

Preliminary Results of a Comprehensive Approach to Prevent Antisocial Behaviour in Preschool and Primary School Pupils in Luxembourg

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ABSTRACT This pilot study evaluated the preliminary short- and middle-term impact of a nation-wide, school-based prevention initiative on antisocial behaviour of preschool and primary school pupils in Luxembourg. Seventeen preschool and reception classes ($n = 183$) were assigned to intervention and comparison conditions. The intervention included social-emotional skills training for both preschool and reception class pupils together with teacher workshops. Three waves of data (pre-test, post-test and 12-month-follow up) were analysed. Univariate analyses of variances with repeated measurements, together with analyses of covariance, for this 2×3 design show significant intervention effects: a reduction in oppositional defiant and aggressive behaviour as well as an increase in social and emotional competencies for reception class pupils after a 12-month follow-up period. Preschool pupils displayed an improvement in their social and emotional competencies at post-test, but these effects were lost one year after the intervention was completed.

KEY WORDS: antisocial behaviour; preschool; primary school; social-emotional skills; universal prevention

Introduction

Despite increasing efforts to reduce its prevalence in recent years, oppositional defiant and aggressive behaviour in children and youth continues to be a problem of significant clinical and social concern. Angold and Costello (2001) reported prevalence rates of Conduct Disorder (CD) or Oppositional Defiant Disorder (ODD) from 5 percent to 10 percent in children between 8 and 16 years. Lifetime prevalence of

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CD had previously been reported ranging from 6 percent to 16 percent for males and from 2 percent to 9 percent for females (Loeber et al., 2000; Maughan et al., 2004), whilst results of the National Comorbidity Survey Replication indicate a lifetime prevalence of about 12 percent for males and 7 percent for females, with a median age-of-onset of 11.6 in the US (Nock et al., 2006).

ODD and CD frequently co-occur with other disorders like Attention Deficit Hyperactivity (ADHD), depression, anxiety and substance use disorders and thus often lead to a high degree of impairment (Essau et al., 2000a, 2000b; Hampel and Petermann, 2005). Moreover, young people's conduct problems are often associated with further negative social outcomes like school drop out, poor professional career, unstable relationships and delinquent behaviour (Welsh and Farrington, 2006). However, negative consequences are not limited to the children and adolescents who perform antisocial behaviours. Certain types of antisocial behaviours like bullying in schools can cause serious psychosocial impairments in peers (Scheithauer et al., 2006) and are linked to increased societal costs (Romeo et al., 2006).

Two major trajectories for antisocial behaviour can be distinguished: the 'early starter' ('life course persistent') and the 'adolescent limited' pathway (Moffit, 2003). The 'early starter'-type shows high degrees of continuity from early childhood to adolescence and even adulthood. These children seem to have the most negative long-term prognosis (Farrington, 2003; Koglin and Petermann, 2007; Lahey et al., 2002; Moffit et al., 2001). Because of the stability of early-onset antisocial behaviour and the difficulties in treating adolescents who already show manifest conduct disorders, a large number of prevention initiatives have focused on preschool and primary school years. Preventive interventions can keep children from or interrupt the early onset trajectory, before the behaviour patterns become automated and rejection by peers and adults perpetuates the antisocial behaviour.

Mrazek and Haggerty of the US Institute of Medicine (1994) identified three basic types of prevention. 'Universal preventive interventions' address entire populations, whereas 'selective preventive interventions' focus on populations at risk for developing a disorder. 'Indicated preventive interventions' target 'high-risk' groups already showing symptoms of a mental disorder.

Because of the heterogeneous nature of antisocial behaviour in children and youth, several preventive interventions have been developed. The majority of prevention programmes aim at reducing risk factors or reinforcing protective factors which have been identified as increasing or decreasing the probability of CD. At the same time, a multitude of risk factors, especially for the early onset trajectory of CD, have been identified. Among them, a 'difficult' temperament (a construct which

includes characteristics like irritability, hyperactivity and impulsivity), deficits in social-cognitive skills, coercive parenting, maternal depression, parental antisocial behaviour, frequent marital conflicts, a low SES and violent neighbourhood have been discussed (Capaldi et al., 2002; Dodge and Pettit, 2003; Frick and Loney, 2002; Frick and Morris, 2004; Goodman and Gottlib, 1999; Snyder et al., 2003).

A lack of social and emotional competencies was found to play a significant role in the social, educational and psychological adjustment of children and adolescents (Denham, 2006; Gresham, 1998; Merrell, 2003). Inadequate social and emotional competencies are often associated with internalizing and externalizing behaviour problems (Cillessen and Bellmore, 2004; Eisenberg et al., 2004; Lengua, 2002). On this basis, researchers have attempted to provide a structured way of teaching these skills with social and emotional skills training. This training usually aims at a selection of specific skills which need to be improved in order to cope with difficult social situations. This is achieved by demonstrating, explaining and modelling these skills, practising skills while being coached, providing feedback and reinforcement during practice and applying the skills to social situations. Most of these training programmes are school-based and some are embedded in multi-component preventive initiatives which include additional interventions for teachers to improve classroom management and interventions for parents to enhance parenting abilities.

Effective examples for these multi-faceted prevention programmes including school-based social skills training are the Seattle Social Development Project (Hawkins et al., 2002) and the Fast Track Project (Conduct Problems Prevention Research Group, 1999a, 1999b). The Seattle Social Development Project is a universal intervention implemented in regular classrooms in classes 1–6. The programme consists of teacher training, parenting training and social-cognitive skills training for pupils. Pupils were reported to have shown less school misbehaviour, violent delinquent behaviour and alcohol use, as well as greater academic achievement and commitment to school after the intervention (Hawkins et al., 1999). A second follow-up nine years after the end of the project confirmed positive effects concerning mental health variables and school/work functioning, while only a few significant effects could be found in terms of crime and substance use. Additionally, pupils who received the complete six-year intervention showed better outcomes than those who only received limited interventions in classes 5 and 6.

Another example of a comprehensive prevention programme, which combined regular universal as well as selective interventions, is the Fast Track Project. The project was targeted at a high risk sample from school entry through class 10. Part of the multi-component programme

were components like parent training, home visiting, social skills training, academic tutoring and a universal teacher-based classroom intervention. The intervention aimed at reducing children's antisocial behaviour at home and in school, improving social and social-cognitive skills and peer relations, reinforcing academic skills and family-school relationships. Several results of the multisite study suggest improvements in all mentioned target areas (Conduct Problems Prevention Research Group 1999a, 1999b; 2004).

Although most universal prevention programmes, including comprehensive and combined interventions like the Fast Track Project, only achieve moderate to small effect sizes, they still seem justified. Very often, children at high risk are not reached by selected or indicated preventive programmes because of 'treatment' barriers (Kazdin and Wassell, 1999). Furthermore, just recently negative 'side effects' of selected and indicated interventions have been discussed (Dodge, 2006). Deteriorating or 'contagion' effects may be caused by grouping youth at high risk in preventive or treatment projects.

The prevention concept 'Projet Prima!r' in Luxembourg

In order to prevent increasing aggressive tendencies among primary school children over time, Luxembourg's Secretary of Education planned a comprehensive universal prevention programme called 'Projet Prima!r', in cooperation with the German University of Bremen. The comprehensive programme was to include school-based social-emotional skills training, parenting courses and a teacher's intervention. The preventive interventions for pupils were planned to start in preschool, continue in reception class and finish in the third class of primary school. Since pupils in Luxembourg are obliged to attend preschool from the age of four, such a comprehensive and long-lasting universal prevention programme was able to address a broad spectrum of pupils from early to middle childhood. The 'Projet Prima!r' was to consist of three intervention components:

- 1) The pupils were to receive social-emotional skills training conducted by their classroom teachers.
- 2) Before the start of school-based social-emotional skills training, teachers were to participate in workshops on classroom and crisis management in school and to be introduced into the social-emotional skills training.
- 3) Parallel to social-emotional skills training the pupils' parents were to receive parenting courses consisting of four sessions.

Methods

Study design, recruitment and sample

In order to examine the effects of single *Projet Prima!* components in Luxembourg as a first step, two aspects of the school-based social-emotional skills training, the interventions for preschool and reception class pupils, were to be evaluated in a pilot study. Since this pilot study was aimed at examining short- and medium-term impacts on each of these two single components, both interventions were to be conducted concurrently in Luxembourg-City. It was hypothesized that the training would increase social competencies (social information processing, problem solving abilities in difficult social situations, academic behaviour, peer relationship quality) and emotional competencies (recognition and understanding of primary emotions, use of emotional vocabulary, emotion regulation). Further, a reduction in aggressive and oppositional defiant behaviours was expected.

The study used a quasi-experimental evaluation design. In order to assess the impact of the preschool and reception class social-emotional skills training of the *Projet Prima!*, intervention and comparison group outcomes were to be compared over a period of about 18 months. To this end, three assessments (pre-test, post-test and follow-up testing of both groups) were performed. Based on requests by the Luxembourgish initiators, 17 preschool and reception classes ($n = 225$) were recruited by the local school district manager of Luxembourg-City in the fall of 2004, therefore sample size as well as study design were not entirely determined by scientific standards.

It should be noted that researchers had no influence on either sample size or assignment policy and that data collection was thus not guided by statistical considerations. Adapting the standard framework (type-1 error $p < 0.05$, $1-\beta = 0.8$, medium effect size $d = 0.5$), post-hoc for the given design and safe-guarding against potential power inflation by over-estimating intra-subject correlation over time (considering both $r = 0$ and $r = 0.5$), these sample sizes can still be considered a precautionary approach in the absence of reference data or published results. They do exceed sample sizes recommended in standard references (Bortz and Doering, 2006, Table 9.7/9.11, (2 x 3)-ANOVA) with respect to the repeated measurement factor and still allow for valid inferences on one-df between-group effects.

Recruited teachers were obliged to participate. Eight classes were assigned to intervention and nine classes to comparison condition. Prior to data collection, parents were invited to special meetings during which they were informed about the study. Written consent was obtained from parents either at these information meetings or via postal request. Of 225 recruited pupils, 183 finally participated in the

study. Due to data protection laws, it was not possible to evaluate whether the 18.7 percent pupils whose parents refused participation differed significantly from sample pupils.

The final intervention group consisted of four preschool ($n = 47$) and four reception primary school classes ($n = 46$) whereas the comparison group included four preschool ($n = 48$) and five reception classes ($n = 42$) at Time 1 assessment. Of the 183 pupils, 93 were male, 90 were female. The age of the pupils ranged from 3 to 10 years (mean = 6.2 years). Preschool pupils were 5 years old on average and the mean age of reception class pupils was 7 years.

Most children of the sample were raised multilingually, due to three official languages being spoken in Luxembourg (Luxembourgish, French and German). Additionally, a large number were of migrant descent (45.3 percent), with the largest migrant group coming from Portugal, which is typical for Luxembourg. Pupils in our sample spoke 2.60 (SD = 0.93) languages on average, most of them Portuguese (34.1 percent), Luxembourgish (32.9 percent), French (20.9 percent).

The school qualifications of parents showed that our sample was not representative; 54.7 percent of mothers and 58 percent of fathers reported having an educational background with a qualification for university entrance at least; 77.3 percent of all mothers and 61.1 percent of fathers described their financial situation as satisfying or better.

The first data collection was performed four to five weeks before interventions started, while the second data collection followed within four to six weeks after the completion of interventions. Final data collection was accomplished 12 months after completion of interventions.

Intervention

Pupils in intervention classes were exposed to age specific social-emotional skills training developed at the Centre for Clinical Psychology and Rehabilitation at the University of Bremen, while comparison group pupils received no interventions and attended their usual school lessons.

The social-emotional skills training for reception class pupils had previously been tested in another study (Gerken et al., 2002). The newly developed training for preschool pupils had been reviewed by German Kindergarten nurses before interventions started. Both types of training were implemented into the school curriculum and conducted by previously trained teachers. The preschool intervention included 25 sessions, each lasting 20 to 30 minutes. The reception class intervention included 26 sessions, each with a duration of about 45 minutes. Both cohorts received training with a frequency of one to two sessions per week. Both trainings were designed to improve children's

emotional knowledge, understanding and emotion regulation as well as social information processing, prosocial and problem solving skills to prevent oppositional defiant and aggressive behaviour.

The two types of training were conceptionally based on Caldarella and Merrell's (1997) comprehensive definition of social skills which comprises peer relation, self-management, academic, compliance and assertion skills, Crick and Dodge's (1994) social-information processing model, as well as Saarni's (1999) and Denham's (2006) constructs of 'emotional competence'. Moreover, the two types of training share similar cognitive-behavioural methods and tasks for the pupils, including contingency programmes and role playing. They differ in duration of each session, providing shorter sessions for preschool children with less complex contents and tasks.

Interventions for both cohorts were embedded into the ordinary school curriculum and were usually taught instead of German lessons in reception class. In preschool the training was taught instead of different activities such as painting. Preschool intervention was conducted in Luxembourgish, whereas reception class training was performed in German. This language difference in preschool and reception class corresponds to official provisions in Luxembourg which require a German alphabetization of primary school pupils. Luxembourgish represents Luxembourg's colloquial language, only being permitted as the language of instruction in preschool.

In the same way that teachers were obliged to conduct training, all pupils were obligated to attend training, since it was implemented into the ordinary school curriculum. As already noted, parents could refuse to answer the questionnaires and thus refuse to participate in the study.

Before the school-based social-emotional skills training started, teachers participated in a four-day workshop on classroom and crisis management. Furthermore, they were introduced to the social-emotional skills training. Teachers' training aimed at maintaining acceptable behaviour, preventing problem behaviour and managing problem behaviour in class and other school environments (such as hallways or playground). In line with current research, key components were clearly defining and establishing classroom rules, consistent, effective consequences and effective instructional management techniques (Lewis et al., 2006).

Although research has demonstrated that traditional authoritarian, coercive discipline techniques fail to decrease aggressive and oppositional defiant behaviour in most classrooms, rates of reprimands still exceed the rate of positive feedback and praise (Sutherland and Wehby, 2001; Sutherland et al., 2000). On the other hand, the association between effective instruction and pupil classroom behaviour has been

well established in literature (Kame'enui and Darch, 2004; Sutherland and Wehby, 2001) Thus interventions such as a reinforcement plan, positive praise-reprimand ratios and effective instruction techniques to alter teacher-pupil-interaction patterns were to be implemented.

During the training period four two-hour-meetings were conducted with intervention group teachers and programme developers in order to maintain implementation quality. Here teachers were encouraged to discuss any problems associated with both sets of training. Furthermore, teachers received immediate help via email or telephone if required.

Measures

Burden of social-emotional problems. In order to assess pupils' burden of social-emotional problems, the German version of the Strengths and Difficulties Questionnaire, a 25-item screening instrument for 4- to 16-year-old children, was chosen (Goodman, 1997). It covers five behavioural constructs such as 'prosocial behaviour' (e.g. 'considerate of other people's feelings'), 'emotional symptoms' (e.g. 'many worries, often seems worried'), 'conduct problems' (e.g. 'often loses temper'), 'hyperactivity/inattention' (e.g. 'restless, overactive, cannot stay still for long') and 'peer relationship problems' (e.g. 'gets along better with adults than with other children'). A 'total difficulties'-score of 20 items containing externalizing and internalizing behaviour problems (emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems) is generated. This 'total difficulties'-score was used as a parameter for pupils' burden of social-emotional problems in this study. The SDQ has been found to be a valid and reliable screening measure of social-emotional problems and prosocial behaviour (Becker et al., 2004).

Aggressive and oppositional defiant behaviour. As an instrument to measure aggressive and oppositional defiant behaviour, we used the SAV (Skala aggressiven Verhaltens; Aggressive Behaviour-Scale; Petermann and Koglin, 2004). This scale consists of eight items concerning verbal, physical, relational and oppositional defiant types of aggression (e.g. 'often argues with adults', 'hits others', 'allows others to play along', 'often has physical fights with other children'). The scale's Cronbach's alpha was 0.88.

Emotional and social competencies. Emotional and social competencies were assessed by two questionnaires. Social competence was tested by the German version of the Social Competence Scale-Teacher (Conduct Problems Prevention Research Group, 2003), which includes 25 items assessing social competence across areas of 'academic behaviour', 'prosocial skills' and 'emotion regulation' (e.g. 'functions well even with distractions', 'acts in a friendly manner towards others', 'controls temper when there is disagreement'). Each item states a behaviour a

child may display at school. Teacher's responses are coded on a five-point Likert-scale. For this research purpose the SCS 'Total (Social Competence)' was calculated as the mean of responses. The alpha coefficient for the Social Competence Scale is reported to range from 0.94–0.98.

Emotional competence was assessed using a short scale of the FEEK, developed by the Centre for Clinical Psychology and Rehabilitation (Fragebogen zur Erfassung emotionaler Kompetenzen; Emotional competencies questionnaire, Koglin et al., 2004) that consists of five items ('the child empathizes with others', 'the child recognizes others' feelings', 'the child verbalizes its feelings', 'the child copes well with frustration', 'the child is able to name others' feelings'). Cronbach's alpha of this scale varies from 0.85–0.93, depending on age (preschool, reception class).

All measures for teachers were delivered in German. Handover of questionnaires was ensured by programme developers and a local co-ordinator of the Ministry of Education.

Statistical analysis

Data were analysed using SPSS for Windows (Version 14.0). First of all, *t*-tests to examine pre-test equivalence were conducted with all measures. In the case of pre-test equivalence, univariate analyses of variance with repeated measurements were performed to examine the main and interaction effects, based on data of all three assessments. If pre-test differences occurred, univariate analyses of covariance with repeated measurements were calculated, with Time 1 functioning as a covariate.

Since random assignment at class level would have risked serious contamination across treatment and control conditions, complete classes were allocated to either one condition. While it is true that such sampling procedures exhibit a hierarchical structure and data should thus be analysed using multilevel models (HLM), there have been substantial reasons to keep to traditional ANOVA *in our particular case*: (a) for official reasons neither schools nor classes were a random sample from their respective population and in treatment-assigned classes programme participation was compulsory (no random assignment at any level, which violates mandatory assumptions of HLM); (b) there are no meaningful hypotheses for level-to-level moderation or transmission of effects that would motivate HLM on psychological grounds; (c) the ratio of class count to within-classes sample sizes as well as total sample size suggest that HLM might be grossly underpowered (as this is a pilot study); and (d) the nested design is unbalanced (with, for instance, all controls being recruited from three of seven schools).

Ignoring potential variance components of school and class and thereby confining analysis to fixed-effect factors (class and group)

results in sample size ratios (treatment versus comparison) of 47:48 for pre-school pupils and 46:42 for reception-class pupils. Note that classes must be analysed separately because pupils have received class-adjusted treatment. As a consequence, we chose to run two traditional two-factor analyses of variance (between-subjects: group [treatment versus comparison]; within-subjects: time [baseline, post-test, follow-up]). Since evaluation was based on four outcome criteria (SDQ, SCS, SAV, FEEK), type-1-error-rates for all effects from univariate analyses have been corrected for multiple testing.

We calculated Eta^2 (η^2) to describe effect sizes (< 0.06 = small; $0.06\text{--}0.13$ = medium, > 0.13 = large). The threshold for statistical significance was set at $p < 0.05$.

Results

Mental health status at Time 1

According to teachers' assessments with the Strengths and Difficulties Questionnaire (SDQ) at Time 1 5.9 percent of children showed borderline and 16.2 percent showed abnormal burden of social-emotional problems. This result was in line with our expectation of about 20 percent of the children displaying at least initial signs of mental health problems in school. There were no gender differences in mental health problems estimated by teachers at Time 1 on the whole, but as expected, boys showed significantly more aggressive and oppositional defiant behaviour than girls (SAV, $t = -2.48$, $p < 0.05$). Corresponding to our expectations, girls were rated to show significantly more social and emotional competencies than boys (SCS, $t = -2.41$, $p < 0.05$; FEEK, $t = -2.92$, $p < 0.005$). When preschool pupils and reception class-pupils were compared however, no age effects could be observed (SCS, $t = -0.319$, *ns*; FEEK $t = -0.540$, *ns*).

Burden of social-emotional problems after intervention

The pupils' burden of social-emotional problems was assessed, using the 'total difficulties'-score of the Strengths and Difficulties Questionnaire (SDQ). Due to pretest equivalence ($t = -0.794$, *ns*), a univariate analysis with repeated measurements was conducted. Results revealed no significant main effects for time ($F(2, 152) = 0.94$, $p = 0.790$) and group ($F(1, 76) = 1.67$, $p = 0.400$), but a significant time*group interaction effect ($F(2, 152) = 6.83$, $p = 0.004$, $\eta^2 = 0.082$; see Table 1), even after correcting for multiple comparisons for preschool pupils. A look at the contrasts between assessments showed that a positive intervention impact had been reached at post-test but faded one year after the intervention (see Table 2).

Table 1 *Results of univariate analyses of variance with repeated measurements, preschool pupils, rated by teachers*

<i>Scale</i>	<i>Effect</i>	<i>F</i>	<i>DF</i>	<i>P</i>	<i>Hommel-Adjustment for multiple comparisons</i>	<i>Eta²</i>
SDQ						
'Total difficulties'-score	Group	1.67	1,76	0.200	0.400	0.022
	Time	0.94	2,152	0.395	0.790	0.012
	Interaction	6.83	2,152	0.001	0.004	0.082
SCS						
Social competencies-score (total score)	Group	4.39	1,76	0.040	0.120	0.055
	Time	2.95	2,152	0.066	0.198	0.037
	Interaction	2.12	2,152	0.133	0.202	0.027
FEEK						
Emotional competence (total score)	Group	5.54	1,73	0.021	0.080	0.071
	Time	10.06	2,146	0.000	0.000	0.121
	Interaction	2.35	2,146	0.114	0.202	0.031
SAV						
Aggressive behaviour (total score)	Group	0.69	1,73	0.410	0.410	0.009
	Time	0.00	2,146	0.995	0.995	0.000
	Interaction	1.65	2,146	0.202	0.202	0.022

Table 2 *Contrasts between pre-test (Time 1), post-test (Time 2), and follow-up (Time 3) in the preschool pupils' intervention group, rated by teachers*

<i>Scale</i>	<i>Contrast</i>	<i>F</i>	<i>DF</i>	<i>P</i>	<i>Eta²</i>
SDQ					
'Total Difficulties'-score	Time 1 vs Time 2	12,594	1,76	0.001	0.142
	Time 2 vs Time 3	0.335	1,76	0.565	0.004
SCS					
Social competence- score (total score)	Time 1 vs Time 2	6.392	1,76	0.014	0.078
	Time 2 vs Time 3	0.032	1,76	0.859	0.000
FEEK					
Emotional competence (total score)	Time 1 vs Time 2	8.301	1,73	0.005	0.102
	Time 2 vs Time 3	0.003	1,73	0.953	0.000
SAV					
Aggressive behaviour (total score)	Time 1 vs Time 2	3.554	1,73	0.063	0.046
	Time 2 vs Time 3	0.150	1,73	0.700	0.002

Table 3 Results of univariate analyses of variance with repeated measurements, reception class pupils, rated by teachers

Scale	Effect	F	DF	P	Hommel-Adjustment for multiple comparisons	Eta ²
SDQ 'Total difficulties'-score	Group	1.90	1,75	0.172	0.218	0.025
	Time	1.38	2,150	0.255	0.510	0.018
	Interaction	4.31	2,150	0.015	0.030	0.054
SAV Aggressive behaviour (total score)	Group	1.54	1,73	0.218	0.218	0.021
	Time	1.10	2,146	0.334	0.668	0.015
	Interaction	10.42	2,146	0.000	0.000	0.125

Table 4 Contrasts between pre-test (Time 1), post-test (Time 2), and follow-up (Time 3) in the reception class pupils' intervention group, rated by teachers

Scale	Contrast	F	DF	P	Eta ²
SDQ 'Total difficulties'-score	Time 1 vs Time 2	0.400	1,75	0.529	0.005
	Time 2 vs Time 3	5.843	1,75	0.018	0.072
SAV Aggressive behaviour (total score)	Time 1 vs Time 2	2.680	1,148	0.104	0.018
	Time 2 vs Time 3	8.338	1,148	0.004	0.053

Since a *t*-test to check for pre-test equivalence was not significant in the reception class subgroup ($t = -0.770$, *ns*), a univariate analysis with repeated measurements was performed for reception class pupils. It revealed a significant time*group interaction effect in the SDQ 'Total difficulties'-score ($F(2,150) = 4.31$, $p = 0.030$, $\eta^2 = 0.054$; cf. Table 3), even after correcting for multiple comparisons. There were no main effects for group ($F(1, 76) = 1.90$, $p = 0.218$) and time ($F(2,150) = 1.38$, $p = 0.510$) however. A comparison of contrasts indicated that the diminution of social-emotional problems in reception class pupils' intervention subgroup was achieved between post-test and follow-up assessments (see Table 4).

Aggressive and oppositional defiant behaviour after intervention

Pupils' aggressive and oppositional defiant behaviour was assessed by the SAV (Aggressive behaviour scale). Due to pre-test equivalence ($t = 0.436$, *ns*) for the preschool subgroup, a univariate analysis with

Table 5 *Results of univariate analysis of covariance with repeated measurements, reception class pupils, rated by teachers*

<i>Scale</i>	<i>Effect</i>	<i>F</i>	<i>DF</i>	<i>P</i>	<i>Hommel-Adjustment for multiple comparisons</i>	<i>Eta²</i>
SCS						
Social competence-score (Total score)	Group	4.47	1,68	0.038	0.114	0.001
	Time	0.38	1,68	0.845	0.845	0.062
	Interaction	8.15	1,68	0.006	0.018	0.107
FEEK						
Emotional competence (Total score)	Group	9.94	1,71	0.002	0.008	0.123
	Time	5.19	1,71	0.026	0.104	0.068
	Interaction	4.09	1,71	0.048	0.048	0.054

repeated measurements was performed here. Although an exploratory view on the progression of means in both the intervention and comparison group of preschool pupils alluded to a reduction of antisocial behaviour in the intervention group and an increase of aggressive and oppositional defiant behaviour in the comparison group (see Table 6), the time*group interaction did not reach significance ($F(2,146) = 1.65$, $p = 0.202$; see Table 1).

After checking for pre-test equivalence ($t = 0.121$, *ns*), a univariate analysis with repeated measurements of the SAV resulted in a significant time*group interaction effect ($F(2, 146) = 10.42$, $p = 0.000$, $\eta^2 = 0.125$, see Table 3) for the reception class subgroup, even after correcting for multiple comparisons. This result may be attributed to the positive impact intervention had on reception class pupils.

Social competencies after intervention

Social competence was assessed by the Social Competence Scale (SCS). Because of pre-test equivalence ($t = 0.527$, *ns*), a univariate analysis of the SCS was conducted for preschool subgroup. It neither displayed significant main effects for time ($F(2, 152) = 2.95$, $p = 0.198$) and group ($F(1, 76) = 4.39$, $p = 0.120$) nor a significant time*group interaction effect ($F(2, 152) = 2.12$, $p = 0.202$, see Table 1). When contrasts between assessments were compared, it became obvious that there had been a significant intervention effect at post-test ($F(1, 76) = 6.39$, $p = 0.014$, see Table 2), which was lost at follow-up however.

A test for pre-test equivalence for the reception class pupils' subgroup showed significant pre-test differences between treatment and comparison group ($t = 3.73$, $p = 0.000$) which could already be observed

Table 6 Mean scores of preschool pupils

	Pre-test		Post-test		12-month follow-up							
	Intervention Group		Comparison Group		Intervention Group		Comparison Group					
	M	(SD)	M	(SD)	M	(SD)	M	(SD)				
SDQ (n = 78)	8.14	(7.06)	7.54	(5.59)	6.00	(6.00)	8.31	(5.96)	6.30	(6.06)	9.63	(6.38)
Total difficulties'-score												
SCS (n = 78)	2.87	(0.73)	2.72	(0.71)	3.14	(0.66)	2.74	(0.69)	3.13	(0.81)	2.75	(0.79)
Social competence- score (Total score)												
FEFK (n = 75)	12.20	(3.50)	11.57	(3.84)	14.91	(3.04)	12.77	(4.06)	14.11	(3.85)	12.29	(4.27)
Emotional competence (Total score)												
SAV (n = 75)	6.14	(5.68)	6.29	(5.50)	5.50	(4.91)	6.91	(5.50)	5.16	(5.56)	7.17	(6.23)
Aggressive behaviour (Total score)												

Table 7 Means scores of reception class pupils

	Pre-test		Post-test		12-month follow-up							
	Intervention Group		Comparison Group		Intervention Group		Comparison Group					
	M	(SD)	M	(SD)	M	(SD)	M	(SD)				
SDQ (n = 77)	7.95	(8.00)	8.74	(7.13)	7.30	(7.04)	8.84	(8.15)	5.31	(6.65)	9.45	(8.01)
Total difficulties'-score												
SCS (n = 73)	3.16	(0.78)	2.54	(0.69)	3.07	(0.72)	2.63	(0.78)	3.45	(0.75)	2.52	(0.81)
Social competence- score (Total score)												
FEFK (n = 75)	14.89	(3.62)	10.29	(3.08)	14.71	(3.78)	10.63	(3.72)	16.82	(3.59)	11.45	(3.13)
Emotional competence (Total score)												
SAV (n = 75)	5.28	(5.71)	4.76	(4.11)	5.51	(4.89)	5.76	(5.39)	2.90	(4.98)	6.92	(4.95)
Aggressive behaviour (Total score)												

by an exploratory comparison of mean scores (see Table 7). Thus an univariate analysis of covariance with repeated measurement, with Time 1 functioning as a covariate, was performed. Results showed no significant main group ($F(1, 68) = 4.47, p = 0.114$) and time effects ($F(1, 68) = 0.38, p = 0.845$), but a significant time*group interaction effect ($F(1, 68) = 8.15, p = 0.018, \eta^2 = 0.107$; see Table 5), which remained after correcting for multiple comparisons.

Emotional competencies after intervention

Due to pre-test equivalence ($t = 0.056, ns$), a univariate analysis of the FEEK for the preschool subgroup was conducted. Results did not reveal a significant time*group interaction effect ($F(2, 146) = 2.35, p = 0.202$) or main group effect ($F(1, 73) = 5.54, p = 0.080, \eta^2 = 0.071$), but a significant main effect for time ($F(2, 146) = 10.06, p = 0.000, \eta^2 = 0.121$), which indicated a similar development of both the preschool treatment and comparison group (see Table 1). However a closer look at contrasts, revealed that a significant intervention effect at post-test ($F(1, 73) = 8.30, p = 0.005, \eta^2 = 0.102$; see Table 2) was lost at follow-up again.

A test for pre-test equivalence of the reception class pupils' FEEK results showed significant differences between the treatment and comparison groups which were also indicated by mean scores ($t = 5.48, p = 0.000$; see Table 7). A following univariate analysis of covariance with repeated measurements with the FEEK-Total-score resulted in a significant main group ($F(1, 71) = 9.94, p = 0.008$) and time*group interaction effect ($F(1, 71) = 4.09, p = 0.048$), even after correcting for multiple comparisons. However, there was no significant main time effect ($F(1, 71) = 5.18, p = 0.104$; see Table 5).

Discussion

The results of this pilot study indicated that 12 months after completion of the interventions, teachers of intervention group pupils reported a reduction of pupils' burden of social-emotional problems in both the preschool and reception class intervention groups. An improvement of social-emotional competencies and the expected decline of aggressive and oppositional defiant behaviour, however, was only found in the subgroup of reception class pupils but not in the preschool pupils' cohort at follow-up assessment. Consistent with prior research, effect sizes mostly ranged from small to medium (Durlak and Wells, 1997; Wilson et al., 2003)

A closer look at the findings of this study reveals an interesting development of both cohorts. While there was an obvious impact of the social-emotional skills training resulting in a reduction of pupils'

burden of social-emotional problems assessed by the 'Total difficulties'-score of the Strengths-and-Difficulties-Questionnaire (Goodman, 1997) among preschool pupils one year after intervention, no positive influence was noticeable with regard to social-emotional competencies and oppositional defiant and aggressive behaviours. Although significantly positive short term effects could be identified, comparing contrasts between pre-test and post-test assessments in terms of an increase of social and emotional competencies, this development could not be stabilized until follow-up assessment for the preschool subgroup. This result may indicate the need for continuing, regular and long lasting preventive efforts for younger pupils, a finding which is in line with results of a meta-analysis by Nelson et al. (2003).

Contrary to these findings, the expected training impact within the reception class intervention subgroup only became obvious 12 months after completion of the intervention. The positive impact of the social-emotional skills training could be found in an improvement of social and emotional competencies as well as a reduction in oppositional defiant and aggressive behaviours. A closer look at the contrasts and mean scores between Time 1, 2 and 3 revealed that significant effects for reception class pupils were reached at follow-up measurement. There are no significant mean differences between Time 1 and Time 2 in the intervention group, so that the social-emotional skill training for reception class pupils showed a medium-term but not a short-term effect in this study. This indication of a sleeper effect, a delayed increase in impact, may be due to three causes: (1) reported problems of reception class teachers in implementing the reinforcement plan which is part of the training; (2) a recency effect which may have influenced teachers' rating at Time 1 and Time 2 unfavourably and (3) the fact that the training was conducted in German which is not very familiar to most pupils during reception class.

Reception class teachers reported serious problems with establishing the contingency procedure during training. Half of the teachers stated that they felt insecure in systematically reinforcing pupils' positive behaviours with tokens. Teacher reports suggest that they tended to use this method as a means to punish pupils rather than to encourage them to show positive behaviours. These problems may have caused pupils' oppositional reactions and may have absorbed positive outcomes at Time 2.

A further reason for the delayed positive impact might have been a rating bias on the teacher's side. At Time 1, reception class teachers showed a tendency to assess pupils more positively than at Time 2. We hypothesize that teachers perceived pupils' behaviours more sensitively after the completion of the questionnaires at the first data collection. Reception class teachers reported that they had participated

in a psychological study for the first time. This sensitizing of teachers may have led to a levelling of outcomes in the reception class subgroup at Time 2.

Finally the delay in positive intervention impacts may be caused by initial language problems. The reception class training had to be performed in German. Although German serves as an official language in Luxembourg, reception class pupils may not have been sufficiently accustomed to use it in their everyday life. It may be hypothesized that pupils improvement of language skills catalysed the generalization of training effects after the second class of primary school one year later.

Our study shows weaknesses according to methodological standards. The Luxembourgish initiators of the study disapproved of a sample randomization as well as recruitment of an optimal sample size, so that the statistical power as well as validity of our results is limited. Analyses of the sample revealed that it was not representative. More than 50 percent of the parents had a baccalaureate and the mean IQ of the sample children was 114. These features exemplify the middle class family background of the vast majority of sample children.

Further limitations may be due to teachers' obligation to both conduct the training and assess the children. Beyond resulting methodological limitations, motivation of several teachers was affected. Motivational problems were particularly recognizable in reception class teachers who considered the training as an additional work load. Furthermore, the majority of them reported having problems with teaching social-emotional competencies. It may be hypothesized that they felt devalued by being forced to focus on social subjects rather than school subjects like mathematics, German or French.

Conclusions which may be drawn from this study refer to problems of implementation quality. Unlike preschool teachers, primary school teachers reported barriers to intervention including their work load, training contents and particularly methods of social-emotional skills training. Although schools have been regarded to be a crucial avenue for preventing children's mental health problems, the question is whether teachers can be trained sufficiently to instruct pupils in social-emotional competencies. Even if teachers are trained and supervised in 'demonstration studies' (see Wilson et al., 2003) such as this pilot study, meta-analyses of school-based programmes on aggressive behaviour exhibit their small impact which continuously fades after the pilot phase. Due to experiences in this study, it may be hypothesized that teachers, who are familiar with effective behavioural classroom and crisis intervention strategies and share positive teacher-pupil relationships, are more likely to conduct effective social-emotional skills training, particularly if these programmes use cognitive-behavioural methods. To ascertain treatment integrity,

teachers have to be supervised and supported regularly while conducting training sessions. Further research is needed to identify requirements for successfully establishing psychological programmes into schools' routine.

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