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One-Year Follow-up of a Parent Management Training for Children with Externalizing Behaviour Problems in the Real World

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Background: The long-term effectiveness of parent training for children with externalizing behaviour problems under routine care within the German health care system is unclear. We report the 1-year follow-up results of the parent training component of the Prevention Program for Externalizing Problem Behaviour (PEP) for 270 children aged 3–10 years with externalizing behaviour problems. **Method:** Outcome measures included child behaviour problems (externalizing behaviour problems, Attention-Deficit/Hyperactivity Disorder symptoms and Oppositional Defiant Disorder symptoms) and parenting (self efficacy of parenting and perceived ability to solve difficult parenting situations). Data were analysed using multilevel modelling. **Results:** Comparison of the changes during the 3-month waiting and treatment periods revealed significantly stronger treatment effects on all outcome measures, indicating a substantial decrease in child behaviour problems and a significant increase in parenting due

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to treatment. At 1-year follow-up, initial treatment effects on child behaviour problems were maintained, while parenting continued to improve. **Conclusions:** Families whose children exhibited externalizing problem behaviour profit from PEP and improvements are maintained for at least one year.

Keywords: Parent management training, externalizing problem behaviour, long-term effectiveness.

Introduction

Externalizing problem behaviour comprises symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) as defined by the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000). These symptoms often cluster together and there are high prevalence rates of ADHD and ODD in both preschool children and school-age children (Cuffe, Moore and McKeown, 2005; Gadow, Sprafkin and Nolan, 2001; Maughan, Rowe, Messer, Goodman and Meltzer, 2004). Children with early externalizing problem behaviour have a higher risk for adverse developmental outcomes in youth and adulthood, such as ongoing psychiatric problems, academic underachievement and substance use (Biederman et al., 2006; Fergusson, Horwood and Ridder, 2005; Mason et al., 2004; Spira and Fischel, 2005). Therefore, effective interventions are needed. From the perspective of developmental psychopathology, these interventions should start early before problems become consolidated and disturb subsequent developmental tasks (Ialongo et al., 2006).

Parents and children mutually influence each other (Maccoby, 2000). Numerous studies document that dysfunctional parenting and externalizing problem behaviour are associated (Bender et al., 2007; Chamberlain, Reid, Ray, Capaldi and Fisher, 1997; Cunningham and Boyle, 2002). For children with antisocial behaviour, the parent-child interaction is often characterized by low levels of parental involvement in children's activities, poor supervision of offspring, and harsh and inconsistent discipline practices (Hinshaw and Lee, 2003). Parent management training (PMT) tries to utilize and to modify the influence that parents exert on their children (Kazdin, 2005).

The present study investigates the 1-year follow-up data of a PMT developed in Germany within the Prevention Program for Externalizing Problem Behaviour (PEP, Plück, Wieczorrek, Wolff Metternich and Döpfner, 2006). Like many other PMTs, PEP has a cognitive behavioural foundation and is based on published prevention and treatment manuals for children with externalizing behaviour problems (Barkley, 1997; Döpfner, Schürmann and Frölich, 2007; McMahon and Forehand, 2003). Parents are trained to notice the antecedents and consequences of the problem behaviour of the children. One key feature of PEP is contingency management. Consequences that follow compliant and noncompliant child behaviour should be immediate, specific, and consistent. To attain this goal, individually tailored rules for specific problem behaviour are developed with the parents during the training sessions. Methods for rewarding the child (e.g. token systems) are presented as well as methods for adequately punishing the child (e.g. time out). The sessions are followed by parental homework. See the Methods section of this paper for more details about the program.

In general, PMTs are evaluated less often than child-focused treatments (Weisz, Doss and Hawley, 2005). Nevertheless, several reviews judge PMT to be evidence-based for children

with externalizing behaviour problems (Connor et al., 2006; Eyberg, Nelson and Boggs, 2008; Farmer, Compton, Burns and Robertson, 2002; McCart, Priester, Davies and Azen, 2006; Nixon, 2002). For children with ADHD, PMT is seen as an environmental way to help the child cope with self-regulation deficits (Weisz, 2004) and it is regarded as empirically supported, either alone or in combination with stimulant medication (Chronis, Jones and Raggi, 2006). Positive short-term effects of PEP, including parent training and pre-school-teacher training, have been demonstrated in a randomized controlled efficacy study (Hanisch et al., 2009; Hanisch et al., 2006).

In general, however, there is a paucity of data on the long-term outcomes of the treatment of externalizing problem behaviour in children (Farmer et al., 2002; Kazdin, 1997). Only a few studies report follow-up data at more than 6 months after treatment. Positive treatment effects were found at 1-year follow-up and longer for Webster-Stratton's Incredible Years program (Webster-Stratton, 2005) and Eyberg's Parent-Child Interaction Therapy (Nixon, Sweeney, Erickson and Touyz, 2004; Querido and Eyberg, 2005). In general, these programs are evaluated as efficacy trials conducted in well-controlled settings.

In the present study, PEP was delivered in routine care settings. PEP was offered by employees of different counseling and mental health services. This study can, therefore, be characterized as an effectiveness trial. In contrast to efficacy trials, effectiveness studies assess treatment effects under real-world conditions (Lutz, 2003; Nathan, Stuart and Dolan, 2000; Weisz, Donenberg, Han and Weiss, 1995). That is, effectiveness studies have high external validity, but this is often obtained at the expense of low internal validity. To date, only a few outcome studies have been carried out as effectiveness trials (Glasgow, Lichtenstein and Marcus, 2003). In general, the results of these effectiveness trials are less promising than those of efficacy trials. In effectiveness trials of traditional child psychotherapy, average effect sizes range from –.08 (Weiss, Catron, Harris and Phung, 1999) to .01 (Weisz and Jensen, 1999). However, none of these studies assessed the effectiveness of parent training in isolation.

One of the few trials that has tested a PMT for externalizing behaviour problems under real-world conditions is that of Ogden and Hagen (2008). Using the Parent Management Training Oregon model (PMTO, Forgatch, 1994) they obtained positive results when applied in the health system in Norway. In comparison with treatment as usual, PMTO was effective in reducing parent-reported child externalizing problems, in improving teacher-reported social competence, and in enhancing parental discipline immediately after treatment. For Webster-Stratton's Incredible Years program (Webster-Stratton, 2005), there is also evidence that treatment effects can persist for a long time when applied in routine care conditions (Gardner, Burton and Klimes, 2006; Hutchings et al., 2007; Scott, 2005). In the study of Hutchings et al. (2007), conduct problems of the child and parenting were both significantly improved at 6-month follow-up in the intervention group compared with the control group. Scott (2005) demonstrated stable effects for externalizing problem behaviour when the post-treatment scores of the intervention group were compared with the follow-up scores 1 year later. Gardner et al. (2006) found that conduct problems and parenting behaviour remained stable when the intervention group post-treatment scores were compared with follow-up scores 18 months later. All three of these trials were conducted in the health care system of the United Kingdom.

The aim of the present study was to determine the effectiveness of PEP at 1-year follow-up under routine care conditions in Germany. To our knowledge, this is the first study that considers the long-term effects of a PMT in routine care in Germany. Despite differences in

the health care systems of the United Kingdom and Germany, it was expected that treatment effects for externalizing problem behaviour and parenting would remain stable at follow-up. That is, comparable results with the studies of Gardner et al. (2006) and Scott (2005) were expected.

Method

Design

In this study, PEP was evaluated using a within-subject control group design. There were two assessment points before treatment: the first assessment (pre1) occurred 3 months before treatment; the second assessment (pre2) was after a 3-month waiting period and immediately before treatment. Changes in outcome variables during this waiting period served as the control condition and were compared with changes during treatment, i.e. between pre2 and post (the assessment conducted immediately after treatment). Follow-up assessments were conducted at 3 months and at one year after treatment (1-year fu). The present analysis considers pre1, pre2, post, and 1-year fu data. The ethics committee of the University Hospital, Cologne, approved the study.

Participants

To be considered an effectiveness trial, the PEP courses had to be conducted by members of local counselling services, pediatric primary care centres, and psychotherapy practices. Altogether, 37 different institutions located in North Rhine-Westphalia (Germany) were recruited for the study. The investigators of these participating institutions decided which families fulfilled the study inclusion criterion. The only inclusion criterion was a 3- to 10-year-old child with externalizing problem behaviour. No limits were defined for symptom severity. The families were informed that prior to the intervention there was a 3-month waiting period.

A total of 324 families were included at the pre1 assessment. Of these families, 265 supplied questionnaire data at the pre2 assessment, 210 at the post assessment, and 101 at the 1-year fu assessment. Families who never attended the training were excluded from the analysis. Thus, conclusions about the effectiveness of treatment are only valid for families who attended at least 1 unit of PEP training. After this correction, the number of families at each assessment point was: pre1 ($n = 270$), pre2 ($n = 248$), post ($n = 210$) and 1-year fu ($n = 101$). The 270 families at pre1 constituted the sample considered in this analysis. Families with missing values at pre2, post and 1-year fu were included in the statistical analysis. The strategy used for handling missing data is given in the missing data section below.

Of the 270 families at pre1, 79.3% children were male and mean age was 6.5 years ($SD = 2.0$). Mothers mean age was 36.4 years ($SD = 5.2$) and 15.9% of the families had an immigration background. In 63.3% of the families, both biological parents lived together, 24.8% of the children stayed with their biological mothers only, and 11.9% of children had other family backgrounds.

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PEP trainers

The PEP trainers were experienced child therapists and employees of the 37 different institutions taking part in the study. Overall, 59 trainers were involved in conducting PEP parent trainings including didactic presentation, modelling group discussion and practising. The PEP trainers attended a 2-day course held by the project members to learn how to conduct the PEP training. The PEP trainers were: psychologists (37.3%), social or educational workers (23.5%), educationalists (15.7%), remedial teachers (15.7%), or belonged to other professions (7.8%).

PEP training

PEP is designed for children with externalizing behaviour problems aged 3 to 10 years and has a parent training component and a (pre-school) teacher training component. The lessons for parents and teachers are given separately. Both training components comprise 12 units: 6 basic units and 6 additional units. Each unit takes 90–120 minutes to deliver and is ideally for between 4 and 8 participants in each group. Each unit is individually tailored to the needs of each participating family. Therefore, at the beginning of the training, the specific problem of each child is defined. The parents are taught how to solve these specific problems by using the different interventions discussed in the units. In the present study, only parents were trained.

In the first basic unit for parents, target problems of the child as well as competencies are identified. In the second unit, the coercive interaction process (cf. Patterson, 1982) is identified with the parents. This serves as an explanatory model for the target problems of the child. In addition, positive play time is introduced as a means to strengthen positive parent-child interactions. In the third basic unit, methods for parents to cope with daily hassles are put together. In the fourth basic unit, firm and secure rules are developed with the parents for the target problems of the child. The parents are taught how to communicate effective commands. In the fifth basic unit, methods for rewarding the child (e.g. token systems) are presented for when the child complies with the rules. In the last basic unit, parents are informed how to punish the child adequately (e.g. time out) when the child has broken the rules.

The first additional unit precedes the basic units and is an initial get-together with a brief introduction to the contents of the program. The remaining additional units are delivered after the basic units. In the second additional unit, methods for managing problem behaviour in public are discussed. In the third additional unit, ways to cope with enduring quarrels between children (e.g. siblings) are presented. The fourth additional unit focuses on how to strengthen persevering play of children. The fifth additional unit is aimed at parents of school-age children and teaches methods to strengthen attention and finish homework. The last additional unit is a summary of the content of the units of PEP.

In the present study, the trainers were obliged to give the 6 basic units, but the remaining additional units were delivered at the discretion of the trainer and according to the needs of the parents. On average, the 59 trainers offered 7.9 units ($SD = 1.4$). Parents attended on average 4.6 ($SD = 1.6$) of the 6 basic units.

Outcome measures

Data were collected from mothers via questionnaire booklets.

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Child behaviour problems. *The Child Behavior Checklist for ages 4–18* (CBCL/4–18, Achenbach, 1991) is designed to assess a variety of child-specific behaviour problems. Items are scored from 0 to 2, with higher scores indicating more severe problems. Various studies proved the German version to be a factorially valid, robust and highly reliable rating scale (Döpfner, Berner, Schmeck, Lehmkuhl and Poustka, 1995). For this report, the externalizing syndrome scale (CBCL-EXT) with 33 items and an internal consistency of Cronbach's $\alpha = .89$ was used.

The Symptom Checklist Attention-Deficit/Hyperactivity Disorder (SCL-ADHD, Döpfner, Görtz-Dorten and Lehmkuhl, 2008) assesses the diagnostic criteria of DSM-IV (American Psychiatric Association, 1994) and ICD-10 (World Health Organization, 1993) for ADHD. The instrument consists of 20 items, each scored on a 0 to 3 severity scale; scores of 2 and above are considered clinically relevant. Reliability of this instrument has been shown (Döpfner et al., 2008). In our sample, internal consistency for the total score was Cronbach's $\alpha = .92$.

The Symptom Checklist Disruptive Behaviour Disorder (SCL-DBD, Döpfner et al., 2008) contains the diagnostic criteria of DSM-IV and ICD-10 for ODD and CD. For this study, only the 9 items of the ODD subscale were considered (SCL-ODD). Reliability of this instrument has been shown (Döpfner et al., 2008). Items are scored on a 0 to 3 severity scale. Internal consistency for SCL-ODD was Cronbach's $\alpha = .91$.

Parenting. *The Self-Efficacy Scale* (SEFS) is the German adaptation of the Parenting Sense of Competence Scale developed by Johnston and Mash (1989) and the Self Efficacy for Parenting Task Index by Coleman and Karraker (2000). The SEFS comprises 15 items measuring parents' perception of self-efficacy on a 0 to 3 scale with higher values indicating more competencies. In this sample, one item was deleted due to low item total correlation. Internal consistency of the remaining items was Cronbach's $\alpha = .85$.

The German adaptation of the *Problem Setting and Behaviour Checklist* (PSBC) developed by Sanders, Markie-Dadds, Tully and Bor (2000) measures the perceived ability to solve difficult parenting situations. Items are scored on a 0 to 3 scale with higher scores reflecting a stronger ability to deal with difficult parenting situations. Internal consistency for the overall score in our sample was Cronbach's $\alpha = .91$.

Statistical analysis

Data were analysed by multilevel modelling (Goldstein, 2003; Hox, 2002; Raudenbush and Bryk, 2002; Snijders and Bosker, 1999) using the sixth version of HLM software (Raudenbush, Bryk, Cheong and Congdon, 2004; Raudenbush, Bryk and Congdon, 2008). For the present analysis, piecewise linear growth models were computed (Raudenbush and Bryk, 2002; Singer and Willett, 2003; Snijders and Bosker, 1999). That is, different growth rates were taken into account for different time periods. Altogether, three time periods and, therefore, three different growth rates (β_{10}, β_{20}, β_{30}) were considered. The first time period was the waiting period from pre1 to pre2. Changes during this period were covered by growth rate β_{10}. The treatment period from pre2 to post was the second time period and was covered by growth rate β_{20}. The third time period was the follow-up period from post to 1-year fu. Changes during this period were covered by growth rate β_{30}. The intercept of model was considered to be random and the growth rates were fixed for reason of model identification.

The analysis had two main objectives. First, to show that growth rate β_{20} (change during treatment) was significantly higher than growth rate β_{10} (change during waiting period) as a test for treatment effects. To check this, contrasts were defined. The results of this analysis should replicate previous findings of the study where a less advanced statistical procedure was used (Hautmann, Hanisch, Mayer, Plück and Döpfner, 2008).

The second main objective was to test whether initial treatment effects were maintained or improved over time, i.e. that the growth rate β_{30} was either not significant or indicated a significant improvement.

For the regression coefficients, the significance tests were based on robust standard errors. We further calculated effect sizes using Cohen's *d* (Cohen, 1988).

Missing data

In multilevel modelling, incomplete cases remain in the analysis (Maas and Snijders, 2003). Little (1995) has shown that this strategy is appropriate if missing data are missing at random (MAR, Rubin, 1976). For all other analyses except the multilevel model, missing data were imputed by the expectation maximization procedure (EM, McLachlan and Krishan, 1996) of SPSS (SPSS, 2007). EM also assumes MAR. In our study, several comparisons were made to get an indication of whether or not data were MAR. This was especially important because there was considerable drop-out over the course of the study (the number of participating families decreased from $n = 270$ at pre1, to $n = 248$ at pre2, to $n = 210$ at post, to $n = 101$ at 1-year fu).

We tested whether families who participated in the training but who dropped out of the study either at post ($n = 60$) or at 1-year fu ($n = 169$) differed from those who attended the training and provided data. Participants with missing data at post did not differ in any of the outcome measures at pre1 from those whose data were available at post (CBCL-EXT: $t(268) = 0.61$, $p = .543$; SCL-ADHD: $t(268) = 1.67$, $p = .097$; SCL-ODD: $t(268) = -0.14$, $p = .893$; SEFS: $t(268) = -1.88$, $p = .061$; PSBC: $t(268) = -1.25$, $p = .211$). For SEFS, significance was only just missed. In this case, those who dropped out were less impaired. Participants with missing data at 1-year fu did not differ in any of the outcome measures at pre1 from those whose data were available at 1-year fu (CBCL-EXT: $t(268) = -0.33$, $p = .740$; SCL-ADHD: $t(268) = 0.96$, $p = .341$; SCL-ODD: $t(268) = -0.13$, $p = .898$; SEFS: $t(268) = -1.37$, $p = .173$; PSBC: $t(268) = -0.68$, $p = .496$). Patients with missing data at 1-year fu did not differ from patients with full data sets at 1-year fu regarding their changes during treatment (difference pre2 to post) on any of the outcome variables (CBCL-EXT: $t(196) = 1.51$, $p = .132$; SCL-ADHD: $t(196) = 0.77$, $p = .442$; SCL-ODD: $t(196) = 37$, $p = .709$; SEFS: $t(196) = -1.68$, $p = .094$; PSBC: $t(196) = -1.39$, $p = .167$). In sum, we found no evidence that missing data were not MAR. We therefore hypothesized that the prerequisites for the chosen missing data handling strategies were appropriate.

We also tested whether families who did not participate in the training ($n = 54$) and were not considered for this analysis differed from those who attended the training and were analysed ($n = 270$). Families who did not participate in the training did not differ in any of the outcome measures at pre1 from those who took part in the training (CBCL-EXT: $t(321) = -0.26$, $p = .793$; SCL-ADHD: $t(322) = -0.84$, $p = .401$; SCL-ODD: $t(322) = 0.50$, $p = .618$; SEFS: $t(322) = 1.14$, $p = .257$; PSBC: $t(322) = -0.30$, $p = .761$).

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Table 1. Means and standard deviations for outcome variables at four different measurement points for the sample of families who attended at least 1 unit of the PMT (missing values not imputed)

	pre1 mean (*SD*) $n = 270$	pre2 mean (*SD*) $n = 248$	post mean (*SD*) $n = 210$	1-year fu mean (*SD*) $n = 101$
Child behaviour problems				
CBCL-EXT	20.15 (9.63)	18.54 (9.29)	15.18 (9.37)	14.52 (9.28)
SCL-ADHD	1.38 (0.64)	1.28 (0.64)	1.07 (0.63)	1.02 (0.59)
SCL-ODD	1.37 (0.75)	1.25 (0.73)	1.01 (0.71)	0.98 (0.70)
Parenting				
SEFS	1.90 (0.47)	1.92 (0.48)	2.04 (0.47)	2.15 (0.40)
PSBC	1.97 (0.44)	2.02 (0.46)	2.18 (0.48)	2.31 (0.42)

Notes: CBCL-EXT = Child Behavior Checklist/4–18 externalizing syndrome scale; SCL-ADHD = Symptom Checklist Attention-Deficit/Hyperactivity Disorder total score; SCL-ODD = Symptom Checklist Disruptive Behaviour Disorder subscale Oppositional Defiant Disorder; SEFS = Self-Efficacy Scale total score; PSBC = Problem Setting and Behaviour Checklist total score

Results

Table 1 summarizes the means and standard deviations for the outcome measures at the four assessment points.

Based on intercept-only models, the intra-class correlation ρ for the various outcome measures were computed. For CBCL-EXT $\rho = .30$, for SCL-ADHD $\rho = .34$, for SCL-ODD $\rho = .31$, for SEFS $\rho = .37$, and for PSBC $\rho = .43$. That is, about one-third of the total variance of the child behaviour problem variables (CBCL-EXT, SCL-ADHD, SCL-ODD) was variance between individuals, and about two-thirds was variance within individuals across time. For the parenting variables (SEFS, PSBC) more than one-third of the total variance could be attributed to variance between individuals.

The results of the multilevel models are presented in Figures 1 to 5. For the waiting period (pre1 to pre2), the growth rate β_{10} was negative and significant for all child behaviour problem variables indicating a significant decrease during the waiting period (CBCL-EXT: $\beta_{10} = -0.488$, $t(825) = -4.30$, $p < .001$; SCL-ADHD: $\beta_{10} = -0.033$, $t(825) = -4.03$, $p < .001$; SCL-ODD: $\beta_{10} = -0.035$, $t(825) = -3.49$, $p = .001$). For the parenting variables SEFS and PSBC, the growth rate β_{10} was not significant, although PSBC only just missed statistical significance (SEFS: $\beta_{10} = 0.005$, $t(825) = 0.77$, $p = .442$; PSBC: $\beta_{10} = 0.014$, $t(825) = 1.96$, $p = .05$).

For the treatment period (pre2 to post), the growth rate β_{20} was significant for all variables, indicating a decrease in child behaviour problems and an increase in self-reported parenting competencies during treatment (CBCL-EXT: $\beta_{20} = -1.213$, $t(825) = -8.66$, $p < .001$; SCL-ADHD: $\beta_{20} = -0.077$, $t(825) = -7.77$, $p < .001$; SCL-ODD: $\beta_{20} = -0.085$, $t(825) = -7.50$, $p < .001$; SEFS: $\beta_{20} = 0.046$, $t(825) = 5.24$, $p < .001$; PSBC: $\beta_{20} = 0.061$, $t(825) = 6.34$, $p < .001$).

In the next step, the first main analysis of the study was conducted. By defining contrasts (see Figures 1 to 5), we calculated whether the growth rate during the treatment period (β_{20}) was significantly larger than the growth rate during the waiting period (β_{10}). This was the case

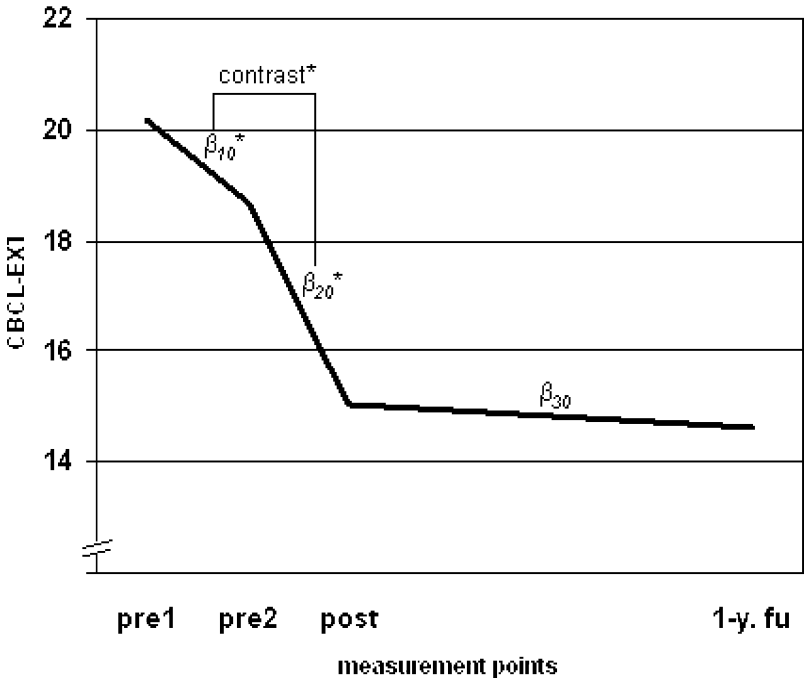

Figure 1. Average course of Child Behavior Checklist for ages 4–18 externalizing syndrome scale (CBCL-EXT) based on parameters of the multilevel model ($N = 270$); β_{10} = slope waiting period (pre1/pre2); β_{20} = slope treatment period (pre2/post); β_{30} = slope 1-year follow-up period (post/1-year fu); by contrast significant difference between β_{10} and β_{20} was tested; $^{*}p < .05$

for all outcome variables – for externalizing behaviour problems (CBCL-EXT: $\chi^2(1) = 12.77$, $p = .001$), ADHD symptoms (SCL-ADHD: $\chi^2(1) = 9.38$, $p = .003$), ODD symptoms (SCL-ODD: $\chi^2(1) = 8.54$, $p = .004$), self efficacy of parenting (SEFS: $\chi^2(1) = 10.30$, $p = .002$), and the perceived ability to solve difficult parenting situations (PSBC: $\chi^2(1) = 10.93$, $p = .001$) as rated by parents.

The second main objective of this study pertained to the growth rate β_{30} during the 1-year follow-up (see Figures 1 to 5). For child behaviour problems, there was no significant change over time during follow-up, indicating stability (CBCL-EXT: $\beta_{30} = -0.034$, $t(825) = -0.59$, $p = .553$; SCL-ADHD: $\beta_{30} = -0.004$, $t(825) = -0.89$, $p = .373$; SCL-ODD: $\beta_{30} = -0.002$, $t(825) = -0.44$, $p = .660$). The growth rates for the parenting variables were positive and significant, indicating a further increase in parenting competence (SEFS: $\beta_{30} = 0.010$, $t(825) = 3.61$, $p = .001$; PSBC: $\beta_{30} = 0.011$, $t(825) = 4.23$, $p < .001$).

To assess the magnitude of these results, Cohen's *d* effect size (Cohen, 1988) was computed for three time intervals: (a) the waiting period (pre1 to pre2), (b) the intervention period (pre2 to post) and (c) the follow-up period (post to 1-year fu). The Cohen's *d* effect sizes for the different outcome measures are given in Table 2. According to Cohen (1988), effect size values ranging from 0.2 to 0.5 are considered as small, from 0.5 to 0.8 as medium, and greater than 0.8 as large.

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Table 2. Cohen's *d* effect sizes for waiting period (pre1/pre2), treatment period (pre2/post) and follow-up period (pre2/1-year fu) for sample of families who attended at least 1 unit of the PMT ($N = 270$)

	d waiting period (pre1/pre2)	*d* treatment period (pre2/post)	*d* follow-up period (post/1-year fu)
Child behaviour problems			
CBCL-EXT	−0.28	−0.68	−0.04
SCL-ADHD	−0.26	−0.60	−0.06
SCL-ODD	−0.22	−0.59	0.00
Parenting			
SEFS	0.06	0.40	0.34
PSBC	0.13	0.47	0.50

Notes: Missing values were imputed by expectation maximization; CBCL-EXT = Child Behavior Checklist/4–18 externalizing syndrome scale; SCL-ADHD = Symptom Checklist Attention-Deficit/Hyperactivity Disorder total score; SCL-ODD = Symptom Checklist Disruptive Behaviour Disorder subscale Oppositional Defiant Disorder; SEFS = Self-Efficacy Scale total score; PSBC = Problem Setting and Behaviour Checklist total score

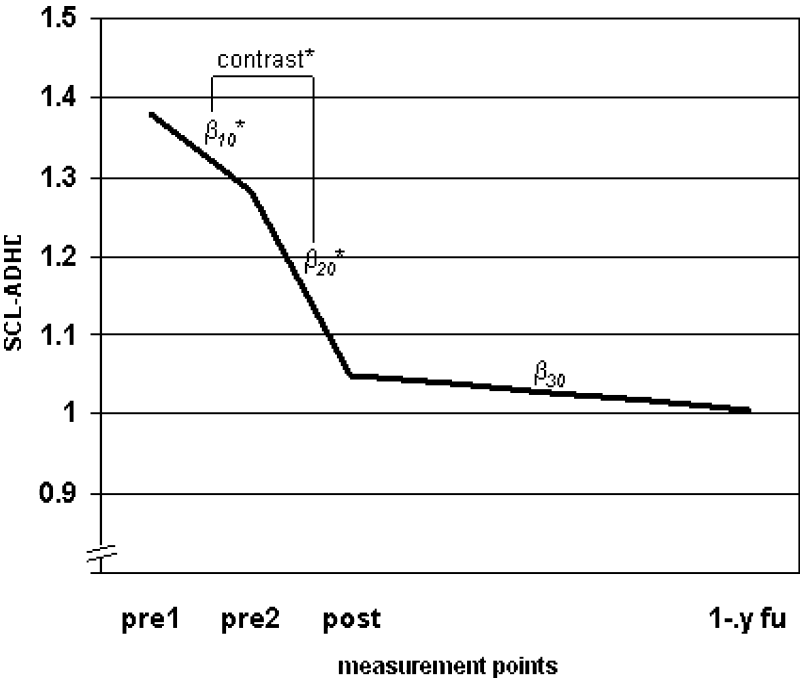

Figure 2. Average course of Symptom Checklist Attention-Deficit/Hyperactivity Disorder total score (SCL-ADHD) based on parameters of the multilevel model ($N = 270$); β_{10} = slope waiting period (pre1/pre2); β_{20} = slope treatment period (pre2/post); β_{30} = slope 1-year follow-up period (post/1-year fu); by contrast significant difference between β_{10} and β_{20} was tested; $^{*}p < .05$

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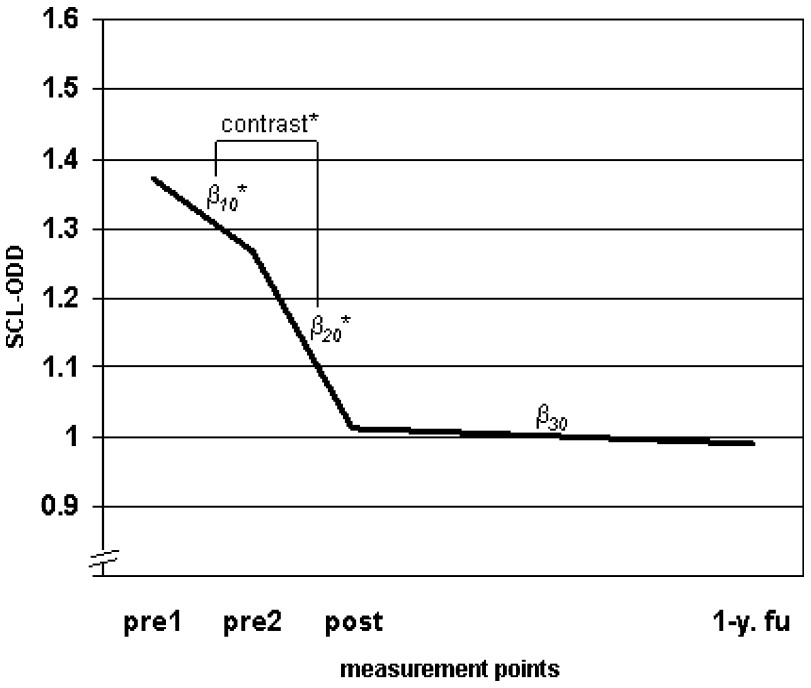

Figure 3. Average course of Symptom Checklist Disruptive Behaviour Disorder subscale Oppositional Defiant Disorder (SCL-ODD) based on parameters of the multilevel model ($N = 270$); β_{10} = slope waiting period (pre1/pre2); β_{20} = slope treatment period (pre2/post); β_{30} = slope 1-year follow-up period (post/1-year fu); by contrast significant difference between β_{10} and β_{20} was tested; $^{*}p < .05$

For child behaviour problems, the effect sizes were small for the waiting period, medium for the intervention period, and negligible for the follow-up period. For parenting, effects sizes were negligible for the waiting period, small for the intervention period, and small to medium for the follow-up period.

Clinical significance of the findings was further investigated by normative comparisons. For CBCL-EXT (Arbeitsgruppe Deutsche Child Behaviour Checklist, 1998), SCL-ADHD (Döpfner et al., 2008) and SCL-ODD (Döpfner et al., 2008) normative data was available. We investigated how many children were above the 90th percentile for the respective measurement points. For CBCL-EXT (pre1: 68.1%; pre2: 61.1%; post: 46.7%; 1-year fu: 44.8%), SCL-ADHD (pre1: 47.0%; pre2: 41.1%; post: 23.3%; 1-year fu: 20.7%), and SCL-ODD (pre1: 50.7%; pre2: 44.1%; post: 30.4%; 1-year fu: 24.1%), there was a progressive decrease in the percentage of children scoring above the 90th percentile over the course of the study.

Discussion

In the present study, a group of children with externalizing behaviour problems was observed for three different time periods. The first 3-month waiting period served as a control period to detect naturally occurring changes in parenting or child behaviour problems. In the second

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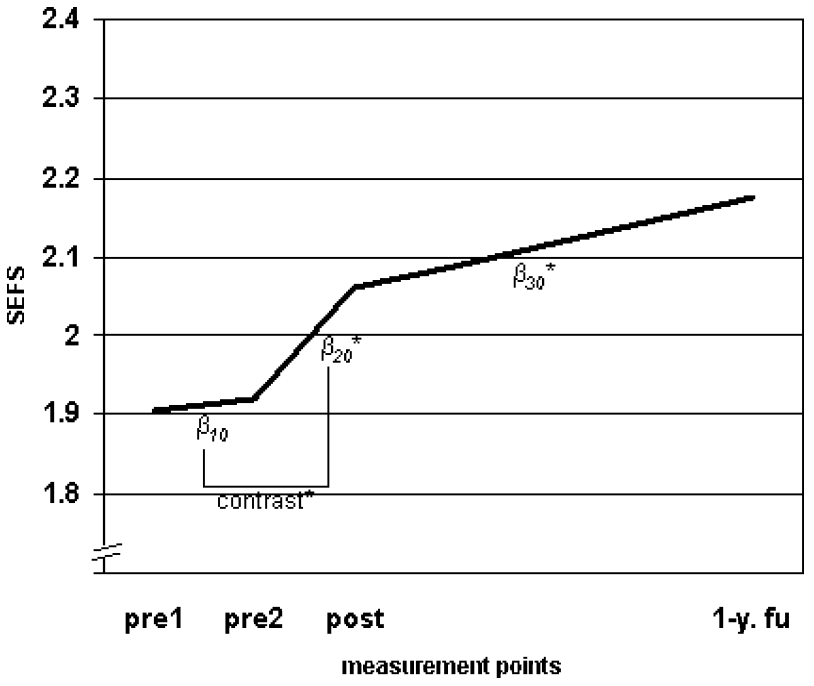

Figure 4. Average course of Self-Efficacy Scale (SEFS) based on parameters of the multilevel model ($N = 270$); β_{10} = slope waiting period (pre1/pre2); β_{20} = slope treatment period (pre2/post); β_{30} = slope 1-year follow-up period (post/1-year fu); by contrast significant difference between β_{10} and β_{20} was tested; $^{*}p < .05$

period, the parent management training of PEP was provided. Changes in outcome measures during this time interval indicated changes during treatment. The third time period covered the time from the end of treatment up to 1 year post treatment.

The study had two main objectives. First, to show that changes during the treatment period were significantly greater than those during the waiting period thereby testing the effectiveness of PEP in routine care. This short-term effectiveness was shown for all outcome variables. Compared with doing nothing in the waiting period, participation in PEP resulted in significantly improved parenting and externalizing child behaviour problems in children referred for these kinds of behaviour problems under routine care conditions. The effects were small for parenting and medium for externalizing behaviour. Thus, previous findings based on a less rigorous statistical approach than used in the present analysis were replicated (Hautmann et al., 2008).

The second main objective of the study was to show that the treatment gains were maintained over time or even increased. Our results show that externalizing problem behaviour was maintained (i.e. stable) over the 1-year follow-up period and that parenting self-efficacy and perceived parenting ability showed further improvement in the small to medium range. With respect to externalizing problem behaviour, this study replicates the findings of the effectiveness trials of Scott (2005) at 1-year follow-up and Gardner et al. (2006) at

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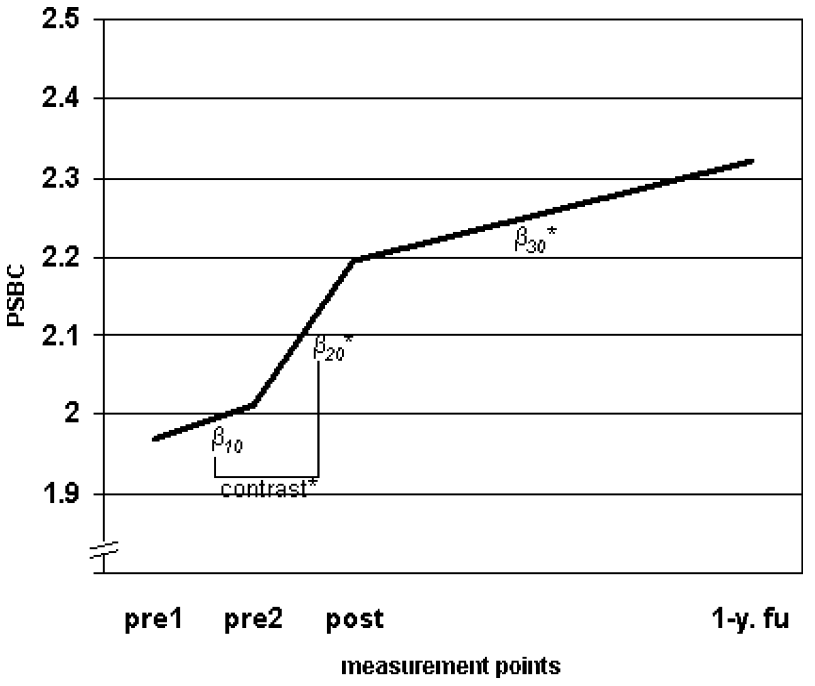

Figure 5. Average course of Problem Setting and Behaviour Checklist (PSBC) based on parameters of the multilevel model ($N = 270$); β_{10} = slope waiting period (pre1/pre2); β_{20} = slope treatment period (pre2/post); β_{30} = slope 1-year follow-up period (post/1-year fu); by contrast significant difference between β_{10} and β_{20} was tested; $^{*}p < .05$

18-months follow-up. However, we obtained somewhat different results for parenting behaviour than these previous studies. Gardner et al. (2006) found stability when post-treatment scores were compared with 18-month follow-up scores, whereas we found an increase in parenting competencies during the 1-year follow-up period. This difference in parenting behaviour might be due to the different lengths of follow-up in the studies, but this remains speculative and is unlikely as the change in the present study was in the medium range, indicating a substantial improvement.

Scott (2005) as well as Gardner et al. (2006) conducted their effectiveness trials under routine conditions in the United Kingdom. The present study is the first study conducted in Germany to demonstrate beneficial long-term effects under real-world conditions. These findings are especially promising as the results of effectiveness trials often are less positive than those of efficacy trials (Weiss et al., 1999; Weisz and Jensen, 1999). Relevance of the findings was further investigated in terms of their clinical significance. For child behaviour problems, we examined how many children scored above the 90th percentile when compared with normative data. At the beginning of the study, between 47.0% and 68.1% of the children were classified as severely impaired. At 1-year follow-up, the corresponding range was 20.7% to 44.8%. That is, over the course of the study, there was a substantial decrease in the proportion of children

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within the clinical range. Nevertheless, the results show there remained a large proportion of children who were in need of further support.

An improvement of perceived parenting during follow-up did not translate into further improvement of child behaviour during this period. This may be because parenting is only one risk or protective factor that contributes to externalizing problem behaviour of children. Child variables (e.g. genetic make-up) as well as other environmental variables of the children (e.g. deviant peer group) also exert an influence on the course and have to be taken into consideration (Lahey, Waldmann and McBurnett, 1999; Nigg, 2006).

Child behaviour improved substantially during the waiting period. There may be several reasons for this. Possible explanatory models include repeated measurements effects, regression toward the mean (Nesselroade, Stigler and Baltes, 1980), "real changes" during the waiting period, or improvement due to expected help. On the other hand, we found significant differences in the magnitude of change for all outcome measures, demonstrating relevance of the treatment success.

Study limitations

This study has several limitations, some of which can be attributed to the nature of effectiveness studies in general. A within-subject control group design is less rigorous than a randomized control trial. Data were gathered exclusively by mother questionnaire and a third-person rating would have been useful. The results therefore primarily reflect the views of the mothers who, in general, also participated in the treatment. Therefore, the observed symptom reduction may primarily reflect effort gratification of the mothers. Further analyses that also consider the views of the fathers will clarify this question (Hautmann et al., 2009). The drop-out rate from the post measurement to the 1-year follow-up measurement was quite high; a higher persistence rate over the long-term course of the study would have been desirable. On the other hand, preliminarily analyses showed that families who dropped out of the study did not differentially profit from treatment and that drop-out could be considered to be at random. Furthermore, because of the general paucity of long-term data, these results are valuable.

Conclusions

The results of this study are promising. In general, only a few studies investigating PMT are conceived as effectiveness trials (e.g. Ogden and Hagen, 2008), and even fewer studies report results for longer follow-up periods. Long-term effects under routine care settings in the United Kingdom have already been demonstrated by Gardner et al. (2006) and Scott (2005). This study confirms their findings under conditions of routine care in Germany. This indicates that PMT can have long-lasting effects even when applied under real-world conditions in different European health care systems.

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