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Multidimensional treatment foster care (MTFC): results from an independent replication

Pia Kyhle Westermark[a,b], Kjell Hansson[b] and Martin Olsson[b,c]

This study examines 24-months post-baseline outcomes for thirty-five Swedish antisocial youths who received either treatment in multidimensional treatment foster care (MTFC) or treatment as usual (TAU). MTFC is a community-based treatment programme that has been successful in treating chronic juvenile offenders in the USA. This study is the first randomized control study outside the USA. The youth treated in the MTFC programme consistently showed some statistically significant positive treatment effects compared to the youth exposed to TAU. The results suggest that MTFC might be an effective method in treating youth with severe behaviour problems in a Swedish context. The authors conclude that the programme ought to be of great interest for Swedish social services as an alternative to traditional care.

Keywords: behaviour problems; MTFC; TAU; foster care treatment; intervention; CBCL; YSR; SCL-90.

Introduction

Multidimensional treatment foster care (MTFC) is one of twelve blueprints model programmes scientifically validated by the Centre for Study and Prevention of Violence (n.d.). Several US studies have shown that MTFC reduces the number of placements in residential care, child problem behaviour, the risks of placement disruption, the number of foster parents dropping out and the cost of care (Aos *et al*., 2004; Chamberlain, 1990, 1994; Chamberlain *et al*., 1992; Chamberlain and Mihalic, 1998; Chamberlain and Reid, 1991; Fisher and Chamberlain 2000). This Swedish study is the first randomized control trial outside the USA and is the first that does not use the

[a] Researcher, National Board of Health and Welfare, SE 106 30, Stockholm, Sweden. E-mail: pia.kyhle.westermark@socialstyrelsen.se.
[b] Professor, School of Social Work, Lund University, Lund, Sweden.
[c] Researcher, Danish National Centre for Social Research, Copenhagen, Denmark.

original programme developers. Results from the baseline and 24-months post-baseline outcomes are presented. There are newly started MTFC sites in a number of European countries (Norway, Denmark, the UK, Ireland and The Netherlands), although no evaluations have been conducted. In the USA and Europe there are approximately sixty-five MTFC sites (MTFC, 2009).

Youths with behaviour problems are difficult to treat (Andreassen, 2003; Farrington and Welsh, 2007; Hansson, 2001; Kazdin *et al*., 1994). Extensive research of antisocial behaviour shows that this group of young people have discouraging prospects and that their management is costly (Andershed and Andershed, 2005; Foster and Jones, 2007; Moffitt *et al*., 2001; Olsson, 2009; Olson *et al*., 2006; Vinnerljung and Sallnäs, 2008). Although youths with antisocial behaviour comprise a small group, their serious problems (characterized by frequent violent behaviour) have great consequences for society (Dalteg and Levander, 1998; Farrington, 1992; Moffitt, 1993; Stattin and Magnusson, 1991). These youth have problems completing treatment (Barber and Delfabbro, 2002; Berridge and Cleaver, 1987; Berry and Barth, 1990; Chamberlain, 1994; Farmer *et al*., 2005; Fenyo *et al*., 1989; Fratter *et al*., 1991; Millham *et al*., 1986; Newton *et al*., 2000; Sallnäs *et al*., 2004, Vinnerljung *et al*., 2001) and few show positive treatment effects (Kazdin, 1993). Moreover some forms of intervention, such as working with them in peer groups, can produce iatrogenic treatment effects (Dishion *et al*., 1999; Dodge *et al*., 2006). This implies that deviant peer influence may strengthen youths' antisocial behaviour. Research has shown that successful treatment programmes target multiple aspects of risk, parental behaviour and management skills and encourage emotional cohesion (Farrington, 2003; Lipsey, 1995; Lipsey and Wilson, 1998; Woolfenden *et al*., 2001). This study focuses on an alternative treatment for youths with antisocial behaviour.

In Sweden the responsibility of child welfare is financially and legally decentralized to local municipalities. Local authorities have the freedom to choose what services to provide. This results in wide local variation of service delivery among municipalities. Swedish legislation makes no strict distinction between child protection and youth justice with the consequence that antisocial behaviour of youths under 20 years of age is a child welfare problem (Hessle and Vinnerljung, 1999). In 2008 nearly two per cent (1.73 per cent) of the Swedish youth population aged 13–17 were placed in out-of-home care. That included foster care, private or public residential care and secure

residential care. Foster care was the most common form of placement (National Board of Health and Welfare, 2009). Youths are the principal recipients of intervention by Swedish social services.

The MTFC programme

Developed by Patricia Chamberlain and John Reid (Oregon Social Learning Centre, OSLC), MTFC is a community-based multi-modal treatment programme that addresses antisocial behaviour. The treatment includes formalized cooperation between a treatment team and the youth's parents, school, leisure activities and social services. The youth is placed individually in a specialized foster home. The foster parents provide the youth with a structured and therapeutic living environment.

The first effect study of MTFC was published in 1990 (Chamberlain, 1990). The study was a matched comparison design and the subjects were referred by the juvenile court. The sample consisted of thirty-two participants who were followed-up 24-months post-baseline. The outcome variables – days incarcerated, behaviour problems, delinquency and programme completion rate – showed positive results for MTFC. However, this study was not a randomized controlled trial and therefore did not meet current evidence-based standards (Shadish *et al*., 2002).

MTFC has been tested in three randomized controlled trials (Table 1). The results have been presented in nine different publications. For the most part, the youths were referred by a juvenile court, a state mental hospital and the Oregon Department of Human Services and Child Welfare Division. The sample size varies ($n = 20$ to 153). In these studies MTFC has mostly been compared to group care treatment. All treatment groups consisted of youths. The studies have focused on several outcome variables, such as incarceration and antisocial behaviour. These outcome variables have been measured at baseline and post-baseline between 3 and 24 months. In general, the results were in favour of MTFC. No negative effects were exhibited. The MTFC-programme has also developed a programme for preschoolers (Fisher *et al*., 2005) and a less intensive MTFC (Keeping foster parents trained and supported) used in regular foster care (Chamberlain *et al*., 2008).

However, the question remains whether MTFC will be successful in another context, using an independent evaluator (Macdonald and

TABLE 1 *Earlier randomized clinical trials of MTFC*

Participants	Outcomes	Follow up	Published study
MTFC; $n = 10$ Treatment as usual in community; $n = 10$ Girls and boys aged 9–18 years	Behaviour problems* MTFC youth were placed out of hospital more quickly*	3 and 7 months post-baseline	Chamberlain and Reid, 1991
MTFC; $n = 39$ Group care; $n = 40$ Boys aged 12–17 years	Criminal referrals* Programme completion* Running away* Days in locked settings* Antisocial behaviour/ delinquency* Self-reported delinquency *ns* Job training *ns* Deviant peer association*	6,12,18 and 24-months post-baseline	Chamberlain and Reid, 1998 Chamberlain and Moore, 1998 Eddy and Chamberlain, 2000 Eddy *et al*., 2004
MTFC; $n = 37$ Group care; $n = 44$ Girls aged 13–17 years	Days in locked settings* Criminal referrals* Self-reported delinquency *ns* Caregiver-reported delinquency* School attendance* Homework completion* Deviant peer association*	3, 6, 12 and 24 months post-baseline	Leve and Chamberlain, 2005, 2007 Leve *et al*., 2005 Chamberlain, *et al*., 2007

Note. *A statistical significance of at least 0.05 per cent level in favour of multidimensional treatment foster care (MTFC). *ns*, no statistical significance for MTFC in comparison with treatment as usual.

Turner, 2008). In this article, we report on the first randomized trial outside the USA led by an independent evaluator.

Aim

This study examined treatment outcomes for thirty-five young people who were randomly allocated to either treatment by the MTFC programme or treatment as usual (TAU) at a 2-year period post-intervention.

Method

The study was completed in a cooperation between Socialhögskolan, Lund University, (responsible for the research) and Familjeforum AB (responsible for the treatment). The study followed a 2 × 2 condition (MTFC versus TAU × baseline versus post-test) with young people assigned to the various treatment conditions.

Participants

The young people were referred by the social agencies for intervention due to serious behavioural problems. Assessment was done by a social worker and MTFC treatment team. In Sweden the assessment of young people is sometimes shared between municipalities and individual social workers (Sundell and Egelund, 2000). The inclusion criteria for the study were that the young people met the clinical diagnosis of conduct disorder according to DSM-IV-TR (American Psychiatric Association) and were at risk of immediate out-of-home placement. Young people fulfilling one or more of the criteria listed below were excluded from the study:

1. Ongoing treatment by another provider;
2. Substance abuse without other antisocial behaviour;
3. Sexual offending;
4. Acute psychosis;
5. Imminent risk of suicide;
6. Placement of the young person in a foster home would cause a serious threat to the safety of a foster family.

After applying the inclusion and exclusion criteria, thirty-eight youths referred by the social service agencies were asked to participate in the study. Three chose not to participate.

TABLE 2 *Description of background variables*

	MTFC $n = 20$	TAU $n = 15$	t value/chi^2	Total sample $N = 35$
Mean age at referral (SD)	15.0 (0.7)	15.7 (1.2)	-1.77^{ns}	15.4 (1.5)
Girls	10	7	0.38^{ns}	17
Boys	10	8		18
Ethnicity				
Swedish	13	13	2.01^{ns}	26
Immigrant[1]	7	2		9
Living with				
both parents	5	3	$.12^{ns}$	8
single parent	15	12		27
Voluntary placement	12	10	$.16^{ns}$	22
Court order placement	8	5		13
Previous interventions				
1–5	11	8	$.01^{ns}$	19
6–25	9	7		16

Note. $p < 0.05$. [1]Immigrant background, at least one parent born outside Sweden;; *ns*, non significant.

The final study included thirty-five youths (seventeen girls and eighteen boys) (Table 2) aged from 12 to 18 years old, with mean age of 15.4 (SD = 1.55). About one-quarter of the young people came from families with immigrant backgrounds. Most (twenty-five youths) came from a single parent family, mainly single mothers. In the Swedish social welfare system young people can be placed in care both voluntarily (parents consent) and by court order. Voluntary placement was the most common; about one-third were placed by court order. Almost half of all the young people had a long history of previous interventions (between six and twenty-five interventions). The interventions included out-of-home placement, respite care, child psychiatric services, family therapy and aggression replacement training. There were no significant differences between the MTFC and the TAU groups regarding their background variables at baseline.

Those who participated were randomized to either MTFC ($n = 20$) or TAU ($n = 15$) (Figure 1). The research staff took responsibility for the randomization and for the assessment process. For the randomization a system of drawing lots was used. There were more young people in the MTFC group because, it seems, that referrers assumed their second referral would be allocated to TAU. Accordingly after the first seven referrals the system of randomization was changed.

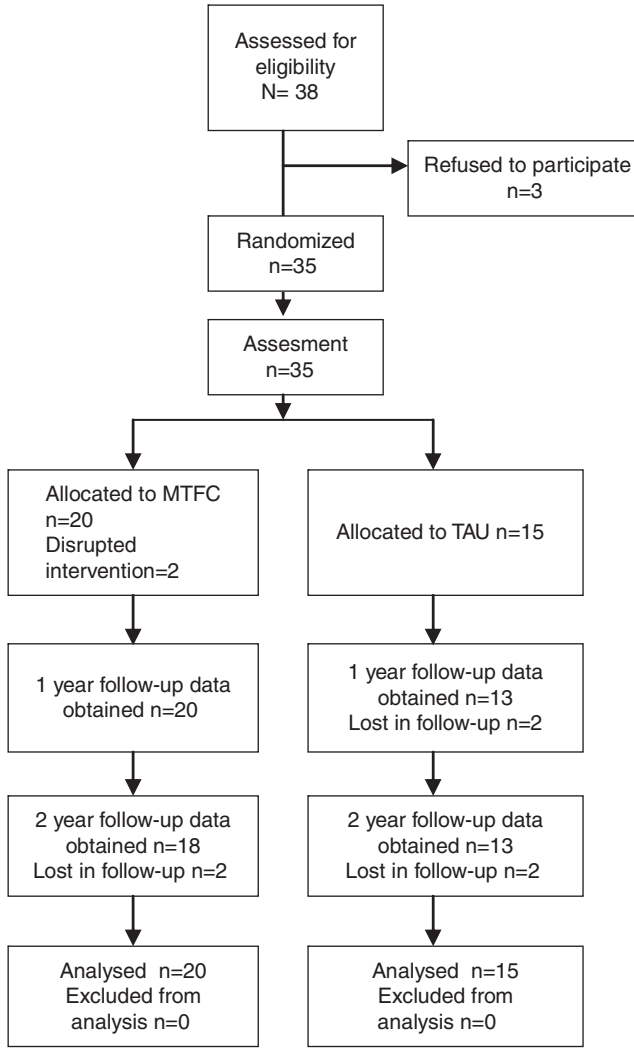

Figure 1 A flow diagram of participants through each stage of the study.

The young people were assessed when they entered treatment. Data were collected at baseline, 6-months, 12-months and at 24-months post-baseline. In this study we present only results from the baseline and 24-months post-baseline. We focus on the longer term treatment effects and thus are interested in whether the treatment

made a difference one year after completed treatment. This is also a common approach in similar treatment studies (Macdonald and Turner, 2008). Among the twenty youths referred to MTFC, two young people ended their treatment prematurely. Two further young people from MTFC were lost in the last follow up (24-months post-baseline). Two young people from TAU group were also lost in the first follow up (12-months post-baseline). According to the dictum 'once randomized always analysed', all four youths were included in the analysis. The average time between the baseline and 24-months post-baseline was 25.2 months (SD = 5.2), with no significant group differences ($t = 1.0^{ns}$). We used multiple informants, including the young people's self-reports and reports by their mothers.

The young people who participated in TAU received some form of intervention from the local child welfare authority. Except for the two belonging to the TAU group, all participants were followed up 12-months post-baseline. At the follow up 24-months post-baseline the treatment attrition rate was eleven per cent.

Description of MTFC programme

MTFC is based on social learning and family system theories. The programme has two main goals: to decrease deviant behaviour and to increase pro-social behaviour. The treatment programme includes formalized cooperation between a treatment team and the youth's birth parents, school and social agencies. Case managers working full time with a small caseload (six families each) supervise the clinical team (family therapists, individual therapists and skills trainers) and the foster family. The MTFC team in our study was supervised once per month by an outside MTFC supervisor. The foster families were recruited by an advertisement in the local newspaper. To be accepted as foster parents in the programme they had to fulfil certain criteria set by the MTFC staff and the local social services agency. The training of the foster parents started with a 2-day theoretical and practical introduction to the programme. Training sessions were organized once every month for the foster parents during placement (Höjman and Dovik, 2008). The foster parents using a point and level system provide the young people with a structured, therapeutic living environment. They receive daily supervision and support from the programme case manager and are supervised weekly at foster parent meetings. A checklist (parent daily report checklist) is communicated in a brief telephone call daily to monitor programme progress

(Chamberlain, 2003); this allows the treatment team to follow the young person's behaviour on a daily basis. The foster parents have only one foster child placed at a time. The young person's parents participate in family therapy and are involved in developing the treatment plan. The family therapy in MTFC requires both young people and parents to participate in therapy session weekly for at least 10 months. The goal for the parents is to be more effective at supervising, encouraging, supporting and following through with consequences with their child. The case manager is available 24 hours per day. Home visits are an integral part of the reunification and start at about 3 weeks after placement. The visits are for the parents to demonstrate to their child that they are a part of the treatment. MTFC aims to prepare for the reunion of the family when the young person has completed the treatment programme (Chamberlain, 1994).

The MTFC programme is described in a five-part manual, one part for each treatment role. The manual consists of components that describe how to run the programme. Adherence to the manual was considered throughout the programme processes. Some components in the manual are required. For example, the foster parents must complete the parent daily report checklist and report on the young person's performance on the point and level system daily. In addition, the team discussions and foster parents' supervision sessions were videotaped and sent to the OSLC for analysis. This information allowed OSLC, the programme developer, to follow continuously the training process of the MTFC site in Sweden. This process formed the basis for the MTFC certification of the Swedish site. To evaluate the programme adherence of new MTFC sites, the OSLC uses an independent organization, Centre for Research to Practice (MTFC Pre-service Training, 2005).

Description of TAU intervention

The young people who were randomly assigned to the TAU group (n = fifteen) received intervention from the social agencies. In Sweden TAU does not normally include manualized treatment, behaviour modification or evidence-based programmes. In this study, seven youths were placed in residential care and five in foster care while three received home-based interventions. In the group placed in residential care, three continued treatment for one year. The rest of the residential group stayed in treatment for from 1 to 6 months and then continued with other interventions such as foster care, family

therapy, mentorship with non-professional volunteers or home-based intervention. Some of the foster care group received individual therapy during placement. The home-based group received different interventions such as family therapy, mentorship with non-professional volunteers and drug testing.

Measures

We used the Achenbach system of empirically based assessment (ASEBA) to estimate the symptom load of each young person. We used SCL-90 to estimate the symptom load of the mothers of the youths.

The ASEBA includes the child behaviour checklist (CBCL) and the youth self report (YSR). It has been translated into more than fifty different languages and is used in numerous studies that examine a wide range of problems in children and young people (Crijnen *et al*., 1999). The CBCL for ages 6–18 (CBCL/6–18) is completed by parents or others who see the child in a home-like setting. In this study the mother completed CBCL. The measurement consists of two parts: a competence scale and a problem scale. In this study only the results from the latter were used. The mothers rated 113 items for how well they described their youth during the last 6 months. In addition to a total problem score, the 113 problem items are combined to form eight narrow-band syndromes or scales and two broad-band dimensions. The total problem score and the two broad-band dimensions (internalizing and externalizing problems) were used. The internalizing score includes somatic complaints and withdrawn and anxious or depressed syndromes. The externalizing score includes delinquent and aggressive syndromes. As reported in the CBCL manual (Achenbach, 1991), test–retest reliability is high ($r = .94$, total problems). For the problems scales, the alpha coefficients ranged from .78 to .97. The YSR was completed by 11 to 18-year olds and describes their own function. The measurement consists of two parts: a competence scale and a problem scale. In this study, only results from the latter were used. The problem scale contains 103 problem items and 16 socially desirable items. The youths were asked to rate each items for how well they described them during the last 6 months. In addition to a total problem score, the 103 problem items are combined to form eight narrow-band syndromes or scales and two broad-band dimensions. The narrow-band syndromes and two broad-band dimensions are the same as in the CBCL and were also used in

this study. As reported in the YSR manual (Achenbach and Rescorla, 2001), test–retest reliability is high ($r = .87$, total problems). For the problems scales the alpha coefficients ranged from .71 to .95 in the YSR. We used a standardized version of both (Larsson and Frisk, 1999) and YSR (Broberg *et al*., 2001) translated into Swedish.

The symptom checklist-90 (SCL-90; Derogatis and Cleary, 1997) is one of the most widely used self-reported rating scales for measuring psychiatric symptoms (Fridell *et al*., 2002). SCL-90 consists of 90 items that measure nine symptom constructs. The global severity index (GSI) includes all scales. In a Swedish study, the alpha coefficients for the nine subscales were between .81 and .91 (Fridell *et al*., 2002). In this study we used the GSI and the subscales depression and anxiety to measure the mother's mental health. The mothers were chosen since most of the young people came from families with single mothers.

Statistical analysis

The statistical analyses were performed in SPSS version 15.0 for Windows. We started with exploring means and standard deviation for outcome variables. The background variables were analysed with an independent *t*-test and chi^2. Baseline differences between MTFC and TAU and gender differences in MTFC and in TAU were examined using a one way analysis of variance (ANOVA). Variance analyses were applied to evaluate the effects of MTFC on youths' behaviour problems and mothers' well being. The general linear model (GLM) repeated measures was used to analyse the variations within groups at two different periods (at baseline and post-baseline) and the statistical interaction effect between groups. We used the Kolmogorov–Smirnov test to test the dependent variables of normality and found no dramatic deviations. Mauchly's test of sphericity was used to check for homogeneity and correlation in the variance in the different populations.

We used Cohen's *d* to estimate the size of any observed effects between the two comparison groups. The effect size (Cohen's *d*) was calculated for each group by taking the differences in post measure (MTFC – TAU). An effect size of 0.2 indicates a small effect, 0.5 a medium effect and 0.8 a large effect (Cohen, 1992).

Clinical significance could be regarded as a considerable symptom reduction (Kazdin, 1999). We focused on the change in a symptom using an individual estimation of each subject's symptom compared to

a normative level of the symptom (Axberg *et al*., 2007; Sundelin, 1991). If the change was at least as large as a standard deviation from pre- to post-intervention in a positive direction (symptom reduction), we rated it as a 'yes' (Table 3). For YSR, the standard deviation in a normal population was estimated by Broberg *et al*. (2001) and for CBCL by Larsson and Frisk (1999). A SCL-90 estimation was done by Fridell *et al*. (2002). A symptom reduction was also estimated if at least a 30 per cent improvement was noted (Webster-Stratton *et al*., 1989). To identify the quantity of symptoms that have developed positively during the treatment, we calculated each youth's symptom change (at least 30 per cent positive) between baseline and post-baseline. If this was fulfilled, it was considered as a significant clinical change

TABLE 3 *Clinical symptoms reduction between pre- and post-interventions for multi-dimensional treatment foster care (MTFC) and treatment as usual (TAU)*

		Reduction in standard deviation[1]			Minimum 30% reduction[2]		
		MTFC	TAU	Chi^2	MTFC	TAU	Chi^2
YSR							
Internal	Yes	4	5	1.28 ns	11	6	.77 ns
	No	16	10		9	9	
External	Yes	16	4	10.0**	14	5	4.64*
	No	4	11		6	10	
Total	Yes	11	6	.77 ns	15	5	6.08*
	No	9	9		5	10	
CBCL							
Internal	Yes	15	5	6.1*	15	5	6.08*
	No	5	10		5	10	
External	Yes	17	9	2.8 ns	15	5	6.08*
	No	3	6		5	10	
Total	Yes	18	8	6.0*	16	6	5.87*
	No	2	7		4	9	
SCL-90							
Depression	Yes	10	4	1.9 ns	15	8	1.79 ns
	No	10	11		5	7	
Anxiety	Yes	8	2	3.0 ns	13	6	2.16 ns
	No	12	13		7	9	
GSI	Yes	9	2	4.0†	13	7	1.18 ns
	No	11	13		7	8	

Note. †$p < .10$, *$p < .05$, **$p < .01$. [1]A reduction as large as one SD in a normal population (yes) (Broberg *et al*. 2001; Fridell *et al*. 2002; Larsson and Frisk 1999). [2]Minimum 30 per cent reduction from pre-intervention scores (yes). *Ns,* non-significant; CBCL, child behaviour checklist; GSI, global severity index; YSR, youth self report.

and rated as a yes. We also calculated how many youth in the MTFC programme and TAU had at least a 30 per cent increased symptom load between baseline and post-baseline. Both measures of symptom decrease and the symptom increase were tested for statistical significance.

Participants who dropped out of treatment before the 24-months follow up were entered in the intention-to-treat analysis, a design that handles missing data (Shadish *et al*., 2002). The missing value was imputed by last observation carried forward (Figure 1). We chose not to use a mixed model analysis since the sample was small and only two youths dropped out of each group with similar baseline measures (Hamer and Simpson, 2009).

Result

No significant baseline differences in symptoms between MTFC and TAU or between boys and girls were found (Table 4).

Regarding the complete sample, regardless of treatment, there were significant time effects in all variables – YSR, CBCL and SCL-90 (Table 4). In most cases, the interaction effect between the two comparison groups showed differences in form of significance or tendency. There was significant interaction on the YSR externalizing symptom. In all variables, MTFC showed a significant reduction in symptoms between the baseline and post-baseline. TAU showed a significant reduction on externalizing symptoms and total symptoms of YSR and CBCL and no significance reduction on SCL-90. The effect sizes favoured MTFC in all variables; five of the nine variables showed a medium effect.

The clinically significant changes illustrate that MTFC in comparison with TAU had more youth reducing their symptoms at a minimum of one standard deviation of a normal population on all nine variables except for YSR internalization (Table 3). However, not all differences in reduction between the groups showed a statistical significance. Most MTFC youth presented a reduction of at least 30 per cent of symptoms in all nine variables, whereas most TAU youth did not reach that level of symptom reduction except for SCL-90 depression. The differences between MTFC and TAU were significant in five out of nine variables.

TABLE 4 *ANOVA with repeated measures and outcome variables*

	MTFC		TAU		Baseline	Time	Time x	Effect
	Pre	Post	Pre	Post			Group	size
	M (sd)	M (sd)	M (sd)	M (sd)	F	F	F	MTFC-TAU
YSR								
Internal	13.8 (9.4)	9.1 (7.3)**	15.4 (10.5)	13.3 (10.4) ns	.2 ns	8.7**	1.2 ns	– .47
External	25.9 (7.0)	14.2 (6.8)***	22.7 (9.6)	16.7 (8.4)*	1.2 ns	49.3***	4.9*	– .33
Total	60.2 (20.5)	37.0 (19.0)***	62.6 (29.7)	46.3 (26.6)*	.1 ns	39.0***	1.2 ns	– .30
CBCL								
Internal	18.4 (8.3)	10.4 (9.0)***	17.7 (11.7)	15.3 (10.3) ns	.0 ns	12.2**	3.6†	– .51
External	36.2 (12.5)	18.9 (11.4)***	31.1 (12.7)	21.1 (12.2)**	1.0 ns	43.8***	3.1†	– .19
Total	74.7 (24.3)	38.6 (25.3) ***	74.3 (33.8)	55.1 (32.4)**	.0 ns	37.5***	3.5†	– .57
SCL-90								
Depression	1.63 (.84)	.72 (.57) ***	1.47 (.89)	1.14 (.88)†	.3 ns	24.0***	5.5*	– .57
Anxiety	1.12 (.68)	.51 (.48)***	1.10 (.58)	.89 (.67) ns	.0 ns	14.7**	3.4†	– .67
GSI	1.00 (.56)	.50 (.45) ***	.93 (.54)	.78 (.55) ns	.1 ns	18.6***	5.3**	– .56

Note. $^{\dagger}p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$. CBCL, child behaviour checklist; GSI, global severity index; MTFC, multidimensional treatment foster care; ns, non significant, TAU, treatment as usual; YSR, youth self -report.

Discussion

The results presented in this study are the first to be published from a randomized controlled study of MTFC outside the USA. The treatment groups of MTFC and TAU included young people with documented severe behavioural problems. Generally, most analyses indicated positive treatment results favouring MTFC over TAU. Both groups together presented reduced symptoms in more or less all outcome variables. However, when separating the two groups, only MTFC showed a consistent statistical significance in symptom reduction. When measuring the clinical significance, the results mostly favoured MTFC.

A randomized controlled trial is regarded as the best design for minimizing selection bias (Shadish *et al*., 2002). We found no differences regarding the background variables and the amount of symptoms at baseline between the MTFC and TAU youth. However, other factors could have influenced the result (Shadish *et al*., 2002). One could be a novelty effect: participants may respond very well to a new intervention (MTFC). To examine this, the study must be repeated later in the same context; if the same result does not occur, it could be due to novelty effects. A second threat could be compensatory rivalry: social workers who have seen their clients randomized into the TAU group may be motivated to show that they can do as well for their clients as those receiving MTFC. Even if this occurred, our results favoured MTFC. A third could be resentful demoralization*:* participants (social workers) not receiving MTFC for their clients may respond negatively by not giving the clients the best possible TAU care. Lastly, the organization that provided MTFC was a newly established private organization that might have included well-motivated clinicians. These threats to the validity might have influenced the results in favour of MTFC.

According to the different statistical analyses, the overall result favoured MTFC over TAU. Firstly, we statistically analysed the value at baseline compared to the value at post-baseline (Table 4). Group-level comparisons depend on the sample size. These analyses are based on parametric analysis. Parametric analyses require a normal distribution. If this is fulfilled, it is possible to use small samples. This approach is the conventional statistical analysis in this type of research. Secondly, we rated every single individual's symptom change from baseline to post-baseline and statistically compared the result between MTFC and TAU (Table 3). These statistical

analyses were based on non-parametric analysis. Non-parametric analyses are considered to be distribution free. Because our study has a small sample size, we have explored different ways of transforming our ordinal variables to nominal variables. All analyses show the same pattern, which indicates the results are valid. Our results also correspond to earlier clinical research results made in the USA (Table 1).

The transportability of treatment effects for an evidenced based intervention from a USA to a Swedish context seems possible for MTFC. Multi-systemic therapy (MST) is also a blueprints model programme that is scientifically validated by the Centre for Study and Prevention of Violence. MST has shown positive results in a US context. But in a Swedish context, the MST's effects were equal to Swedish TAU (Gustle, 2007; Olson *et al*., 2006; Sundell *et al*., 2008). This raises the question why MTFC seems to have better results. MTFC's different components are common in Swedish TAU, but combined in one treatment they are rare. It is possible that the nature of the family therapy undertaken in each treatment is different, with a focus on attachment in MTFC. In MTFC the young person is obliged to participate in therapy, which is not always required in MST. Functional family therapy (FFT), another blueprints model programme, showed transportability from a US to a Swedish context (Hansson *et al*., 2000). Family therapy is a crucial component in both MTFC and FFT. A second component in MTFC is the explicitly defined roles in the team. This might act to dampen stress at crisis moments and ensure that the team works collaboratively together. A third component is the young person's individual therapist, a role that supports the young person's adjustment in the home. This therapist acts as an advocate. This probably motivates the young person to stay in treatment and could also be one explanation for the comparable low attrition (11 per cent) in MTFC. From research, we know that family management skills (that is, discipline, supervision and positive adult relationships) and deviant peer association affect the behaviour of antisocial boys (Eddy and Chamberlain, 2000). Trying to specify the influence of the programme's different mechanism of change on the result from the Swedish MTFC site would be speculative. But it could be that individual support combined with family therapy could enhance attachment to the parents, a result that will positively affect the young person's symptoms. Several studies have found a strong correlation between a high internalizing and a high externalizing symptom load (Delfabbro *et al*., 2001; Harrington *et al*, 2005; Newton

et al., 2000; Rutter *et al*, 2006; Vinnerljung and Sallnäs, 2008). This could explain the reduction of both externalizing and internalizing symptoms in this study.

The attrition rate was 11 per cent. Usually, this type of study suffers from large attrition. Reviews of psychiatric and therapeutic treatments have found that around 40–60 per cent of children and youth drop out prematurely. This indicates the obvious challenge of retaining clients in treatment (Kadzin, 2004). High attrition rates could indicate a risk of bias in the results. A rate of 11 per cent attrition is comparatively low (Shadish *et al*., 2002), although we have to bear in mind the small sample in this study. The earlier studies of MTFC presented in Table 1 had a wide range of attrition rates, from zero to 35 per cent.

To achieve successful treatment results, MTFC depends on the treatment team's adherence to the programme (Farrington and Welsh, 2007). The certification process of the MTFC team could be looked upon as a safeguard that insures compliance with the programme's protocols. We also know that the foster parents were very positive about using the MTFC manual (Kyhle Westermark *et al*., 2007). This could have contributed to the results.

This evaluation of MTFC in a Swedish context could be regarded as a beginning of the further dissemination of the programme. Involving local agencies is necessary for the further implementation of the programme in other contexts and for testing whether the programme will continue to show positive results. It is important to communicate to practitioners that MTFC can at least be regarded as a good complement to TAU. For future research it is still essential that MTFC is replicated and is continuously evaluated in prospective research trials in Sweden and other countries.

Methodological considerations

This study is based on a small sample size due to the size of the treatment facility and the nine outcome variables measuring symptoms in the youths and mothers. It is possible that the result is restricted to conditions in similar contexts. In this case, however, we know that the young people in TAU received extensive treatment, such as institutional care. All results are based on self-declarations. Social desirability could have influenced the study group's answers.

Conclusion

The results suggest that MTFC is an effective method in treating young people with behavioural problems in a Swedish context. The results are based on a small sample and indicate a need for further evaluation studies before disseminating the programme on a national level.

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