

EFFECTS OF A TEACHER TRAINING PROGRAMME ON SYMPTOMS OF ATTENTION DEFICIT HYPERACTIVITY DISORDER**Jan Froelich***Central Institute of Mental Health
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A substantial lack of effective school based interventions especially in the natural setting exists in the treatment of Attention Deficit Hyperactivity Disorder. We performed a 18-week teacher training programme in a public elementary school with 378 pupils in 16 classes. After completing a screening assessment for symptoms related to ADHD and to Oppositional Defiant Disorder (ODD) we identified 47 students and assigned them non-randomized together with their teachers to either an intervention or control group. Over 12 weeks teachers were given intensive information on ADHD and ODD on a weekly basis, including basic principles of behavioural management, classroom-relevant didactic aspects. Elements of behaviour modification were implemented in the school lessons. Results after statistical analysis indicated significant treatment effects on ADHD and ODD symptoms. We conclude that teacher training programmes may be helpful in improving teachers' skills in addressing attentional and disruptive behavioural problems in the classroom.

The school plays an important role in the assessment and treatment of attention deficit hyperactivity disorder (ADHD). ADHD affects at least 3-5 % of school children (Banaschewski et al., 2010). Children and adolescents with this disorder are at higher than average risk of experiencing significant impairment in school and educational settings (DuPaul & Stoner, 2003; Barbaresi, Katusic, Colligan, Weaver, & Jacobsen, 2007; Frazier, Youngstrom, Glutting, & Watkins, 2007). Due to their greater familiarity with age-appropriate norms of behaviour, as well as the opportunity to observe children in situations where symptoms of ADHD typically occur, teachers are essential providers of information for the therapist who is responsible for treatment. Teachers therefore contribute significantly to accurate diagnosis (Bekle, 2004; Sayal, Hornsey, Warren, Macdiarmid, & Taylor, 2006). Furthermore their reports are crucial in documenting the efficacy of pharmacological interventions (Swanson, Lerner, March, & Gresham, 1999) and psychological treatments (Jitendra, DuPaul, Someki, & Tresco, 2008).

Only a few studies have examined teachers' beliefs and knowledge in relation to general issues of identification, diagnostic criteria, and treatment of students with ADHD (Jerome, Gordon, & Hustler, 1994; Jerome, Washington, Laine, & Segal, 1999; Havey, Olson, McCormick, & Cates, 2005; Brook, Watemberg, & Geva, 2000; Ghanizadeh, Bahredar, & Moeini, 2006). Teachers' knowledge and attitudes influence their classroom practices in working with ADHD students, and consequently influence the performance of the students (Bekle 2004). For example, teachers tend to have significantly more negative attitudes towards students with ADHD (Bay & Bryan, 1991; Li, 1985), and these students are treated differently even by experienced teachers (Goldstein & Goldstein, 1998). Teachers may have a negative effect on the behaviour and performance of students with ADHD by demanding less, calling on them more infrequently, criticising them more and praising them less (Gersten, Walker, & Darch, 1988).

The success of a school-based approach to intervention depends on the efficacy of the treatments being used and on teachers' perceptions of the accessibility of the intervention programme (Witt & Elliott,

1985). Witt (1986) suggests reasons why some teachers resist implementation of behavioural treatment strategies in the classroom, including concerns regarding a) time and resource requirements b) theoretical orientation, and c) intrusiveness in the classroom. Time-consuming behavioural interventions over a long period of time may be judged as unreasonable (Elliott, 1988; Pfiffner & O'Leary, 1993), especially if combined with methods of punishment (Power, Hess, & Bennett, 1995). The type of intervention is another important factor that influences the teacher's willingness to implement behavioural interventions in the classroom. Positive as opposed to negative consequences are generally preferred in treatment (Witt, Elliott, & Martens, 1984). Finally, teachers of elementary and middle school children view combined behavioural and pharmacological interventions as more acceptable for children with ADHD than medication used in isolation (Power et al., 1995).

Research has shown that school-based intervention programs are effective in reducing ADHD symptoms and other disruptive behaviours in children (Catalano, Arthur, Hawkins, Berglund, & Olson, 1998; Mytton, DiGuseppi, Gough, Taylor, & Logan, 2002; DuPaul & Eckert, 1997), and behaviourally based school interventions are among the most effective (Wilson, Gottfredson, & Najaka, 2001; Wilson, Lipsey, & Derzon, 2003).

With regard to behavioural treatment, two commonly used and relatively effective approaches for inattentive and impulsive children are daily report cards with positive consequences administered at home or in school when the child achieves an established goal (Pelham & Hoza, 1996; Evans & Youngstrom, 2006), and contingency management procedures (teacher-implemented reward programmes, response cost techniques, and time-out; Pelham & Fabiano, 2008; Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004; Fabiano, Pelham, Gnagy, Burrows-MacLean, Coles et al., 2007). Shapiro, DuPaul and Bradley-Klug (1998) propose self-management strategies to improve the classroom behaviour of adolescents with ADHD, and according to recent research results these techniques have demonstrated considerable efficacy (Evans, Axelrod, & Langberg, 2004; Gureasko-Moore, DuPaul, & White, 2006). DuPaul, Ervin, Hook and McGoey (1998) investigated the effects of peer tutoring on classroom behaviour and academic performance of students with ADHD, and reported significant effects on engagement in academic tasks and academic performance. The MTA Cooperative group (1999) demonstrated significant effects of school-based behavioural interventions combined with interventions in the family and with the child on hyperactive, aggressive and internal symptoms. Other multimodal interventions, e.g. the Challenging Horizon Program (CHP) (Evans, Langberg, Raggi, Allen, & Buvinger, 2005) or the Behaviour Education Support and Treatment (BEST) School Intervention Program (Waschbush, Pelham, & Massetti, 2005) demonstrated moderate to large effect sizes for academic and social outcome measures (Langberg, Smith, Bogle, Schmidt, Cole, & Pender, 2006; Molina, Smith, & Pelham, 2005). In the Cologne Multimodal Study for Children with ADHD (COMIS), 75 children aged between 6 and 10 years underwent psychostimulant medication and/or behavioural interventions in the family and at school. 35-40 % of the children with unique behavioural interventions showed a significant decrease in problem behaviours in the school setting. However, children with unimodal intervention in the family showed greater improvement (50-60%; Döpfner et al., 2004).

In contrast to most clinic-based studies relying on an individual treatment approach, we used a community-based approach and assessed the effects of a comprehensive teacher-training programme in a Cologne elementary school on the classroom behaviour of students with symptoms suggestive of ADHD and oppositional defiant disorder (ODD).

Methods

Subjects and study design

All 372 pupils at a public elementary school in Cologne were incorporated in the study. A high percentage of families in this district live on welfare. Due to missing data, 320 pupils finally took part in the study. The teaching staff consisted of 16 regular elementary school teachers (13 females). No first-time employees were among the staff and no teacher had previously had special training with behavioural disorders. The mean number of students per class ($n = 16$) was 25 students (grades 1 to 4). The mean age was 8.6 years ($SD \pm 1.22$; age range 7-11 years). The ethnic affiliations of the children were German (51.8 %), Turkish (21.0 %), Italian (19.9 %) and other nationalities (7.3 %). Of the 320 children, 167 (52.1 %) were males.

All students were screened for ADHD-and ODD-related symptoms in the classroom setting two weeks before the training started and one week after the training ended. Each teacher completed a short German version (15 items) of the Yale Children's Inventory (YCI) (Shaywitz, Schnell, Shaywitz & Towle 1986

a). This rating scale originally consisted of 48 items assessing the presence and extent of hyperactivity, inattentiveness, impulsivity, and oppositional defiant behaviour problems. The YCI scale development is based on items differentiating normal children from children with learning disabilities, with a particular emphasis on attentional deficits, in a community sample. The results of Shaywitz et al., (1986 b; 1992) showed that it was most unusual for a child with Attention deficit Disorder to score below two on the attention scale (sum of item score divided by sum of items). The YCI scales were able to correctly classify children with Attention Deficit Disorder and normal children with high sensitivity (87.5% of patients correctly classified) and specificity (94 % normal controls correctly rejected). The authors maintain that the YCI can serve as an initial reliable indicator of risk status in the diagnosis of ADHD. Shaywitz et al., (1992) also provided normal values in subsequent epidemiologic studies. To develop the short version of the YCI we selected the 3 to 6 items with the highest item total correlations from the original version (> 0.7). We calculated internal consistencies (Cronbach's alpha) of the abbreviated subscales Attention Problems (3 items, $\alpha = 0.87$), Hyperactivity (3 items, $\alpha = 0.87$), Impulsivity (3 items, $\alpha = 0.81$), Oppositional Symptoms (6 items, $\alpha = 0.87$), the abbreviated ADHD-Score (= Hyperactivity + Impulsivity + Inattention, 9 items, $\alpha = 0.92$) and the abbreviated total score (15 items, $\alpha = 0.94$) According to the individual total scores of each pupil and relying on the cut-off norms of the YCI, the 3-4 students per class with the highest scores for ADHD (mean ratings on impulsivity, hyperactivity and attention deficit > 2) or ODD-related symptoms (> 1.5) were selected for the intervention and control groups.

A semi-structured interview was also performed with the teacher to confirm the presence of ADHD symptoms. In this interview, DSM IV criteria for the diagnoses of ADHD combined type and for ODD were checked. The screening process resulted in identification of 42 children with a full data set and significant ADHD-related symptoms and/or ODD-related behavioural problems. 23 of the 25 children from the intervention group according to DSM IV criteria were at risk for ADHD or ODD, while 2 were in the subclinical range. In contrast, in the control group only 8 out of 17 children met DSM IV criteria for one of the two diagnoses. When compared with the entire study sample, the children in the control group were at or above the 72nd percentile on the total score for ADHD- or ODD-related symptoms in the abbreviated YCI.

The teachers ($n = 16$) of these students were allocated either to the control or intervention group. Due to the varied willingness of the teachers to take part in a training program, a randomised or matched-pairs allocation could not be realised as intended. Finally 8 teachers with 25 selected students took part in the teacher-training program (intervention group) and another 8 teachers with 17 children belonged to the control group.

The design used was a within-subject control group design with a non-randomised control group and a normal comparison group. During the 6 week baseline period, ADHD and ODD symptoms were assessed both in the control and the intervention group with weekly assessment (t1 to t6). In the second phase a 12-week training program was conducted for the teachers in the intervention group, while the teachers in the control group did not receive any training. ADHD symptoms and ODD symptoms were assessed on a weekly basis in both groups (t7 to t19). No student in either group received medical or behavioural treatment during the intervention.

During 18 weeks of baseline and intervention, teachers in both groups completed two symptom checklists weekly for each student, assessing the presence and extent of ADHD and ODD according to DSM IV criteria. The ADHD and ODD Symptom Checklists consisted of 20 and 9 items each with a four point rating scale (Doepfner & Lehmkuhl, 2000). Both instruments have been shown to be internally consistent (Bruehl, Doepfner, & Lehmkuhl, 2000; Doepfner & Lehmkuhl, 2000).

Teachers of the experimental group also completed an Individual Problem Check List (IPL) that consisted of 3 to 4 individually defined behavioural problems of the students. Only for the experimental group the IPL was used in order to analyse if the teacher training yielded individually measurable effects in the concerned children. Our goal was to receive additional information to potential individual training effects besides a more global measure as the YCI. On this checklist the teachers were asked to specify 3 to 4 major problems with the child in the classroom, and to rate each problem on a nine-point rating scale indicating the intensity of the behavioural problems (0-3 = low intensity; 4-6 = moderate intensity; 7-9 = high intensity).

At the end of the study qualitative interviews with the teachers of the intervention group were conducted. We asked the teachers open ended questions about their satisfaction with the training format, the specific intervention modules and regarding the effects of the training. The answers were not quantified.

Training programme

The training programme consisted of 12 weekly sessions (120 minutes) with two groups of four teachers each, and was administered by a child and adolescent psychiatrist who was experienced in the treatment of ADHD and ODD children. He did not initiate contact with the parents of the students and was not involved in school lessons. The teacher-training program took the form of a manual that included the following modules:

1. Information for the teacher on aetiology, symptoms, assessment and treatment strategies of children with ADHD and ODD.
2. Information about basic principles in the management of ADHD and ODD.
3. Introduction to behaviour modification procedures, e.g. using contingent social reinforcement and extinction, token economy (daily report cards with home- or school-based rewards), response-cost strategies and (for severe cases of oppositional or disruptive behaviour) time-out procedures. Finally aspects of peer tutoring were introduced.
4. Each session was divided into two parts. The first was theoretical, where the principles of behaviour management in the classroom were presented. In the second part individual behavioural problems with students occurring during school lessons or breaks were discussed. Distinct interventions for behaviour modification were defined for problem behaviours of individual students.

Statistical Methods

For assessment of treatment effects on the ADHD/ODD Checklist parameters, we carried out three different multilevel-analyses with two levels each. Repeated assessments across time at level 1 (repeated measures) are tested within individuals at level 2. The first two multilevel-analyses were conducted in the intervention group and the control group separately as within-group comparisons. By comparing the treatment slope (representing the course during the treatment phase) as a fixed effect with the baseline slope (representing the course during the baseline phase), we were able to analyse possible differences between these slopes as a measure of treatment effects. Thus we constructed time variables to test the contrasts between the courses during waiting period and treatment period in the intervention and control group.

In a third multilevel-analysis we compared the courses during the treatment period in the intervention group and the control group directly (between group comparisons). Due to the difference in the intercept between the two groups at the beginning of the treatment phase, we introduced the assessment at the end of the baseline phase at time 6 (t6) as a covariate to control for primary differences between treatment and control group at this assessment point.

For the within group comparisons in the intervention group, we expected stronger reductions of symptom scores during intervention (t7 to t19) compared to reductions during the waiting period (t1 to t6). Based on the course of symptoms during the baseline period, the course during intervention was predicted with multilevel analysis (assuming the same slopes). We tested whether the empirical slope (change during intervention) differed significantly from the predicted slope.

For the within group comparisons in the control group, we expected no significant differences in the courses of the baseline phase and intervention phase. For the between group comparison we expected stronger symptom reductions (stronger negative slopes) in the intervention group compared to the control group. Differences between the two groups at the beginning of the intervention (at t7) were taken into account by introducing t6 outcome as a covariate. Additional to the multilevel analyses multivariate analyses of variance (MANOVAs) were performed for the evaluation of pre- and post effects on the YCI in the intervention group and the control group.

Results

Table 2 shows the distribution of gender, nationality, and grades in the intervention group, the control group, and the normal comparison sample of 278 children. No statistically significant differences between the intervention group and the control group could be detected for age, gender or nationality. In comparison to the normal comparison sample, German boys were over-represented in both groups.

Table 3 shows means and standard deviations of the YCI subscale scores of ADHD and ODD symptoms on the total score (ADHD+ODD) at pre- and post-assessment in the intervention group, the control group and the normal comparison group. Intervention and control groups differed both significantly on the ADHD score on pre- and post-testing measurements ($F = 12.89$, $df = 1.36$, $p \leq 0.001$). In both groups the ADHD score decreased significantly over time ($F = 34.62$; $df = 1.36$; $p \leq 0.001$). No interaction effects were found. For ODD symptoms no effects could be identified for the factor group but a significant effect was found for the factor time ($F = 24.25$; $df = 1.36$; $p \leq 0.001$). There was no interaction effect. Although a significant reduction was observed in ADHD and ODD scores in both the intervention and the control group, higher scores were found in both groups compared to the normal comparison group at post assessment (t- test: ADHD symptoms: $t = 9.14$, $p \leq 0.001$; ODD symptoms: $t = 7.74$; $p \leq 0.001$).

Table 1: Basic principles in the management of ADHD and disruptive children

<p>1. Keep the lessons stimulating for the students! Inhibit low intrinsic or extrinsic levels of stimulation of given exercises because they contribute to attentional problems. Especially your important assignments require a distinct elevation of the stimulation level.</p>
<p>2. Involve the student in the lesson! Exercises requiring active responses of the student improve his attention span.</p>
<p>3. Reduce complex information to their most important messages! Give clear and understandable instructions because ADHD children have problems in processing complex and detailed information. Use short sentences when speaking to the student. Give examples of your instructions. Let the student repeat your instruction.</p>
<p>4. Give regular, immediate and specific feed back to the student! To enhance his motivation for performance. To achieve his attention call him by name or keep eye contact with him.</p>
<p>5. Develop routines for the classwork! Develop routines for the student to start day off in a consistent manner. Instruct the student what he has to do and not to do if he enters the classroom in the morning. Design procedures how the student should deal with transitions during school day (e.g. short breaks) that might distract him.</p>
<p>6. Plan ahead for critical transitions of activities! Discuss critical situations with the student where he regularly gets into problems in continuing his work, e.g. from break to school lessons. Focus your attention on the student especially during these critical transitions!</p>
<p>7. Find the right place for the disruptive student! Never seat a disruptive or ADHD child beside a frequently used classroom activity center or beside another disruptive student! The best seating is in close proximity to the teacher so that the student is easily accessible for your prompting, correction or reinforcement. Alternatively a good peer role model can be chosen.</p>
<p>8. Help the student to stay organized! Teach the student to write notes to himself for helpful reminders. Let him use a homework journal or an assignment pad every day. Instruct the student to clear his desk of unnecessary material during school lessons.</p>
<p>9. Define clear rules against disruptive behavior and combine them with immediate consequences! Discuss appropriate rules with the entire class and define the four most important rules for academic performance and social behavior. Establish clear consequences if rules would be broken. Print the rules on a posterboard and display them in the front of the classroom.</p>

Table 2. Sociodemographic variables in the study sample

	Intervention n=25		Control n = 17		Redidual n = 278	
	N	%	n	%	n	%
Gender:						
Boys	19	76,0	14	82,4	134	48,2
Girls	6	24,0	3	17,6	144	51,8
Nationality:						
German	17	68,0	8	47,1	142	51,1
Others	8	32,0	9	52,9	136	48,9
Grade:						
Schoolkindergarten	1	4,0	0	0,0	11	4,0
Grade 1.	0	0,0	7	41,2	86	30,9
2.	12	48,0	0	0,0	47	16,9
3.	7	28,0	3	17,6	61	21,9
4.	5	20,0	7	41,2	73	26,3
	M	SD	M	SD	M	SD
Age (Years)	8,72	0,94	8,82	1,45	8,51	1,26

Group differences between intervention and controls

Grade $\chi^2 21,17^{***}$ (70 % of cells with expected frequencies less than 5)

Table 3. Yale Childrens' Inventory (YCI) Pre-Post assessment for symptoms of ADHD and ODD

	Intervention n=24		Control n = 14		Normal Comparison n = 268	
	Pre	Post	Pre	Post	Pre	Post
	M SD	M SD	M SD	M SD	M SD	M SD
Total-Score	2,3 0,4	1,6 0,7	1,8 0,3	1,2 0,5	0,9 0,7	0,6 0,6
ADHD-Score	2,5 0,4	1,8 0,7	1,9 0,4	1,3 0,5	0,8 0,6	0,6 0,6
ODD-Score	1,9 0,6	1,4 0,7	1,6 0,4	1,1 0,6	0,6 0,5	0,6 0,6

Figure 1 shows the distribution of severe, moderate and low individual problems in the intervention group as rated on the Individual Problem List (IPL) before and after treatment. When comparing the first baseline assessment (t1) with the last assessment of the intervention (t19) the proportion of patients with severe individual behavioural problems decreased significantly from 48.0 % at baseline to 0.0 % at the end of the intervention. In the same time interval, the proportion of patients with low individual behavioural problems significantly increased from 4 % to 64 %. We additionally performed a Wilcoxon rank test and revealed a statistically significant change from t 1 assessment to t 19 assessment $Z=-4.21$, $p < 0.001$.

Figure 2 shows both the raw scores and predicted scores of MLM of ADHD symptoms for intervention group and controls. Within the treatment group there were no significant effects during the baseline period ($df = 1,501$; $F = 0.122$; $p = 0.728$) with a slope of nearly zero (CI 95%: -0.0017 to 0.024), but during the treatment period (t7 to t19) a significantly stronger symptom decrease was found ($df = 1,501$; $F = 20.12$; $p < .001$). The negative slope shows a decrease of -0.054 score values (CI 95%: -0.10 to -0.008) per assessment against the expected course based on the baseline course.

Regarding the controls, there was a significant symptom decrease at baseline period ($df = 1,304$; $F = 57.0$; $p < .001$) with a negative slope of -0.07 (CI 95%: -0.088 to -0.052). During the subsequent phase 2 there was a negative slope of -0.01 (CI 95%: -0.033 to 0.027). Compared to the stronger reduction during baseline the subsequent symptom reduction during phase 2 was smaller than expected ($df = 1,304$; $F = 25.2$; $p < .001$).

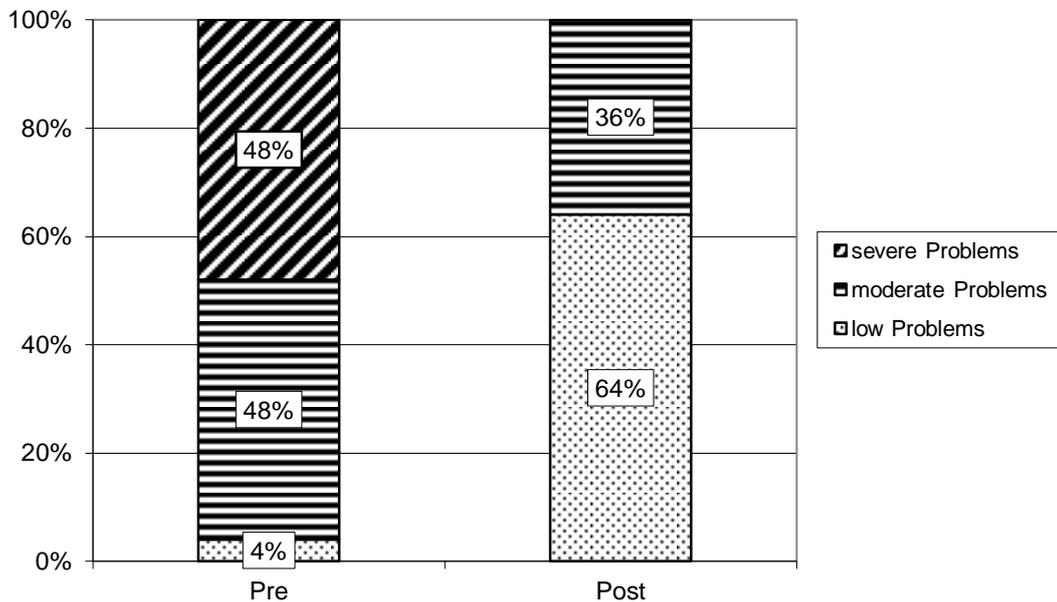


Figure 1. Distribution of individual problems at pre- and post-intervention on the Individual Problem List in the intervention group.

Due to the group differences at t_1 , the assessment at t_6 was introduced as a covariate in the analysis resulting in a non-significant group effect ($df = 1,41$; $f = 2.07$; $p = .158$) and a significant group \times time interaction during the treatment period ($df 1,41$; $f = 4.98$; $p < .031$) indicating a treatment effect in the between-group comparison.

Figure 3 shows the raw scores and predicted scores of ODD related symptoms for intervention group and controls. There was no significant effect during the baseline period within the treatment group (slope = -0.008 ; CI 95% = -0.03 to 0.014 ; $df = 1,506$; $F = 0.501$; $p = .479$), but during the treatment period (t_7 to t_{19}) a significantly stronger symptom decrease was found ($df = 1,506$; $f = 4.82$; $p = .029$). The negative slope shows a decrease of -0.038 (CI 95% = -0.087 to 0.011) score values per assessment against the expected course during intervention based on the baseline course.

Regarding the controls, there was a significant symptom decrease at baseline period ($df = 1,271$; $f = 11.85$; $p < .001$) with a negative slope of -0.042 (CI 95% = -0.066 to -0.018). During the subsequent phase 2 a slight negative slope of -0.003 (CI 95% = -0.059 to 0.48) was found. Compared to the stronger reduction during baseline, the subsequent symptom reduction during phase 2 is smaller than expected ($df = 1,271$; $f = 6.10$; $p = .015$). When t_6 scores were introduced as a covariate in the analysis, no group \times time interaction during the treatment period was found ($df 1,39$; $f = 0.29$; $p = .865$), indicating no treatment effects in the between-group comparison.

Discussion:

In order to evaluate the effects of a school-focussed comprehensive training programme for teachers of children with ADHD and/or ODD symptoms, we used a non-randomised control group design and a within-subject control group design to compare symptom changes during the waiting period and intervention period. The within-subject analyses showed significantly stronger decreases in both ADHD and ODD symptoms during the intervention phase as compared to the baseline phase. Moreover, the between-group analysis using baseline scores as covariates to control for group differences at baseline revealed an intervention effect on ADHD symptoms, but not on ODD-symptoms. The difference in symptoms between the normal and intervention groups was reduced at the end of the training. However, a statistically significant difference between both groups remained at the end of the intervention with respect to ODD and ADHD symptoms as rated by teachers.

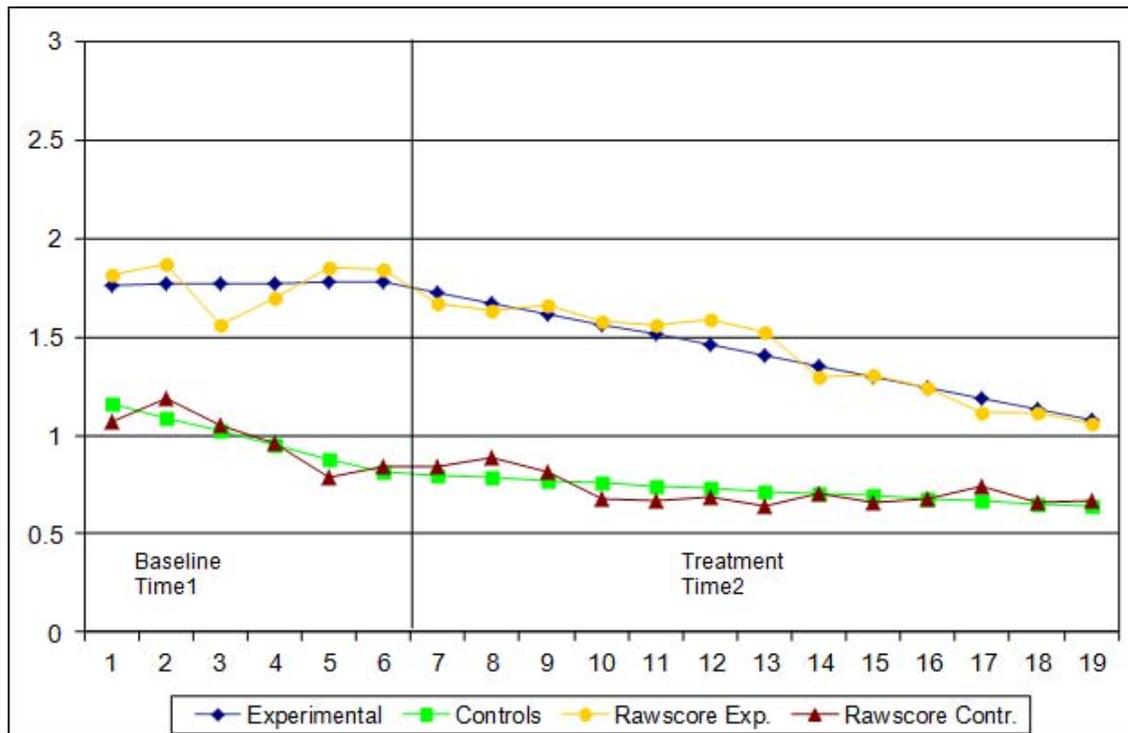


Figure 2. Raw scores and predicted scores of MLM and ADHD experimental and control groups.

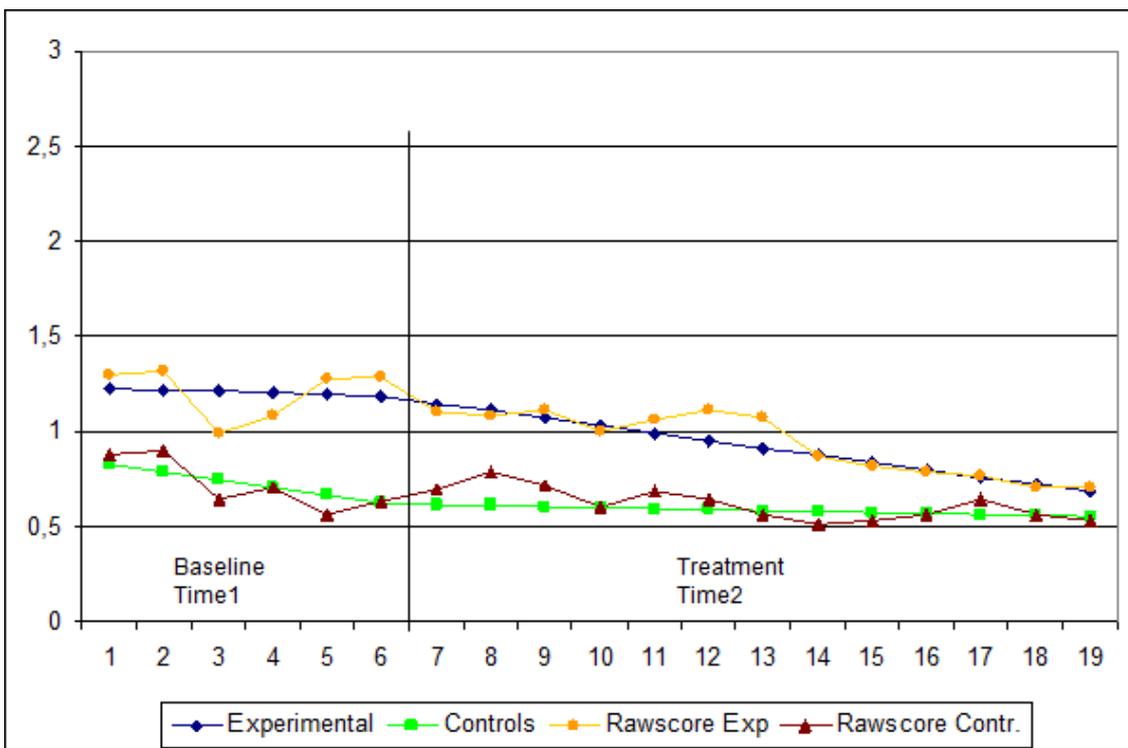


Figure 3. Course of raw and predicted ODD scores (multi level analyses)

We see several reasons for the success of our approach. In our opinion the most effective aspect of the training programme was the combination of information about the basis of ADHD with a concrete package of measures for individually relevant behavioural problems. The teachers particularly valued the fact that they could rely on a written handout that was distributed after each training session. In this way they felt encouraged to work independently with the students and to introduce previously discussed interventions in their school lessons. The importance of giving teachers a clear strategy in their work with disruptive children should not be underestimated. In a study of Arcia et al. (Arcia, Frank, Sanchez-

LaCay, & Fernandez, 2000) who assessed teacher understanding of ADHD, the majority of the participants had no coherent or systematic classroom strategy and did not appear to realise that one could use principles of behaviour modification to target specific behaviours in children with ADHD. Programmes incorporating comprehensive behavioural interventions similar to ours have also demonstrated high levels of teacher satisfaction and effectiveness, e.g. the ABC programmes (Pelham, Massetti, Wilson, Kipp, Myers et al., 2005) or the TEACCH program (Rossbach & Probst, 2005).

Another important aspect for successful intervention is a closer cooperation between teaching colleagues. Many teachers previously had no forum to discuss how one should deal with behavioural problems of students in their classes. The training programme initiated a common forum for helpful exchange of individual experiences and reciprocal support. We also support the conclusions of Evans, Axelrod and Langberg (2004) drawn from their school-based training programme, that face-to-face communication between therapists and school teachers is a valuable tool in the implementation of such training programmes.

With regard to the content of the training package, teachers especially appreciated the didactic and educational aspects. Firstly they found that these interventions were suitable for the entire class. Secondly, these components were much less likely to interrupt school lessons than some other complex measures for behavioural treatment (e.g. token systems). Moreover, the teachers found it especially useful to learn how to cooperate in an appropriate manner with the parents of their students (e.g. for completion of homework).

Teachers generally preferred those measures for behaviour modification in the classroom that used positive reinforcement to those that used mild punishment (response cost system). If possible the teachers tried to develop relatively simple, timesaving and easily applicable token systems (e.g. home report cards). In contrast, time-out for disruptive and extremely aggressive behaviour was well accepted and was coordinated with teachers of neighbouring classes.

Critical aspects of the training programme can be seen in its duration and its time costs. The majority of the teachers felt that an intervention lasting for three months with one weekly session and several hours of preparation for concrete measures in the classroom were too time consuming. We completely agree with the results of Arcia, Frank, Sanchez-LaCay and Fernandez (2000) who mentioned that regardless of the technique used, teachers did seem to have a strong preference for those interventions that did not demand a great deal of their time.

A further disadvantage of this training programme focussing solely on school-related problems was the relative helplessness that teachers found when confronted with desperate social situations of some of their students or with extremely difficult children. They had to accept that the training was planned to be practised primarily in the classroom and not as a substitute for social work. Our concept is principally a preventive approach for children with attention problems and disruptive behaviour. Clinically relevant cases require further therapeutic measures. There is some evidence that multimodal interventions incorporating work with the student at school and cooperation with the families, e.g. through the implementation of daily home report cards, may be quite effective (Dishion & Kavanagh, 2003).

Limitations

The statistical validity of our study is limited because we were neither able to realise a randomised control group study nor that we could perform a blinded assessment. In fact affiliation to either control or intervention group was influenced by whether or not the teachers were interested in taking part in the training program, and presumably by their individual evaluations of the extent of their students' behavioural problems. However this was controlled for to some extent by introducing a covariate into the analysis. The study results are further limited by the fact that no ratings of parents or other assessment sources could be introduced.

Another important limitation is the fact that the students we selected with attention and conduct problems are not identical with referred children in whom the clinical diagnosis of ADHD or oppositional defiant disorder was confirmed by a comprehensive clinical assessment. However, the children selected in our study had high scores for ADHD and /or ODD symptoms based on teacher ratings, and in most of the children a clinical diagnosis based on teacher information could be confirmed.

Moreover we did not assess systematically feedback from teachers concerning advantages and disadvantages of the training. Though we have to admit that this might be a limitation of the study we concentrated on qualitative interviews with the teachers because of the pilot character of the study. Furthermore it would have been very interesting and useful to perform a follow-up evaluation of the study sample in order to analyse possibly occurring long term effects in the experimental group. We gave up this attempt because in Germany elementary school ends after four years. Moreover after two school years teachers are assigned to new classes. In consequence we would have been obliged to give up about 25 % of the study sample in the follow up and even more complicated we would have been confronted with the situation that some of the teachers of the experimental would have been assigned to the control group and vice versa. Due to these difficulties we omitted this goal.

Despite these limitations the study gives some hints on the feasibility and the effectiveness of a teacher training as perceived by teachers for children with symptoms of ADHD and ODD in an educational routine setting of a public school.

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