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Change in teacher–student relationships and parent involvement after implementation of the Incredible Years Teacher Classroom Management programme in a regular Norwegian school setting

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This quasi-experimental pre–post comparison group design examined if the Incredible Years (IY) Teacher Classroom Management (TCM) programme implemented as a school-wide universal preventive intervention to students aged 6–8 years at the lower primary level in a regular school setting had an effect on teacher–student relationships and teacher–parent involvement. The IY-TCM training was delivered simultaneously to the entire group of school staff in first to third grade. Teacher reports in 21 intervention schools were compared to teacher reports in 23 control schools. A total of 241 teachers and 1,518 students took part in the trial. Linear mixed model analyses suggest modest positive effects on change in teacher–student closeness (d_{zv} = 0.22) and conflict (d_{zv} = 0.15), where a moderator analysis showed a significantly higher treatment effect for high-risk students on change in teacher–student conflict. A positive effect was found on change in teacher-reported parent involvement in school (d_{zv} = 0.40), however, not on change in teacher-reported bonding with parents. Results suggest a potential preventive impact of the IY-TCM programme on change in teacher–student relationships and teacher–parent involvement when implemented as a universal preventive intervention in a regular school setting.

Keywords: universal preventive intervention; teacher–student relationships; parent involvement

Introduction

Consistent behaviour problems across time represent a powerful predictor of poor long-term outcomes related to academic problems, school dropout, crime, substance abuse, unemployment and poor mental health (Odgers *et al.*, 2008). Disruptive and challenging behaviour in the classroom is a widely recognised problem. Negative teacher–student interactions are more likely to occur in poorly managed classrooms

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(Reinke & Herman, 2002; Conroy *et al.*, 2009), and these classroom environments contribute to the risk of students developing behaviour problems (Webster-Stratton *et al.*, 2004). Thus, optimising teachers' skills in managing disruptive behaviour and socio-emotional difficulties within the classroom could be an effective strategy to reduce problem behaviour and promote socio-emotional competence, as well as positive educational outcomes (Whear *et al.*, 2013). Student–teacher relationships influence several aspects of students' school experience and impact development in social, emotional, behavioural and academic domains (Hamre & Pianta, 2001; Murray & Zvoch, 2010; Roorda *et al.*, 2011). Children with behavioural problems are at larger risk of developing negative relationships with their teachers (Silver *et al.*, 2005; Drugli, 2013; Mejia & Hoglund, 2016; Zee & Koomen, 2017). Distrust, discordance, high conflict level and low level of closeness often characterise negative student–teacher relationships, which may escalate student behaviour problems and academic problems across time (Hamre & Pianta, 2001; Roorda *et al.*, 2014). Zee and Koomen (2017) found that externalising behaviours of individual students generally predicted higher levels of teacher-perceived conflict, which, in turn, resulted in lower student-specific teacher self-efficacy beliefs across teaching domains. Through their perceptions of conflict, teachers may see the task of teaching, engaging and offering emotional support to such students as challenging, and this may subsequently reduce their self-efficacy in relation to these students (Spilt *et al.*, 2011; Zee & Koomen, 2017). However, positive student–teacher relationships characterised by warmth, respect, caring and positive effect, especially towards children at risk, may serve as an important protective factor (Sabol & Pianta, 2012; McGrath & Van Bergen, 2015).

Parents' involvement in their children's development includes quality and frequency of contact between teachers and parents (Dearing *et al.*, 2006; Wyrick & Rudasill, 2009). Both parents and teachers can initiate parent involvement, but teachers have the main responsibility for establishing contact with parents and supporting parent involvement (Driessen *et al.*, 2005). However, some parents avoid contact because they feel demeaned by schools and teachers (Desforges & Abouchaar, 2003). Parents with a low level of belief in their ability to help their child are likely to avoid contact with the school and are probably less willing to be actively involved in school or education (Hornby & Lafaele, 2011). Parent involvement is associated with improved child behaviour, emotional adjustment and well-being at school, in addition to academic achievement (Hornby & Lafaele, 2011), and seems particularly important for the youngest children (Englund *et al.*, 2004). Furthermore, positive contact between parents and teachers seems to predict positive social development and academic success for children with behaviour problems (Reid *et al.*, 2007). However, for these children parent involvement seems to be both important and complicated (Henggeler *et al.*, 2009). When children exhibit negative behaviours in school, most contact between teachers and parents is related to these negative behaviours, and after some time, parents may feel reluctant to stay in contact with the teacher or may even try to avoid contact. Lack of positive contact between parents and teachers may perpetuate child behaviour problems (Webster-Stratton *et al.*, 2008).

A variety of intervention programmes to prevent behavioural problems among young children have been developed for use in school settings. One example is the

Incredible Years Teacher Classroom Management programme (IY-TCM), which is a universal school-based programme aimed at strengthening teachers' proactive classroom management strategies in order to promoting children's pro-social behaviour and school readiness. In addition, the programme aims at helping teachers to support parents' school involvement and promote consistency between home and school (Webster-Stratton, 2011). The first session of the IY-TCM programme includes two core components of the intervention: how to build positive relationships with students and how to involve parents (Webster-Stratton, 2011).

In high-risk samples in the USA, the IY-TCM programme has shown significant effects on change in both teacher and child behaviour, such as less use of harsh and critical teacher classroom strategies and a reduction in child conduct problems and levels of disengagement (Webster-Stratton *et al.*, 2001, 2004, 2008). Significant benefits in child and teacher behaviour based on observations, teacher and parents' reports were confirmed in cluster randomised controlled trials (RCTs) of the IY-TCM programme in 24 Jamaican preschools (Baker-Henningham *et al.*, 2009, 2012). Examinations of adapted versions of the IY-TCM programme using mental health consultations have reported improved teacher management practices and emotional climate in classrooms (Shernoff & Kratochwill, 2007; Raver *et al.*, 2008; Williford & Shelton, 2008). Furthermore, significant improvements in teachers' competencies and their management of disruptive behaviours in the classroom were found within the general school population in studies from Wales (Hutchings *et al.*, 2007, 2013) and Ireland (McGilloway *et al.*, 2010). Positive effects for change in problem behaviour and social competence have been found in studies in Norway as well (Fossum *et al.*, 2017; Aasheim *et al.*, 2018).

As far as we know, this is the first evaluation of the IY-TCM programme given as a school-wide universal preventive intervention to the entire group of school staff at the lower primary level, simultaneously, towards students aged 6–8 years. In addition, no studies have explored the effect of these core components of the IY-TCM programme in the general school population, hence, these components of the IY-TCM programme are the focus of the present study. Based on previous findings mentioned above, we hypothesised that training the teachers in the IY-TCM programme would (1) change teacher–student relationships (i.e. reduce conflict and increase closeness) and (2) change teacher–parent involvement (i.e. increase involvement and bonding with parents) in favour of the IY-TCM group.

Method

Participants

Incredible Years Norway selected and invited municipalities (n = 17) that had previously implemented the IY parenting programme, and hence had IY group leaders who could be trained for the TCM programme, to implement the TCM programme and participate in the study. The group leaders informed the schools about the programme implementation and research study. Extensive predefined study inclusion criteria had to be met prior to study participation, which implied the acceptance of a school-wide implementation from first to third grade, and the approval of the

programme implementation from at least 80% of the entire school staff. Hence, the schools that wanted to implement the programme and participate in the study had to apply to IY Norway. Provided schools met the predefined inclusion criteria, they were enrolled in the study and allocated to the intervention group. From a total of 25 schools which applied for programme implementation, 21 met the predefined study inclusion criteria and were offered the IY-TCM training free of charge. Four schools did not manage to meet the predefined inclusion criteria for school-wide implementation from first to third grade. However, these four schools accepted being allocated to the comparison group, and were offered IY-TCM implementation the year immediately after study participation.

To minimise program contamination, IY Norway contacted education agencies in municipalities (n = 12) without IY implementation, and invited schools to participate as comparisons in the study. These municipalities were strategically selected in order to match to the IY-TCM group on geographical location and school size; small (< 200 students), medium (201–350 students) and large (351–780 students) (Nygård, 2014). Of 32 invited schools, 19 schools responded to the invitation and accepted participating in the comparison group; they were offered a modest financial compensation for not receiving the IY-TCM training immediately. Provided they wanted the IY-TCM training, municipalities and schools were given implementation support from IY Norway after participation in the study ended. The mean school size for the 43 included schools was 179 students (range 22–652) and the total number of classes from first to third grade inclusive was 225 (124 in the intervention and 101 in the control). The mean class size was 19.7 (SD = 8.8). None of the 43 schools were actively attending or had attended any other evidence-based school intervention programmes during the previous year. The flow of participants through each stage of the study is illustrated in Figure 1.

The total number of teachers from first to third grade was 567. One teacher per class was asked to participate as respondent regarding his/her relationship with the student and the degree of teacher–parent involvement. This was normally the class teacher who was in daily interaction with the students, and who on a regular basis was in contact with the parents of students in the class. If the teacher was new to the class at pre-assessment, the teacher was instructed to wait to complete the questionnaires until she/he had known the students for at least 3–4 weeks. Teacher respondents included a total of 241 teachers (139 teachers in the intervention and 102 teachers in the comparison). The teachers received a small financial compensation for the time spent on completing the questionnaires.

The total number of students in first to third grade was 3,331. According to Snijders and Bosker (2012), high intra-class correlations may decrease the benefits of including whole classes in the sample. In order to maximise the effective sample size and reduce data dependency, as well as limit teacher burden, only seven students per class were randomised to participate in the study. A statistician who was blind to the characteristics of the schools, classes and students was given the number of students in each class, and subsequently composed a random number sequence list of students in each class. Thereafter, the class teacher matched the first seven random numbers from the list with the students' alphabetical order in class. This randomisation resulted in 829 students in the intervention and 689 students in the comparison

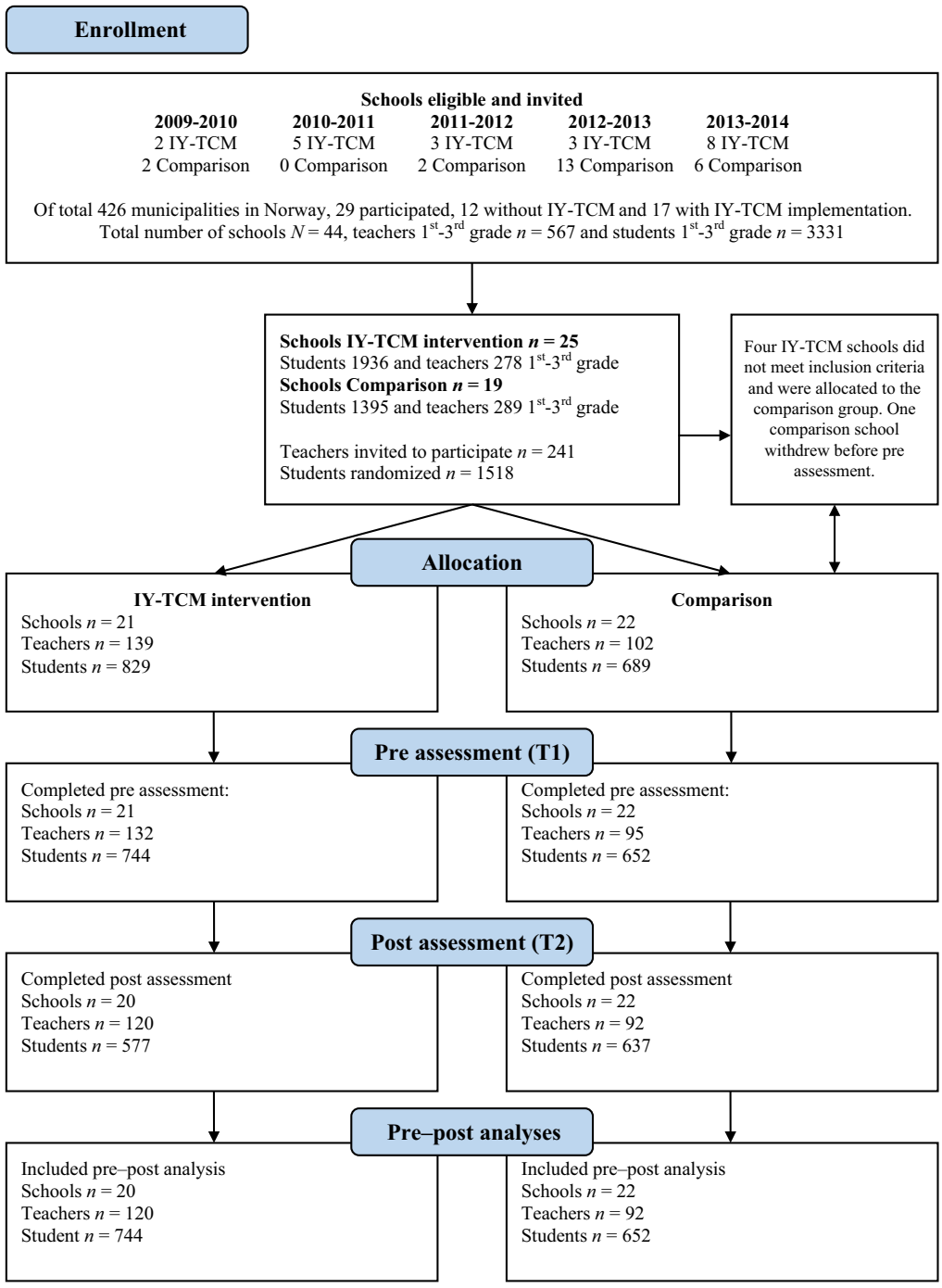

Figure 1. Flow-chart of schools, teachers and students in the study [Colour figure can be viewed at wileyonlinelibrary.com]

group. Only students aged 6–8 years in first to third grade participated. The students' mean age was 7.3 (SD = 0.87). The students were screened using the Sutter–Eyberg Student Behavior Inventory-Revised (SESBI-R) (Eyberg & Pincus, 1999). A

subsample of 83 students (6%) scored equal to or above the 90th percentile on the SESBI-R scale (> 144), which is considered to be in the clinical range (Kirkhaug *et al.*, 2012). Findings are presented in Kirkhaug *et al.* (2016). About 7% of students at the lower primary level in Norway have a first language other than Norwegian (Statistics Norway, 2017). In the present study, a significant difference in terms of students' ethnicity was found: 64 (8.6%) of 744 students in the intervention and 13 (2%) of 652 students in the comparison group were non-Norwegian. Apart from this significant difference, no significant group differences were found on other demographic variables. Demographic information for the schools, teachers and students included in the study is presented in Table 1.

Procedure

This study had a quasi-experimental pre–post design with a continuous enrolment of intervention and comparison schools through five consecutive years, from autumn 2009 to autumn 2013. In total, 24 municipalities implemented the IY-TCM programme and from 17 of these, 25 schools applied for programme implementation and study participation (see Figure 1). Before pre-assessment and the first IY-TCM session, information about the IY-TCM programme and data collection procedures was presented to teachers and staff. Pre-assessment (Time 1) took place during the autumn, about 3 weeks ahead of the first IY-TCM training, and post-assessment (Time 2) was carried out in spring the year after, about 3 weeks after the final IY-TCM training. The duration between the two assessments was typically 8–9 months. Parents were informed about the IY-TCM programme and the research study,

Table 1. Descriptive information for schools, teachers and students at baseline

	IY-TCM	Comparison	Total
Schools, *N*	21	22	43
School size large (351–780 students)	4	2	6
School size medium (201–350 students)	6	5	11
School size small (< 200 students)	11	16	27
Class size, *M* (SD)	20.82 (6.85)	18.48 (10.55)	19.74 (8.84)
Teachers, *N*	132	95	227
Teacher's age in years, *M* (SD)	40.94 (11.86)	44.19 (10.31)	42.75 (11.26)
Work experience in years, *M* (SD)	11.73 (9.11)	15.48 (8.68)	13.37 (9.05)
Educated as teacher, *n* (%)	123 (93.2)	87 (91.6)	210 (92.5)
Female teacher, *n* (%)	115 (87.1)	84 (88.4)	199 (87.7)
Students, *N*	744	652	1396
Girls, *n* (%)	355 (47.7)	297 (45.6)	652 (46.7)
Age, *M* (SD)	7.22 (0.86)	7.30 (0.87)	7.26 (0.87)
Non-Norwegian, *n* (%)⋆	64 (8.6)	13 (2.0)	77 (5.5)
Special education, *n* (%)	67 (9.0)	72 (11.0)	139 (10.0)
High-risk students, *n* (%)[a]	45 (6.1)	38 (5.8)	83 (6.0)

Note: IY-TCM = Incredible Years Teacher Classroom Management.
[a]Score of 144 or higher on SESBI-R intensity.
⋆$p < 0.05$.

including the data collection procedures, through written information or verbal presentation during parents' meetings, and were requested to consent to their children's participation. Provided parental consent was given, the teacher filled out questionnaires about the student. The questionnaires were only available in Norwegian, so students whose parents did not speak Norwegian were excluded. Teachers and students were anonymised using ID codes. Parents could withdraw their child from the study without further explanation. The questionnaires were returned in prepaid envelopes or completed using the Internet survey tool, QuestBack.

The study was approved by the Regional Committee for Medical and Health Research Ethics, Norway. Approval/reference number: 2009/655/REK North.

The intervention

The IY-TCM is a universal classroom management programme for teachers in kindergarten up to third grade, used to strengthen teachers' classroom management strategies in order to reduce early-onset problem behaviour and promote social skills. One basic premise for the IY-TCM training is to establish solid relationships with students and parents, and these elements have to precede other teaching strategies. Another premise is that teachers' attention should be directed far more frequently to positive student behaviours than to negative ones (Webster-Stratton, 2012). Six topics are covered, with one workshop for each topic. Each workshop builds upon the content of the previous one, and they are delivered as follows: (1) building positive relationships between teacher and student, and between teacher and parents; (2) teacher attention, coaching, encouragement and praise; (3) motivating students through incentives; (4) decreasing inappropriate behaviour—ignoring and redirecting; (5) decreasing inappropriate behaviour—follow through with consequences; (6) emotional regulation, social skills and problem solving.

Two experienced and qualified group leaders trained the teachers and staff simultaneously in groups (20 in each group), through six full-day workshops, starting in autumn and ending in spring the year after, over an 8 to 9-month period (about one workshop per month), 42 hours in total. Teachers were instructed to practice the programme principles during the month following each session and to report on their experiences at the start of the following session; they were provided with guidance after each workshop. As part of the training, the textbook *How to promote social and emotional competence in young children* (Webster-Stratton & Okstad, 2005) was provided to teachers and staff. In order to ensure evidence-based implementation of the programme, fidelity in training was promoted by means of checklists completed by both group leader and teacher, as well as a user satisfaction questionnaire completed by teachers at the end of training (Webster-Stratton, 2011).

To become a qualified group leader, a 21-hour mandatory TCM training course provided by IY Norway had to be completed. A higher education qualification (Bachelor's or Master's degree) in teaching, special education, psychology, health or social studies was also required. Before the group leader could complete the training for this study, they had to deliver the training programme at least once or twice (or in one or two schools, depending on school size) per year on average. The group leaders were trained and supervised by the same two IY-TCM mentors (certified in both the

Parenting and the TCM programme by the programme originator), throughout the data acquisition period.

Measures

The *Student–Teacher Relationship Scale, short form* (STRS-SF; Pianta, 1996) was used to measure the teacher's perception of his/her relationship with a particular student. The STRS-SF has been tested in a regular national sample of Norwegian school-age children in first to seventh grade; hence, the measure has been adjusted for the Norwegian population and found to be valid for studies of Norwegian students (Drugli & Hjemdal, 2012). The STRS-SF consists of 15 items, and factor analyses have shown that the STRS-SF measures two latent characteristics of the teacher–student relationship (Drugli & Hjemdal, 2012). The closeness scale contains eight items (ranging from 8 to 40) and measures the degree of emotional support, warmth and open communication in the teacher–student relationship (e.g. '*This child openly shares his/her feelings and experience with me*'). The conflict scale contains seven items (ranging from 7 to 35) and measures the degree to which a teacher perceives his/her relationship with a particular student as negative and conflictual (e.g. '*Dealing with this child drains my energy*'). The responses are given on a five-point Likert-type scale (1 = does not apply at all, 5 = applies very well). For this study, Cronbach's alpha was 0.81 for the closeness scale and 0.84 for the conflict scale.

The *Teacher Involvement Questionnaire* (INVOLVE-T) was adapted from the Oregon Social Learning Center (OSLC) and revised by Webster-Stratton (1998) for use by teachers of young school children. The INVOLVE-T is a 20-item questionnaire in which teachers are asked to report on parents' involvement in their children's education and frequency of contact with teachers and the school. The questionnaire originally had three subscales (Webster-Stratton *et al.*, 2001). For the present study the subscale *Parent Involvement in Education* (six items: if parents have the same goals as teacher; if parents value education as important; and parents' engagement in school activities and homework) was merged with the subscale *Parent Involvement with School/Teacher* (seven items: the degree to which parents contacted the teacher or school during the last 6 months, e.g. if parents attended conferences, were present in the classroom and at school arrangements) to create one variable for the analysis (for further explanation, see the discussion section). Hence, the two subscales, *Parent Involvement in Education* and *Parent Involvement with School/Teacher*, will be referred to as 'Parent Involvement in School' in the following text. The teacher's responses are coded on item-specific five-point scales, where zero represents no involvement and four represents high involvement. In addition, the subscale *Teacher Bonding with Parent* (seven items) was used, referring to how often the teacher initiated contact with parents during the last 6 months (e.g. telephone contact, written note, invited parents to school, was comfortable meeting with parents). The responses are given on the same five-point Likert-type scale as the Parent Involvement in School scale, where zero represents no bonding and four represents high bonding. For this study, Cronbach's alpha was 0.61 for *Teacher Bonding with Parent*, 0.76 for *Parent Involvement in Education* and 0.79 for *Parent Involvement with School/Teacher*.

Statistics

All statistical analyses were conducted with SPSS 24. To test for group differences on demographic variables, independent sample *t*-tests and Pearson's chi-square tests were used before the main analysis was conducted. In the present study, the students are the unit, hence the data were hierarchically organised with students (level 1) nested within teachers (level 2). To test for group differences on baseline scores, as well as group differences on change in teacher–student relationships and teacher–parent involvement from pre- to post-assessment, linear mixed model (LMM) analysis was used. The dependency in data, which reduces the effective sample size, is ensured by the LMM analysis, and hence this is a suitable method for analysing hierarchical data. Intra-class correlations (ICCs) were calculated on pre-, post- and change scores to estimate the degree of dependency within teachers that this clustering causes. The change scores were used as dependent variables in the main analyses. To deal with missing data, multiple imputation was used for the analyses, creating 20 complete sets of data. Demographic variables and all relevant pre- and post-student variables were used as predictors in connection with imputation of both missing pre- and post-data in the imputation model. Performing multiple imputation of data under the assumption of MAR (data missing at random) is an appropriate and flexible way of handling missing data, and was therefore done in order to ensure that the pre- and post-analyses reflect the entire student population that participated in this study (Stuart *et al.*, 2009). Effect sizes (d_w) were computed as standardised group differences in pre–post mean change using the pooled within-cluster sample standard deviation (Hedges, 2007). Cronbach's alpha was used to examine internal consistency for all scales, and the values were evaluated according to the EFPA criteria (Evers *et al.*, 2013), whereby values below 0.70 were considered inadequate, 0.70–0.79 adequate, 0.80–0.89 good and values 0.90 or higher were regarded as excellent. A significance level of 0.05 was adopted for all tests.

Results

Attrition

The number of participating teachers at pre-assessment was 227 (94%) from a total of 241 teachers invited, and the number of participating students was 1,396 (92%) from a total of 1,518 possible students. Dropout at pre-assessment was due to lack of parental consent or delayed arrival of consent forms from parents, as well as insufficiently completed questionnaires, and amounted to 7 teachers and 85 students in the intervention; 7 and 37, respectively, in the comparison group. The number of participants at both pre- and post-assessment was 212 (88%) teachers and 1,214 (80%) students. Dropout at post-assessment was different between intervention and comparison, in that 167 students in the intervention and 15 students in the comparison group had missing subject-level data. Missing data in the intervention group was due to withdrawal of one school (organisational causes); this included 7 teachers and 49 students. Dropout was also due to teachers on leave or changing their jobs; this included 5 teachers and 28 students. A further 90 students in the intervention group,

and 3 teachers and 15 students in the comparison group, had missing data (due to incomplete questionnaires or protocol errors). When students who had missing data at post-assessment were compared with students who had both pre- and post-assessment data, no significant differences were found.

Group effects in teacher–student relationships measured with STRS Closeness. There were no significant differences between the conditions on STRS scores at pre-assessment. Significant group differences were found in change on STRS Closeness ($t = 2.14$, $p = 0.03$) and on STRS Conflict ($t = -2.34$, $p = 0.02$). The corresponding effect sizes were small for STRS Closeness ($d_w = 0.22$) and STRS Conflict ($d_w = 0.15$). Based on the change score, calculations of the ICCs suggested that 36% of the variance in STRS Closeness and 19% of the variance in STRS Conflict may be due to clustering effects within teachers (see Table 2).

Testing for moderating effects of gender and grade, a significant interaction between intervention group and grade for STRS Closeness was found ($F = 3.25$, $p = 0.05$). Studying this interaction, the analysis showed a significantly larger treatment effect in second grade than in third grade ($t = -2.52$, $p = 0.01$), whereas the treatment effect in the first grade, compared to the second and third grade, was not significant. Testing for moderating effects of the level of behaviour problems (high/low), measured with SESBI-R intensity, revealed a significant interaction between treatment group and high-risk status on change in STRS Conflict. Examining this interaction, a significantly higher treatment effect was found for high-risk students on change in STRS Conflict than for those students not in the high-risk group (3.0 points pre–post change difference, $t = -3.25$, $p = 0.001$). The mean change in STRS Conflict for the high-risk students in the intervention group was -3.02 (SE = 0.93), whereas the mean change for the high-risk students in the comparison group was 0.49 (SE = 0.93). Testing for separate group differences in change on STRS Closeness by gender and grade, a significant group difference was found for second grade ($t = 2.11$, $p = 0.03$) ($d_w = 0.39$). For STRS Conflict by gender and grade, a significant group difference was found for boys ($t = -2.41$, $p = 0.02$) ($d_w = 0.25$) and first grade ($t = -2.66$, $p = 0.01$) ($d_w = 0.29$) (see Table 2).

Group effects in teacher–parent involvement measured with INVOLVE-T. At pre-assessment, significant differences between conditions were found on teacher-reported Parent Involvement in School and Teacher Bonding with Parent (see Table 2 for more details). A significant group difference was found in pre–post change on teacher-reported Parent Involvement in School ($t = -2.16$, $p = 0.031$). For teacher-reported group differences in pre–post change on Teacher Bonding with Parent, results were not significant at the 0.05 level ($t = 1.73$, $p = 0.083$). For Parent Involvement in School, the effect size was medium ($d_w = 0.40$). Based on the change score, the ICC was 0.48 for Parent Involvement in School and 0.47 for Teacher Bonding with Parent, suggesting quite high within-teacher dependency for these scales. Testing for separate group differences in change on teacher-reported Parent Involvement in School by gender and grade, a significant group difference was found for boys ($t = 2.29$, $p = 0.02$) ($d_w = 0.51$) and first grade ($t = 2.46$, $p = 0.01$) ($d_w = 0.77$) (see Table 2).

Table 2. Descriptive statistics at pre- and post-test, results of multilevel analyses examining group differences in pre/post change scores and effect sizes (d_{zv})

	TCM intervention[a]				Comparison[a]				Baseline[b]	Effects[b]		
	Pre		Post		Pre		Post		Pre	Pre/post		
	n	*M* (SD)	*n*	*M* (SD)	*n*	*M* (SD)	*n*	*M* (SD)	*t*	Estimates	*t*	d_{zv}
STRS-SF												
Closeness	724	28.4 (4.5)	577	29.7 (4.0)	628	28.7 (4.2)	635	29.4 (4.4)	0.64	0.74	2.14*	0.22
Girls	355	29.2 (4.4)	288	30.6 (3.6)	297	29.6 (3.8)	297	30.3 (3.9)	0.77	0.65	1.67	0.26
Boys	364	27.6 (4.4)	284	28.9 (4.1)	331	27.8 (4.4)	338	28.6 (4.6)	0.31	0.66	1.50	0.24
1st class	241	27.2 (4.5)	198	29.9 (3.7)	216	27.6 (4.2)	214	29.1 (4.2)	0.24	1.07	1.69	0.44
2nd class	227	29.3 (4.3)	160	30.2 (3.8)	212	29.9 (3.3)	216	29.8 (3.8)	1.17	1.20	2.11*	0.39
3rd class	256	28.7 (4.3)	219	29.2 (4.3)	197	28.4 (4.6)	202	29.2 (5.1)	–0.16	0.39	0.07	0.07
Conflict	723	11.5 (4.9)	576	11.1 (6.4)	625	10.9 (4.5)	633	11.1 (4.8)	–1.71	–0.76	–2.34*	0.15
Girls	354	10.6 (4.1)	287	10.1 (3.4)	295	10.3 (3.8)	297	10.3 (4.1)	–0.92	–0.48	–1.26	0.11
Boys	364	12.5 (5.5)	284	12.0 (5.3)	330	11.5 (5.0)	336	11.7 (5.3)	–1.89	–0.97	–2.41*	0.25
1st class	240	11.7 (4.8)	197	10.5 (4.3)	215	11.2 (4.3)	214	11.2 (4.9)	–0.63	–1.52	–2.66**	0.29
2nd class	227	11.0 (4.3)	160	10.5 (3.6)	210	10.1 (3.8)	214	10.2 (3.5)	–1.76	–0.18	–0.34	0.19
3rd class	256	11.8 (5.5)	219	12.0 (5.3)	197	11.5 (5.3)	202	11.9 (5.6)	–0.60	–0.45	0.87	0.07
INVOLVE-Teacher												
Parent involvement in school	718	35.7 (5.4)	574	36.9 (2.2)	621	36.9 (4.5)	633	36.6 (4.9)	2.02*	1.04	2.16*	0.40
Girls	353	35.8 (5.5)	286	36.8 (4.1)	293	37.0 (4.4)	297	36.7 (5.1)	2.31*	0.85	1.48	0.35
Boys	360	35.7 (5.4)	283	37.0 (4.7)	328	36.8 (4.6)	336	36.4 (4.7)	1.86	1.21	2.29*	0.51
1st class	239	34.8 (5.7)	196	37.2 (4.4)	215	37.0 (4.8)	215	36.4 (5.1)	2.30*	2.35	2.46*	0.77
2nd class	226	36.7 (5.3)	160	37.7 (4.4)	211	37.1 (4.5)	216	36.2 (5.0)	0.42	0.80	1.08	0.49
3rd class	253	35.8 (5.2)	218	36.0 (4.4)	192	36.5 (4.2)	199	37.0 (4.6)	0.73	–0.45	–0.67	0.06
Teacher bonding with parent	719	17.5 (1.4)	576	18.0 (2.1)	627	18.3 (2.9)	634	18.4 (2.0)	3.56***	0.40	1.73	0.16
Girls	354	17.4 (2.2)	288	17.9 (1.9)	297	18.4 (2.3)	296	18.3 (2.1)	3.99***	0.51	1.97*	0.41
Boys	360	17.6 (2.4)	283	18.1 (2.2)	330	18.3 (2.2)	338	18.4 (2.0)	2.34*	0.23	0.92	0.28
1st class	240	16.8 (2.2)	197	17.8 (2.0)	215	18.2 (2.7)	214	18.5 (2.4)	3.25**	0.76	1.84	0.45

Table 2. (Continued)

	TCM intervention[a]				Comparison[a]				Baseline[b]	Effects[b]		
	Pre		Post		Pre		Post		Pre	Pre/post		
	n	*M* (SD)	*n*	*M* (SD)	*n*	*M* (SD)	*n*	*M* (SD)	*t*	Estimates	*t*	d_w
2nd class	225	17.9 (2.4)	160	18.3 (2.2)	212	18.6 (2.0)	215	18.2 (1.8)	1.68	0.29	0.71	0.46
3rd class	254	17.8 (2.2)	219	18.0 (2.0)	197	18.2 (2.1)	202	18.4 (1.8)	1.08	–0.03	–0.11	0.04

Note: TCM = Incredible Years Teacher Classroom Management; STRS-SF = Student–Teacher Relationship Scale, short form; INVOLVE-T = Teacher Involvement; Questionnaire, d_w = effect sizes computed using the pooled within-treatment groups' standard deviation of the cluster means (pre-assessment scores).
ICC for STRS Closeness (pre = 0.45, post = 0.41, pre–post = 0.36), for STRS Conflict (pre = 0.20, post = 0.21, pre–post = 0.19), for INVOLVE-T Parent Involvement (pre = 0.48, post = 0.40, pre–post = 0.48), for INVOLVE-T Teacher Bonding (pre = 0.60, post = 0.60, pre–post = 0.47).
The covariates gender, grade, ethnicity, special education, how well the teacher knew the student, number of hours the teacher taught the student each week and number of students in each class were all statistically accounted for in the different multilevel analyses.
[a]Original data.
[b]Imputed data.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

As schools were recruited through five consecutive years, an interaction analysis was conducted to test for differences in the outcomes between the two groups during the years, both on original and imputed data. However, no interaction effects on outcome variables were found, either for original or imputed data. Overall, the results from analyses performed on imputed data were similar to the results of the analyses on the original data. For further details about group differences in pre–post changes and effect sizes, see Table 2.

Discussion

In this study we examined whether the Incredible Years Teacher Classroom Management training, given as a school-wide universal preventive intervention simultaneously to the entire group of school staff in first to third grade, changed teacher–student relationships and teacher–parent involvement for students aged 6–8 years. It was hypothesised that teachers who received the IY-TCM training would show more favourable changes in their conflict and closeness with students, as well as in their involvement and bonding with parents, than teachers in the comparison group. The first hypothesis seems supported, as small preventive effects on change in teacher–student conflict and closeness were found. The second hypothesis was partially supported. A significant effect on teacher-reported parent involvement, such as parents' engagement in school activities and homework, and how often parents contacted the teacher or school, was found. However, for teacher-reported bonding with parents, such as how often the teacher initiated contact with parents, a significant effect was not found. The reliability for the INVOLVE-T teacher bonding with parents was below 0.70 and is, therefore, considered inadequate, which may explain the lack of findings (Evers *et al.*, 2013).

Teachers' self-efficacy beliefs for behaviour management may be associated with their experiences of conflict in relationships with externalising students' behaviour (Zee & Koomen, 2017). Hence, teachers of students with problem behaviour may have higher risk of developing conflictual relationships with their students (McGrath & Van Bergen, 2015). A moderation analysis showed that there was a larger programme effect on STRS Conflict for teachers of students with elevated problem behaviour intensity scores at pre-assessment. A positive relationship between teacher and student may protect students against further development of problem behaviour (Baker, 2006; Baker *et al.*, 2008; McGrath & Van Bergen, 2015). Therefore, especially for students with behavioural risk, this finding may be important. As teachers were provided with strategies to reflect on their own behaviour towards students' externalising behaviours, and their associated emotions and cognitions during daily interactions with these students, the intervention may have amended the difficulties teachers often have in forming positive relationships with students whose behaviour is problematic.

No significant moderation effect for gender on STRS scores was found in this study, however, previous research has shown that, on average, boys share less close and more conflicted relationships with their teachers than girls (Hamre & Pianta, 2001; Baker, 2006; Drugli & Undheim, 2012). Students with elevated problem behaviour at pre-assessment included several more boys than girls (84%) (Kirkhaug *et al.*,

2016). The number of female teachers in the intervention group was 87% in our study. Female teachers may give more attention to and warnings over boys' problem behaviour than girls' (Jones & Wheatley, 1990; McGrath & Van Bergen, 2015), and boys may begin school with more aggression and less developmental maturity than girls (Baker, 2006). Together, this may give explanation to the moderation effect on STRS Conflict for teachers of students with elevated problem behaviour intensity scores at pre-assessment, as well as the significant findings for class and gender on STRS Conflict in our study (see Table 2).

When interpreting the significant findings for change in parental involvement reported by teachers, several elements must be taken into consideration. First, the pre–post mean score for parent involvement in school changed by 1.2 points in the IY-TCM group, whereas the pre–post mean score changed by −0.3 points in the comparison group. The parental involvement scale can theoretically vary between 13 and 65 (the total variation is approximately five points), hence a 1.20-point change is not very much and may be considered small. There was little variation in the INVOLVE-T scores, which may indicate that the questionnaire was not optimal for use in a Norwegian school setting. In order to minimise possible cultural differences in relation to how and how often school–home interactions are carried out (Driessen *et al.*, 2005), the subscales Parent Involvement in Education and Parent Involvement with School/Teacher were merged into one variable for analysis. At pre-assessment, teachers in the intervention rated parents' involvement less favourably compared to teachers in the comparison. Moreover, the variation in the outcome variable was largely explained by the variability between classes. However, the variability within classes was low; hence, the intra-class correlation for the INVOLVE-T scores in this study was large (ICC $\geq$ 40). The effect size was computed using the within-cluster (class) standard deviation. Taken together, the standardised mean difference between the groups of 0.4 should be interpreted with caution.

Findings have shown that parental involvement rates increase significantly when teachers actively encourage parental involvement (e.g. by communication about a child's progress and ideas for helping the child) (Epstein, 2001; Wyrick & Rudasill, 2009). Teachers in this study were actively requested to make more effort to involve parents, as well as being provided with strategies to communicate effectively with parents through, for instance, newsletters and homework (Webster-Stratton, 2012). In Norway, the extent of school–home contact, such as teacher–parent conferences and meetings, is largely prescribed by the government through a national curriculum (The Norwegian Directorate for Education and Training, 2016). These predefined guidelines may have prevented teachers from enhancing their involvement and bonding further with parents.

Limitations and strengths

The present study has some limitations that should be pointed out. First, an RCT would have been the preferred design of choice for the study. The implementation of the IY-TCM programme was dependent on qualified group leaders in the current municipalities. In addition, since extensive predefined criteria for programme implementation had to be fulfilled before study participation, schools had to apply to IY

Norway for programme implementation and study participation. Hence, recruitment of intervention schools had to be based on applications from schools in these municipalities. Hence, a true RCT was difficult to achieve. To minimise validity threats such as diffusion (contamination), recruitment to the comparison group was carried out in municipalities that lack IY implementation. The situation for the comparison schools may have been different from that for the IY-TCM schools. Slightly elevated pre-scores in the intervention group suggest that some of the schools which sent a request for implementation of the programme (self-recruitment) may have realised they had issues in relation to teacher classroom management strategies and/or student behaviours and that they could benefit from implementing the IY-TCM programme. Therefore, a potential selection threat due to the sampling strategy may have affected our results. To reduce validity threats stemming from selection bias, several comparison schools were recruited from the same county as the interventions, and schools in the comparison were matched to the interventions based on school size and geographical location. In addition, covariates that were potentially related to the selection process were added to the analyses. An alternative approach could have been a step-wedge design. This was discarded because it would have resulted in an excessive burden for the participants, and would have been problematic to use in a school-wide implementation in several municipalities in Norway.

Second, the Norwegian Directorate of Health funds IY Norway, and the authorities meet expenses in connection with organising curricula, groups and training of IY group leaders. At the time of conducting the study, the fundraiser wanted boundaries to exist between the implementation of IY-TCM in Norway and its research project, in order to facilitate independence between research and implementation. Hence, the implementation process was in the hands of the local authorities involved. Teacher-reported fidelity information was given through fidelity checklists, however, access to these assessments was problematic due to practical reasons (e.g. code of ethics). There is a lack of data on fidelity and implementation. Hence, we cannot know for certain whether the programme was delivered in a less than optimal manner as required by the manual. However, the mentors who supervised the group leaders did not detect any serious discrepancies in the way the programme was delivered.

Third, based on predefined guidelines for school–home contact provided by the government, the design of the INVOLVE-T questionnaire may not be sufficiently adapted to the Norwegian school environment. This may have resulted in little variation in the teachers' responses on the questionnaire.

Fourth, the findings in the study are predominantly based on teachers' reports. Teachers and staff in the IY-TCM schools were the implementers of the intervention, and hence a positive response bias may have occurred in their assessments of the outcomes. However, in a meta-analysis by Desimone *et al.* (2010), the results show that teachers' self-reports on teaching are highly reliable, showing strong correlations with both classroom observations and teachers' records. Use of additional respondents, as well as observational data, would have improved the robustness of the study and the findings.

Finally, a different dropout pattern between the intervention and comparison conditions was found. In order to compensate for the missing data, multiple imputation was used to ensure that the pre–post analyses reflected the whole of the student

population that participated in this study. Analyses performed on imputed data were stringent, and confirmed the results of the LMM analyses on the original data, which improves the generalisability of the findings (Stuart *et al.*, 2009).

Conclusions: Implications for school practice

This study may have some weaknesses and the findings should be interpreted with caution. The findings may suggest that proactive teaching strategies taught in the IY-TCM programme, such as how to build positive relationships with students and involve parents, may be useful to teachers in order to improve their relationships with students, and facilitate their involvement with parents (Wyrick & Rudasill, 2009). The moderate effect found on teacher–student conflict for students with elevated externalising behaviour may be of importance, as positive teacher–student relationships may serve as a protective factor against further development of problem behaviour (Hamre & Pianta, 2001; Murray & Murray, 2004).

Further, the study was conducted as an effectiveness study under naturalistic and real-life conditions, the sample size was quite large and the power to detect relatively small effects was sufficient. But effect sizes may be a poor metric for assessing outcomes of universal interventions, given that they are delivered to entire populations with varying degrees of risk, and as in this study, over a short period of time. Thus, in this study it was less likely to expect large changes (Durlak *et al.*, 2011; Greenberg & Abenavoli, 2017). However, when the IY-TCM programme is provided as a school-wide universal preventive intervention, it gives an opportunity to influence all students, including students with behavioural risk. So far, preventive effects found in this study on teacher–student relationships and teacher–parent involvement after the IY-TCM programme, given as a universal intervention, are promising.

Future research

Several potential outcomes of the IY-TCM programme, implemented as a universal preventive intervention, will be included in future analyses, such as effects on teachers self- and collective efficacy, behavior management practice, problem behavior in classroom and in the school environment and classroom climate. In addition, evaluation of programme fidelity (e.g. process evaluation to identify barriers to implementation and features of successful implementation), as well as long-term effects of the IY-TCM intervention, are important implications for future research.

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