). Some children are in urgent need of guidance and support both from parents and school staff (Patterson, 2002; Webster-Stratton, 1999). A number of school programmes have been developed,

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especially in the United States, in response to the need for more effective interventions targeting school behaviour problems by promoting socially competent and positive behaviour (Berryhill & Prinz, 2003; Ferrer-Wreder, Stattin, Lorente, & Adamson, 2004; Lane, Gresham, & O'Shaughnessy, 2002; Wilson, Gottfredson, & Najaka, 2001).

School programmes differ in focus, scope, length, and intensity. Some have a single intervention component, as in many social-skills training programmes (Elliott & Gresham, 1991), while multi-component programmes include several interventions aiming at reducing risk and strengthening protective factors (CCPRG, 2002; Dishion & Kavanagh, 2002; Reid & Eddy, 2002; Smolkowski, Biglan, Barrera et al., 2005). Some programmes target all students with a universal approach (Reid & Eddy, 2002) or some high-risk students only (CCPRG, 2002), while others use a flexible approach matching interventions to the students' risk level through multiple gating assessment procedures (Dishion & Kavanagh, 2003; Sprague & Walker, 2005).

The most effective school-based programmes seem to be multi-component and school-wide with interventions targeting students at different risk levels, teachers, and sometimes also involving parents (Fray, 2002; Sørli, 2000). Characteristically, the most promising programmes are guided by an explicit theory, they are research-based, developmentally and culturally appropriate, and focused on the importance of skills training (e.g., student reading and social skills, teacher classroom management skills) (National Institute of Health, 2004; Ogden, 2001; Sundell & Forster, 2005). Furthermore, they are well planned and systematically implemented, with research-based and predefined intervention components (Sørli, 2000). High implementation quality is associated with better outcomes, while low implementation quality seem to produce small, no, or even negative effects (Arthur & Blitz, 2000; Biglan & Taylor, 2000; Gresham, MacMilla, Beebe-Frankenberger, & Bocian, 2000; U.S. Department of Justice, 2004).

Meta-analyses of school-based prevention programmes indicate that they generally have a positive and modest effect on problem behaviour, but effects vary in magnitude across studies (Berryhill & Prinz, 2003; Wilson et al., 2001). In a meta-analysis of 221 school prevention programmes, Wilson, Lipsey, and Derzon (2003) found the most effective programme components in reducing aggressive and disruptive behaviour to be skills training with cognitive-behavioural methods (effect size (ES) = .27) and behaviour management (ES = .22). Additionally, effectiveness in school-based programmes seems to vary across outcome variables (e.g., better effects on problem behaviour than on academic competence) and across informants (e.g., better outcomes in teacher-ratings than in parent-ratings) (Smolkowski et al., 2005).

Programmes might fail because they tend to be too narrowly focused, have only limited intervention periods, include too few sessions, or are only partly implemented at one grade level or in a few classes (Fray, 2002; Sørli, 2000). Wilson et al. (2001) found that school-based interventions or strategies, implemented in isolation, had small effects, and they therefore recommend that schools should develop comprehensive packages of prevention strategies and implement these with high fidelity. Another reason for failure might be that school-based programmes are

implemented by external professionals, while teachers are given a passive role when the intervention components are presented to the students (Ogden, 2001). This can reduce the impact of the programme, especially if the regular teachers are unfamiliar with the aims and focus of the programmes and do little to maintain the behavioural or attitudinal changes brought about by the external interventionist.

The review of the research literature thus leads us to conclude that the School-Wide Positive Behaviour Support model (PBS), developed at the University of Oregon, stands out as one of the most promising intervention model, because it appears to meet most of the criteria for effective school intervention programmes (Crone & Horner, 2003; Sprague & Walker, 2005; Sugai, Horner, & Gresham, 2002). PBS was therefore adopted and adapted to the Norwegian school-setting at the elementary level and titled "Positive behaviour, interactions and learning environment in school" (PALS). PBS is characterised by a school-wide approach to the prevention and management of problem behaviour, and high-quality implementation is ensured through staff development and external support. The flexibility of the programme lies in the multiple-gating assessment procedure and in matching interventions to the students' needs and risk level (Walker & Severson, 2002). The model allows for an early intervention approach in primary school, combining modifications of the social-learning environment with behavioural interventions implemented by the school staff rather than external interventionists. PBS has been successfully implemented in a large number of schools in the United States and Canada (Tobin & Sugai, 2005).

Results from United States evaluations of the school-wide positive behaviour support approach are encouraging. PBS appears to have a positive impact on several outcomes, including reduction in discipline referrals and increase in self-control; moreover, generalisations of behavioural change across time and situations are feasible (Clonan, Lopez, Davison, & Rymarchyck, 2004; Hawken & Horner, 2003; Lewis, Sugai, & Colvin, 1998; Nelson, Martella, & Galand, 1998; Nelson, Martella, & Marchland-Martella, 2002; Sprague, Walker, Golly, White, Myers, & Shannon, 2001; Tobin & Sugai, 2005). Taken together, data from PBS outcome studies indicate positive changes for most students, but especially for students at elevated risk for conduct disorder (e.g., Tobin & Sugai, 2005). These evaluation studies, however, rely heavily on discipline referrals as the main outcome variable, and none of them used teacher observations of student problem behaviour. We wanted to find out whether the programme has an impact on teacher observations of problem behaviour in classrooms and the school environment, as teacher-perceived behaviour problems were the main reason for including schools in the intervention programme. We also wanted to evaluate the impact of PALS on the students' ratings of their own behaviour and of the learning environment. Because the research cited is mostly conducted in the United States, a Norwegian outcome study would shed light on the transportability of the PBS across national and linguistic borders. In Norway, as in other countries, it is a well-established fact that behaviour problems are more prevalent among boys than girls (Wichstrøm, Skogen, & Øia, 1996) and that girls

might respond differently to interventions than do boys (Kjelsberg & Dahl, 1998). There also is a great interest in how interventions match the needs and cultural background of immigrant students (i.e., students with Norwegian as their second language) and how they respond to interventions, compared with their fellow Norwegian students. Despite the interest, no empirical data has to our knowledge been published on this topic in Scandinavia.

We designed a Norwegian implementation and evaluation study based on the main principles and findings from PBS studies in the United States. Additional intervention components were established for high-risk students, combining individual support and social-skills training (SNAP<sup>TM</sup>; Earls court Child and Family Centre, 2001) with Parent Management Training, Oregon model (PMTO; Reid, Patterson, & Snyder, 2002), and intensive teacher consultation based on PMTO principles. In the present study we expected that the PALS schools would achieve better results on the main outcome variables than the comparison schools, when assessed two years after programme initiation. We also expected differential effects as a result of variations in implementation quality across schools, as well as some groups of students profiting more from the intervention programme than others. Therefore we examined the possible moderating effects of gender and immigrant status (comparing students with Norwegian as their first or second language). The research questions were:

- What impact did the PALS school-wide intervention programme have on teacher ratings of student behaviour in the classrooms, in the school environment, and on the number of problem students in class from pre- to post-assessment, as perceived by teachers?
- What impact did PALS have on the students' social competence and learning environment in class, as rated by teachers and students?
- Did the programme impact vary according to the quality of implementation and the students' cultural background and gender?

## **Method**

### *Participants*

Five elementary schools (first to seventh grade) were invited to participate in the programme. No systematic screening or assessment of student behaviour was carried out prior to inclusion in the project, but only four schools (referred to as project-schools, P-schools) met all the predefined inclusion criteria recommended by the developers of PBS: (a) an explicit goal to reduce problem behaviour and to promote positive behaviour and a supportive learning environment; (b) agreement to participate in the programme activities by at least 80% of the staff; (c) the school leader was willing to take part in programme implementation; (d) explicit support and involvement from parents, school administration, and the school psychological services; (e) willingness to use necessary time, reallocate resources, and prioritize

PALS for at least three years; and (f) willingness to participate in the outcome evaluation study.

The comparison group (C-schools) was made up of four neighbouring schools of approximately the same size as the project schools. The total number of students in the eight schools ranged from 110 to 450, and the student and teacher groups were quite stable from pre- to post-assessment. Only students and teachers participating at both time points were included in the analyses. The participants in the study were 735 third- to seventh-grade students from 44 classes, and 82 teachers and staff in after-school services (working at least 50%, referred to as teachers). This sample included only individuals with positive parental consent and complete pre-post data, which made 81% of the actual student body ( $n=908$ ) and 71% of the staff ( $n=116$ ). In the P-schools, 363 students and 48 teachers participated, while 372 of the students and 34 of the teachers participated in the C-schools. Students in first and second grade were not included in the study sample, as the students were considered too young (6–7 years) to contribute self-assessment data, and the students in the sixth grade at baseline did not participate in the post-assessment, because they had gone on to secondary school at a different location.

In this study, 53.5% of the baseline sample were girls ( $n=417$ ), and 7.2% had Norwegian as their second language ( $n=56$ ). Most students with foreign backgrounds were from Asia (mainly, Pakistan and India) or Eastern Europe. The mean class size was 20.7 students (range 13 to 32 students). Most teachers were females (80.5%). Eighty percent had formal teacher training, and the mean age was 44.7 years, ranging from 26 to 62 years. The teachers had worked in school an average of 16.1 years, ranging from 2 to 38 years. Most of the participating teachers were present the actual week of assessment (98.6%), and most of these teachers (92%) described it as an ordinary week.

### *Procedures*

Prior to the first data collection, the study was presented to the staff at the P-schools, parents' consent was collected, and a local research contact was appointed for each school. Baseline data were collected at the beginning of the programme implementation, and post-assessment was conducted 20 months later, at the end of the second year of the three-year implementation period. At baseline, third–sixth graders in the P- and C-schools filled out a questionnaire during 1–2 lessons on a specified day. One or two teachers were present and were told to give the students necessary support (e.g., read aloud or explain items).

### *The intervention*

PALS is an action- and skills-oriented intervention model, and the aim of the programme is to strengthen the students' capacity for coping with developmental challenges, such as risk factors in school. To prevent and reduce problem behaviour

in all arenas in school, a consistent and supportive social-learning environment was established (Arnesen, Sørli, & Ogden, 2003). The programme has a multi-theoretical foundation drawing from social interaction learning theory and coercion theory (Patterson, 1982) and social ecological theory (Bronfenbrenner, 1979). PALS also builds on theoretical principles of functional behaviour analysis and behaviour modification in school (Greer, 2002; O'Leary & O'Leary, 1976).

PALS was established on an evidence-based platform. This implies that the included components and strategies explicitly match research related to the development of behavioural misconduct, risk and protective factors, and effective approaches to prevention and management of behaviour problems in school (Arnesen, Ogden, & Sørli, 2006; CPBIS, 2002). The predefined core components and intervention strategies are carefully described in a programme manual that, with supervision from a certified PALS consultant, was adapted to the situation and local context of the schools, and specified in the schools' own PALS handbook. The theoretical and empirical basis was reflected in the school-wide, multi-level and multi-component programme design. The innovative work was organised into three levels of intervention (universal, selected, and indicated).

Within any school it is possible to identify three types of students: (1) typically developing, non- or low-risk students (80–90% of Norwegian students; Arnesen et al., 2007); (2) students at elevated (moderate) risk of developing antisocial-behaviour problems (10–15%); and (3) high-risk students who show signs of life-course persistent antisocial-behaviour patterns and current or future involvement in criminal behaviour (2–5%) (e.g., Moffit & Caspi, 2001). Members of each group, arrayed along this severity-of-risk continuum, “are candidates of differing levels or types of interventions that represent correspondingly greater specificity, complexity, comprehensiveness, expense, and intensity” (Walker & Shinn, 2002, p.15).

Matching interventions to student risk level thus is a leading principle in PALS. Research has shown (e.g., Berryhill & Prinz, 2003; Sørli, 2000; Wilson et al., 2001) that interventions appropriate for group 1 (universal level, corresponds to primary prevention) focus on enhancement of protective factors on a school-wide basis to keep minor problems and difficulties from escalating into more serious behaviour problems and protect students from greater risk. Students who do not respond to universal interventions implemented school-wide, need more individually tailored and intensive interventions. Appropriate interventions for students in group 2 (selected level, corresponds to secondary prevention) typically provide behavioural and/or academic support, mentoring combined with evidence-based social-skills training applied on an individual or small-group basis (short term). For severely at-risk students (who may also have severe mental-health problems) successful interventions (indicated level, corresponds to tertiary prevention) must be comprehensive, intensive and include specific components targeting the child, parents, teachers, and in some cases even peers.

In the evaluation of PALS in Norway, training in-programme components and planning of universal interventions in the school-wide and classroom systems were

emphasised during the first year of implementation. During the second year, universal interventions targeting all students and selected interventions targeting students at risk were combined. The core components were (a) defining and establishing school-wide expectations, a few school-wide rules of conduct (e.g., be respectful, be responsible) and their application in different school settings (in the classroom, hallways, playground, etc.); (b) a programme for teaching expected positive behaviour to all students; (c) implementing a school-wide system of encouraging positive student behaviour and handling problem behaviour; (d) establishing an information system for registration of disciplinary referrals (Arnesen & Ogden, 2006); (e) implementation of a functional behaviour assessment procedure (Crone & Horner, 2003) and multi-component individual-support plans and interventions for at-risk students, including individualized social-skills training, parent management training and teacher training (Arnesen et al., 2003, 2007).

Implementation teams with participants from staff, administration, parents, and school psychological services were established at each school. Team tasks were to plan and implement interventions, develop the schools' own handbook, monitor the progress and outcomes, organise school-wide assessment of risk and protective factors, and introduce PALS to parents and staff. The teams also arranged seminars on the theoretical and empirical basis of PALS and on topics such as classroom management, prevention of conflict escalation, and social-skills promotion. The teams attended monthly training and supervision sessions with the PALS project manager (Anne Arnesen) and were responsible for the training of the school staff of the PALS components on a weekly basis.

The C-schools had initiated alternative projects to promote positive student behaviour and/or improve learning conditions. Two schools implemented parts of the Second Step Programme (Committee of Children, 1997); a third school ran a combined organisational and teaching restructuring project, while the last school continued an ongoing school-wide socio-cultural learning project.

### *Measures*

*Behaviour problems.* The prevalence of school problem behaviour was assessed with three measures based on teacher observations. The measures "Problem behaviour in the school environment last week" (15 items,  $\alpha = .84$ ) and "Problem behaviour in the classroom last week" (20 items,  $\alpha = .88$ ) were originally developed by Grey and Sime (1989) and translated into Norwegian (Ogden, 1998). Teachers working 50% or more reported problem behaviours that they had observed during a randomly selected week in their classrooms and in other school areas like the hallways and the playground. Item examples are "Running in corridors" and "Physical attacks on students". A five-point Likert scale was applied with scoring alternatives ranging from 1 (not observed) to 5 (observed several times per day). "Behaviour problem students in class this year" (15 items,  $\alpha = .82$ ), developed by Ogden (1998), asked teachers who were most familiar with the students to report the number of students

who seriously hindered learning and teaching activities in class during the present year. For example they stated how many who had often been “Inattentive” or “Fighting with others”.

*Social competence.* Social competence was measured with Gresham and Elliott’s (1990) Social Skills Rating System (SSRS), which is a well-validated assessment tool (Elliott, Gresham, Freeman, & McCloskey, 1989; Kratochwill, McDonald, Levin, Bear-Tibbets, & Demaray, 2004; Ogden, 2003;). The teacher and student forms used in this study consisted of 30 and 33 items, respectively (teacher,  $\alpha=.95$ , student,  $\alpha=.88$ ). Teachers who knew the students best conducted the teacher ratings. Each item was rated on a four-point frequency scale (1=never to 4=very often). The original SSRS has a three-point scale (0=never, 1=sometimes, 2=very often), but the present translated version has a four-point scale to get a more normalized distribution (Ogden, 2003).

*Learning environment.* To assess the quality of the social-learning context, we used the Classroom Climate Scale (Sørlie & Nordahl, 1998). The student form has a 22-item scale ( $\alpha=.88$ ); and the teacher form, a 14-item scale ( $\alpha=.86$ ). They are based on Moos and Trickett’s (1974) and Eccles, Feldlaufer, and Midgley’s (1989) scales. Sample items on the scales include “The students in this class help each other” and “Some teachers have problems with this class”. A four-point scale ranging from 1 (does not fit) to 4 (fits completely) was used.

*Programme implementation quality.* The Total Implementation Quality Scale (TIQS) was constructed to measure the implementation quality of PALS (and was therefore not used in the comparison schools). The scale is based on the Effective Behaviour Support Survey (Sugai, Horner & Todd, 2000) and the School-Wide Evaluation Tool (Horner, Todd, Lewis-Palmer, Irvin, Sugai, & Boland, 2004). TIQS consisted of 55 teacher-rated items ( $\alpha=.97$ ). The measure included the sub-scales Implementation Quality—School-Wide (IQS, 33 items,  $\alpha=.96$ ) and Implementation Quality—Classroom (IQC, 12 items,  $\alpha=.81$ ), respectively, referring to the integrity of interventions implemented school-wide and within-classroom contexts. The P-school teachers were asked how various statements corresponded with the actual situation at their school, with a three-point scale (1=fits completely, 3=does not fit). Examples of statements are “In our school we have a few and clearly formulated school-wide rules” and “Students with severe behaviour problems get individually adjusted teaching in this school-based on functional problem analysis”.

*Teacher collective efficacy.* The Collective Efficacy Scale (CES), developed by Goddard and colleagues (2000), is designed to assess the extent to which a faculty

believes in its conjoint capability to positively influence student learning. Collective efficacy might be considered an outcome variable at the school level but also a programme-independent indicator of how successful each school was in its efforts to establish consistent school-wide academic and behaviour policy and practice. In the present study the 12-items-revised version of CES (Goddard, 2002) was used at post-assessment ( $\alpha = .74$ ). The scale was a five-point scale ranging from 1 (never) to 5 (very often) and included items such as “Teachers in this school are able to get through to difficult students” and “Teachers here are confident they will be able to motivate their students”.

### *Statistical Analyses*

Univariate (ANCOVA) and multivariate analyses of covariance (MANCOVA), together with repeated measures analyses of variance, were run to examine changes over time and to investigate intervention effects at the end of the two-year intervention period. Multivariate analysis was used when outcome variables were correlated in the moderate to high range at pre- and post-assessment. Hierarchical regression analyses were conducted to test if the magnitude of change was related to programme integrity and teacher collective efficacy. One way ANOVAs were used to test group differences, respectively, at baseline and post-assessment.

## **Results**

### *Attrition and Baseline Comparisons*

The rate of participation at post-test was 94% among students ( $n=735$  of 780 with pre-data) and 76% among teachers ( $n=82$  of 108 with pre-data). The main reasons for attrition from pre- to post-test (45 students and 26 teachers) were change of school, illness, or leave of absence. Testing for baseline differences between the attrition groups (students, teachers), and the other participants revealed no significant group differences. Differences between the intervention and comparison group at baseline were also tested. The P-schools had significantly higher prevalence of problem behaviour observed by teachers in the school environment ( $t_{[1,81]}=6.2$ ,  $p<.02$ ) and in the classroom context ( $t_{[1,81]}=12.0$ ,  $p<.001$ ) than did the C-schools. No significant baseline differences were found on background variables or in pre-test scores on any of the other outcome variables.

The mean score of problem behaviour in the school environment was higher in both the P-schools ( $M=25.7$ ,  $SD=7.0$ ) and the C-schools ( $M=21.1$ ,  $SD=5.2$ ), compared with a representative sample of 340 Norwegian elementary schools ( $M=20.7$ ,  $SD=3.9$ ) (Ogden, 1998). As concerns classroom problem behaviour the mean score for the P-schools was 37.2 ( $SD=10.0$ ) and 31.3 ( $SD=7.9$ ) for the C-schools, while the corresponding mean score of the national sample was 27.8 ( $SD=5.3$ ). The problem situation in the participating schools thus seemed to be more serious than in the average Norwegian elementary school at the first

assessment. Especially the prevalence of problem behaviour in the P-school classrooms seemed high.

### Teacher-Observed Problem Behaviour

The analysis of the teacher-observed problem behaviour demonstrated a significant reduction in the mean prevalence of student problem behaviour from pre- to post-assessment in the school environment and in the classrooms ( $F_{[1,81]}=12.78, p<.01, F_{[1,81]}=11.18, p<.01$ ) (table 1). Multivariate analyses (MANCOVA) were chosen because the two variables were strongly inter-correlated (pre  $r=.56$ , post  $r=.76, p<.01$ ). There were significant intervention effects favouring the P-schools in problem behaviour measured in the school environment ( $F_{[1,81]}=6.79, p<.01$ ), and in the classrooms ( $F_{[1,81]}=4.67, p<.04$ ). In other words, even if there was a significant overall decrease in teacher-observed problem behaviour in classrooms and school environment over time, the decrease was significantly greater in the P-schools. For example, *daily* occurrence (i.e., observed one or several times per day last week) of “verbal attacks on other students” declined significantly, by 18%, in the

Table 1. Main outcome variables: Mean, standard deviation and multivariate/univariate analyses of covariance by type of school condition

| Variables   | P-schools<br>(n teacher=48,<br>n student=354) |                   | C-schools<br>(n teacher=34,<br>n student=350) |                   | Intervention<br>Effect |      | Time Effect |      |
|---|---|-------------------|---|-------------------|------------------------|------|-------------|------|
|   | Pre Mean<br>(SD)                              | Post Mean<br>(SD) | Pre Mean<br>(SD)                              | Post Mean<br>(SD) | F                      | p    | F           | p    |
| <u>Problem behaviour in school</u>                          |   |                   |   |                   |                        |      |             |      |
| Problem behaviour in school environment last Week (teacher) | 25.74<br>(6.97)                               | 21.08<br>(5.24)   | 22.37<br>(4.19)                               | 21.76<br>(5.61)   | 6.79                   | .011 | 12.78       | .001 |
| Problem behaviour in classroom last week (teacher)          | 37.17<br>(10.04)                              | 31.27<br>(7.93)   | 30.59<br>(5.71)                               | 31.56<br>(7.83)   | 4.67                   | .034 | 11.18       | .001 |
| Behaviour problematic students in class last year (teacher) | 1.68<br>(0.96)                                | 1.35<br>(0.87)    | 1.19<br>(0.62)                                | 2.01<br>(1.01)    | 9.17                   | .004 | 4.72        | .035 |
| <u>Social competence</u>                                    |   |                   |   |                   |                        |      |             |      |
| SSRS (main teacher)   | 88,13<br>(16,37)                              | 89,33<br>(14,91)  | 86,12<br>(14,42)                              | 87,77<br>(13,23)  | 0.20                   | .654 | 529.12      | .000 |
| SSRS (students)   | 101.85<br>(13.26)                             | 104.92<br>(11.44) | 102.49<br>(10.78)                             | 105.52<br>(10.43) | 0.22 <sup>1,2</sup>    | .643 | 165.13      | .000 |
| <u>Learning environment</u>                                 |   |                   |   |                   |                        |      |             |      |
| Classroom climate (teacher)                                 | 27.26<br>(5.86)                               | 27.07<br>(7.29)   | 29.19<br>(4.80)                               | 25.80<br>(6.18)   | 3.69                   | .059 | 5.74        | .067 |
| Classroom climate (student)                                 | 73.64<br>(8.64)                               | 70.91<br>(7.45)   | 74.02<br>(6.71)                               | 71.84<br>(6.93)   | 2.51 <sup>2</sup>      | .113 | 75.71       | .000 |

Note: <sup>1</sup>Language-group effects:  $F_{(3,1)}=7.78, p=.005$ . <sup>2</sup>Language-group effects:  $F_{(3,1)}=3.11, p=.078$ . <sup>3</sup>Gender effects:  $F_{(3,1)}=11.08, p=.001$ .

P-schools, and increased by 6% in the C-schools, while a reduction of 6% was registered for daily occurrence of “physical attacks on other students” in P-schools, compared with a 3% increase in the C-schools. Furthermore, differential outcomes within the intervention group were detected. Repeated ANOVA produced significant interaction effects (time  $\times$  school) in problem behaviour observed in the school environment ( $F_{[3,41]}=3.35$ ,  $p<.03$ ), which indicated that the two P-schools with most behaviour problems at baseline had changed the most over time.

At the *classroom level* the largest decrease in favour of the P-schools was registered for disturbing behaviour, which was also the most common form of problem behaviour in all eight schools. *Daily* occurrence of “talking when inappropriate” was significantly reduced by 25% in the P-schools, compared with a 9% increase in the C-schools. Likewise, daily occurrence of “rule breaking behaviour” decreased by 25%, in the P-schools but increased by 5%, in the C-schools. Daily occurrence of “disturbing classmates during lessons,” and “unnecessary noise” declined by 14%, in P-schools, while ascending 9% in the C-schools. Likewise, daily observed classroom problem behaviours like “refusing to comply with instructions” and “leaving the seat without permission” decreased with, respectively, 16% and 14% in the P-schools, while increasing by 6% and 4% in the C-schools.

A significant intervention effect favouring the P-schools was also found for the mean number of behaviour problematic students (i.e., students with internalising and externalising problem behaviour) in class ( $F_{[1,81]}=9.17$ ,  $p<.01$ ) (table 1). There was a significantly larger reduction in number of students showing externalising problem behaviour in P-schools than in C-schools ( $F_{[1,81]}=6.93$ ,  $p<.01$ ), but no corresponding reduction in number of students showing internalising problems.

### *Social Competence*

No significant differences were found between P-schools and C-schools in student social-skills ratings at post-test. A time effect was however registered for both teacher ( $F_{[1,703]}=529.12$ ,  $p<.001$ ) and student assessments ( $F_{[1,702]}=165.13$ ,  $p<.001$ ), indicating an overall increase in the students’ social competence from pre- to post assessment. No gender differences were found in *teacher-rated* social competence at post-test when the pre-scores were taken into account. By contrast, an increase in *self-reported* social competence was registered for girls, as compared with boys ( $F_{[1,702]}=11.08$   $p<.01$ ). That is, girls generally rated themselves more socially skilled across time than did boys.

### *Learning Environment*

Analysis of *teacher assessments* of the quality of the learning environment in class (“Classroom Climate”) showed a general negative trend in all schools (time effect), but the trend was more pronounced in the C-schools than in the P-schools ( $F_{[1,81]}=3.69$ ,  $p=.06$ ) (Table 1). Likewise, no intervention effect was registered when *students’ assessment* of the classroom learning environment was analysed.

*Immigrant Students*

Outcomes for students with Norwegian as their first and second language in P- and C-schools were compared (Ogden, Sørli & Amlund Hagen, 2007). Pre-post data existed for 49 (87.5%) of the 56 immigrant students participating in the study (i.e., students with Norwegian as their second language), of whom 37 were P-school students, and 12 were C-school students. To counteract the possible effect of differences in number of immigrant students, both within and across the two groups, school membership was included as a covariate. Immigrant students in the intervention group were rated by the teachers as significantly more socially competent than their counterparts in the comparison group at post test when school differences were accounted for ( $F_{[1, 47]}=24.20, p < .001$ ). However, no such intervention effect was detected in the *self-ratings* of social competence, and contrary to our expectations, the immigrant students in the P-schools rated the classroom climate as significantly more negative at post-test than the immigrant students in the C-schools ( $F_{[1,47]}=4.16, p < .05$ ). No equivalent intervention effects were found when P- and C-school students with Norwegian background were compared.

*Implementation Quality and Programme Effectiveness*

There was a significant and inverse relationship between the TIQS and teacher-reported problem behaviour scores in classrooms and in the school environment in the intervention schools at post-test ( $r = -.30$  and  $-.51, p < .01$ ). ANOVAs revealed significant differences between the four P-schools at post-test both in problem behaviour observed in the school environment ( $t_{[3,46]}=4.36, p = .01$ ), in the classroom ( $t_{[3,46]}=3.12, p < .04$ ), and in implementation quality (TIQS) ( $t_{[3,46]}=6.91, p = .001$ ). In the following hierarchical regression analyses, with teacher-observed post-score of problem behaviour in the school and classroom environment, respectively, as dependent variables, the actual pre-score variable was entered in the first block, while the corresponding implementation quality subscale variable was entered in the second block (IQS or IQC). The interaction between the respective implementation subscale and problem behaviour pre-score was entered in the third block (centred variables used). IQS did not, however, contribute uniquely to the explained variance in teacher-observed problem behaviour in the school environment at post-test (only the pre-score did). An alternative regression model was then tested with IQC in block 2; and the corresponding interaction variable, in block 3. The final models explained 49% ( $R^2 = .49$ ) and 43% ( $R^2 = .43$ ) of the total variance in teacher-observed problem behaviour in the school environment and classroom at post-test (Table 2). Prevalence of problem behaviour at baseline (unique contribution, 40% and 27%, respectively) and implementation quality of the classroom-based interventions (unique contribution, 9% and 16%) made significant contributions to the explained variance, while neither of the interaction variables did so. The analyses showed that the reductions in teacher-observed behaviour problems

Table 2. Hierarchical Regressions Analyses (HRA): Teacher-observed problem behavior during a random week in the intervention group ( $n=46$ )

| Variable                                | HRA <sub>1</sub>                                   |      |         | HRA <sub>2</sub>                                      |      |         |
|---|--|------|---------|---|------|---------|
|   | Problem behaviour in the school environment (post) |      |         | Problem behaviour in the classroom environment (post) |      |         |
|   | B  | SE B | $\beta$ | B   | SE B | $\beta$ |
| Step 1                                  |  |      |         |   |      |         |
| —Pre-score variable                     | .48  | 0.09 | .63     | .41   | 0.10 | .52     |
| Step 2                                  |  |      |         |   |      |         |
| —Pre-score variable                     | .38  | 0.09 | .51     | .33   | 0.09 | .41     |
| —Implementation quality classroom level | -.95   | 0.35 | -.32    | -1.89   | 0.53 | -.42    |

Note: HRA<sub>1</sub>:  $R^2=.40$  for step 1;  $\Delta R^2=.09$  for step 2 ( $ps<.01$ ). HRA<sub>2</sub>:  $R^2=.27$  for step 1;  $\Delta R^2=.16$  for step 2 ( $ps<0.01$ ).

in the P-schools were significantly related to how well the PALS interventions were implemented, especially at classroom level.

*Teacher Collective Efficacy*

Collective efficacy was measured at post-test only, and we found statistically significant differences favouring the P-schools ( $t_{[1,81]}=8.59, p <.005$ ). That is, the staff in the intervention schools significantly rated themselves as more competent to handle problem behaviour and student differences than did their colleagues in the comparison schools. ANCOVAs, with collective efficacy and the pre-scores of teacher-observed problem behaviour as covariates, produced significant group differences, both in prevalence of problem behaviour in the school environment ( $F_{[1,81]}=4.08, p<.05$ ), and in number of students showing problem behaviour in class ( $F_{[1,47]}=6.72, p<.02$ ). The results indicate that better outcomes in the P-schools than in the C-schools were systematically related to higher collective efficacy.

*Practical Significance*

Statistical significance does not directly reflect the magnitude of an effect. As recommended by the American Psychological Association (2001), Chambless and Hollon (1998), and others, we used effect size (Cohen, 1992) calculated from  $F$  statistics (Thalheimer & Cook, 2002) as a supplementary indicator of practical significance (i.e., applied value or importance of programme effectiveness). Cohen (1992) suggests that an effect size (ES) of .20 is small, .50 is medium, and .80 is large. An effect size of .20 indicates that the mean of the intervention (treatment) group is at the 50th percentile of the comparison (control) group, while an effect size of .80 and 1.7 indicates that the mean of the intervention group is at the 79th and 95.5th percentile of the comparison group, respectively. In our study the effect sizes of

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problem behaviour in the school environment ( $ES=.59$ ), problem behaviour in the classroom ( $ES=.49$ ), and classroom climate ( $ES=.43$ ) rated by teachers were in the moderate range. The effectiveness of PALS on number of students with behaviour problems in class ( $ES=.91$ ) and on the immigrant students social competence assessed by teachers ( $ES=1.73$ ) were in the large range.

## Discussion

While the analyses of the main variables in the outcome study documented a general reduction in problem behaviour in all eight participating schools, the reduction was significantly larger in the intervention schools (P-schools) than in the comparison schools (C-schools). Teachers in the P-schools reported a significantly lower number of problem behaviour incidents, both in the school environment and in the classroom during a randomly selected week two years after the initiation of PALS. The number of teacher-reported students with severely disturbing problem behaviour in class was also significantly reduced in the P-schools, while the number actually increased in the C-schools. A practical significance as indicated by effect sizes in the moderate to large range on the main outcome variables was also registered, in favour of the P-schools. The results indicate that the implementation of PALS interventions in years 1 and 2 led to statistically, as well as practically, significant changes in the most important behavioural outcome variables when the intervention schools were compared to the C-schools with alternative approaches to student problem behaviour.

Interestingly enough, the positive behavioural changes observed in the P-schools were more evident at the school level than classroom level. This might be attributed to the importance placed on implementing school-wide rules and consistent rule enforcement in PALS. Another explanation might be the programme's emphasis on developing a sense of collective efficacy among staff. The less encouraging results at the classroom level might be explained by the fact that not all teachers had sufficiently implemented the programme principles in their daily practice. Commenting on these results, the teachers in the P-schools reported that the programme "seemed to be in the walls, but not quite in fingertips of each teacher". More explicit monitoring of teacher programme fidelity should be considered in the future research on the PALS-programme.

As could be expected, the PALS-programme was more effective in reducing externalising problem behaviour than internalising problems. PALS contains interventions primarily focusing on risk factors related to overt problem behaviour or conduct disorder (Moffitt & Caspi, 2001; Loeber, 1990), even though we expected that a more safe and orderly learning environment would have some positive effects on internalising problem behaviour as well.

We found that PALS worked better in some P-schools than in others. The two schools with most behaviour problems at baseline turned out to have the largest mean change scores on the main outcome variables. Greater potential for change

may be a logical explanation to this, and the finding supports the assumption underlying the inclusion criteria, that schools that struggle with behaviour problems should be the main targets of programme implementation. The importance of good match between the school ecology and the characteristics of prevention programmes is highlighted by findings in several studies (Huges, Cavell, Meehan, Zhang, & Collie, 2005; Rowe, Almeida, & Jacobson, 1999; Patterson, Dishion, & Yoerger, 2000). In environments where problem behaviour and antisocial attitudes are uncommon, the most effective interventions are likely those that promote aggressive students' pro-social interaction skills and restrict their involvement with deviant peer groups (Patterson et al., 2000). In more adverse environments it is more likely that positive effects are achieved by a combination of (a) universal interventions targeting school-wide norms and behaviours to create a climate supportive to targeted competencies; and (b) selective interventions to promote pro-social cognition and behaviour in risk students (Huges et al., 2005; Rowe et al., 1999). Moreover, research has shown that in high-adverse environments the universal interventions need to be more intense and implemented on a school-wide basis rather than on a classroom level to achieve positive results (Aber, Jones, Brown, Chaudry, & Samples, 1998). In sum, these findings seem to strengthen the theoretical assumptions and empirical findings from the current PALS study.

The students' social competence increased significantly in all schools during the two-year project period, according to both teachers and students. However, significant intervention-group differences were not found at post-assessment. This indicates that PALS, at least in the short run, was not more effective in promoting social competence than interventions in the comparison schools. Improved social competence for immigrant students in the P-schools may, however, be explained by the more explicit behavioural expectations and responses, as well as practical skills-training opportunities, in relation to what is considered normative pro-social behaviour in the Norwegian school context. Systematic social-skills training was not universally included in the present implementation of PALS, and that might explain the lack of intervention effects for all students. Social-skills training programmes have been successfully integrated in earlier implementations of positive behaviour support programmes, for instance, by Sprague et al. (2001), who combined PBS with Second Step (Committee of Children, 1997). We therefore recommend the addition of such programmes in future implementations of PALS in efforts to strengthen the programme impact on social competence outcome variables.

We expected that the interpersonal relations among students and between students and teachers would be positively affected by the approaches and consequences promoted by the programme. It turned out that there were indications of a deteriorating learning environment over time in all of the participating schools, a tendency also found in Norwegian survey studies of problem behaviour in school (e.g. Sørli & Nordahl, 1998). PALS seemed to counter this negative behavioural trend to a certain extent, as the P-school teachers rated change in the social-learning

context less negatively than teachers in the C-schools. This finding was, however, not matched by the student ratings. According to the majority of students, PALS and the alternative interventions were equally ineffective in producing positive changes in the classroom learning environment. A closer examination revealed that immigrant students in fact rated the socio-academic learning environment in class as poorer in the P-schools than in the C-schools at the end of year 2. It might be that PALS actually resulted in a positive redistribution of the teachers' attention and positive feedback to the more problematic students, while the other students experienced no change; and some (i.e., immigrants), even negative change. If the learning environment is improved for some students at the expense of other students, this might signal the need for a closer look at the social-learning climate of the immigrants and the regular well-adapted students in future research on PALS. The assessments of the classroom climate show a tendency, also found in other outcome variables, that the teachers reported more positive changes than the students, at least in the short term. This can probably be attributed to teacher-bias based on positive expectancies. But it might also be explained by the fact that teachers were more aware of, and therefore more sensitive to, the immediate positive changes, while students perhaps need more time to experience changes in the teachers' behaviour and in the learning environment (i.e., delayed effects).

As hypothesised, higher scores on the specific implementation scales used in the P-schools were significantly related to better teacher-rated behaviour outcomes. Especially how well the interventions were implemented within the classroom system seemed important. Higher scores on the general aspects of implementation quality measured as collective efficacy were also significantly associated with better outcomes in the intervention group than in the comparison group. The importance of high procedural integrity to programme effectiveness is evidenced and underlined in several school and community-based intervention studies (Greenberg, Domitrovich, Graczyk, & Zins, 2001; Gresham et al., 2000; U.S. Department of Justice, 2004). Goddard et al. (2000) examined collective efficacy in schools and found that differences between schools in student achievement (mathematics and reading) were positively and significantly related to collective efficacy (after the analysis was made to control for student demographic characteristics and prior achievement). Our study indicates that the amount of consensus among staff regarding collective efficacy perceptions also affect behavioural outcomes of school-based interventions to prevent student problem behaviour. It should be noted that no widely applicable standardised methodology exists for how to measure fidelity of interventions (Waltz, Addis, Koerner, & Jacobson, 1993). There is a general need for developing more valid measures and fidelity indicators that can be used across interventions that differ markedly in their approach (Dusenbury, Brannigan, Falco, & Hansen, 2003). In this study the observed relationship between outcome and fidelity scores was based on teacher ratings only. Supplementing fidelity ratings by informants less directly involved in the implementation process (e.g., students) could have been included to strengthen the validity.

Other limitations and guiding proposals for future research on PALS should also be mentioned. Because we used a quasi-experimental design and focused on immediate outcomes, the results should be interpreted with some caution as concerns programme effectiveness, sustainability, and generalisability of results. The long-term effects of the PALS-programme were not examined in this study, which makes it difficult to determine potential delayed effects or the magnitude of positive expectancies effects. Unfortunately, the design of the study did not allow us to test the effects of matching interventions to the students' risk level. How PALS might produce differential outcomes for students at various levels of risk is, however, an important question that will be investigated in the next outcome study of the PALS-model (randomized study planned in 2007). Although the parents were only indirectly involved in the programme implementation, they were playing a central role by consenting to the project, by participating in the schools' planning teams and by giving informal feedback and support to the school staff. However, in future studies they should also be included as respondents in the evaluation and thus broaden the information-base on which the conclusions about PALS should be drawn.

The teachers were generally more positive in their assessments of behavioural and environmental change than the students, a difference that also should be looked into more closely in future research. The so-called Hawthorn effects (e.g., the tendency of positive effects independent of type of intervention implemented) and strategic ratings (e.g., if resources to further innovative work depend on immediate positive outcomes) (Hellevik, 2002) might affect outcomes, but less so in a long-term interventions like PALS, which were evaluated after two years. A possible bias might have been introduced because teachers were carrying out the interventions and also performing the behaviour ratings. However, both P- and C-schools were implementing new projects, so we would expect this to affect the schools equally.

The study also had several strengths, including (a) use of well-established and reliable measures; (b) assessments conducted at both at the school, classroom, and individual levels; (c) combining teacher and student assessments; (d) measuring changes in actual student behaviour ratings; (e) measuring implementation quality of the PALS-interventions at the school, classroom, and individual levels; and (f) examining potential differential effects for subgroups among participants. The fact that PALS was tested in a natural setting, with practically no extra resources, and that the comparison schools also had ongoing intervention projects strengthens our conclusion that PALS is a promising intervention model both for school-wide prevention of behaviour problems and deteriorating learning conditions in class and for promotion of positive behaviour and teacher collective efficacy. At a more general level we believe that the evaluation of the PALS model illustrates the value of systematic school-wide interventions for reducing and preventing problem behaviour. This implies systematic implementation of evidence-based comprehensive interventions in all arenas of the school and with contributions from the whole staff.

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