



Implementation fidelity of Multidimensional Family Therapy in an international trial

Cynthia Rowe, Ph.D.^{a,*}, Henk Rigter, Ph.D.^{b,c}, Craig Henderson, Ph.D.^d, Andreas Gantner, M.Sc.^e, Kees Mos, M.Sc.^f, Philip Nielsen, M.A.S.^g, Olivier Phan, M.D., Ph.D.^h

^a Department of Epidemiology and Public Health, Center for Treatment Research on Adolescent Drug Abuse, University of Miami Miller School of Medicine, 1425 N.W. 10th Avenue, Suite 217, Miami, FL 33136, USA

^b Department of Public Health, Erasmus MC, Rotterdam, the Netherlands

^c Department of Child and Adolescent Psychiatry, LUMC, Leiden, the Netherlands

^d Department of Psychology, Sam Houston State University, Huntsville, TX, 77341, USA

^e Therapieladen, Berlin, Germany

^f Palmhuis/De Jutters, The Hague, the Netherlands

^g Phénix, Centre de Chêne, Chêne-Bougeries, Geneva, Switzerland

^h Centre Emergence, Institut Mutualiste Montsouris, Paris, France

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ABSTRACT

Implementation fidelity, a critical aspect of clinical trials research that establishes adequate delivery of the treatment as prescribed in treatment manuals and protocols, is also essential to the successful implementation of effective programs into new practice settings. Although infrequently studied in the drug abuse field, stronger implementation fidelity has been linked to better outcomes in practice but appears to be more difficult to achieve with greater distance from model developers. In the International Cannabis Need for Treatment (INCANT) multi-national randomized clinical trial, investigators tested the effectiveness of Multidimensional Family Therapy (MDFT) in comparison to individual psychotherapy (IP) in Brussels, Berlin, Paris, The Hague, and Geneva with 450 adolescents with a cannabis use disorder and their parents. This study reports on the implementation fidelity of MDFT across these five Western European sites in terms of treatment adherence, dose and program differentiation, and discusses possible implications for international implementation efforts.

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1. Introduction

Implementation is a critical bridge between a promising idea, approach, or technology and its actual impact on intended recipients. Understanding the processes and outcomes of successful implementation efforts may promote the adoption of promising programs into new contexts and increase their effectiveness with different populations. Yet surprisingly, given its central importance in the diffusion of interventions, few studies in the drug abuse field have examined the implementation of evidence-based treatments in practice (Garner, 2009).

Implementation fidelity, or the extent to which an intervention is delivered as prescribed, appears to be critical in facilitating the long-term, routine use of evidence-based interventions in practice (Klein & Sorra, 1996). Although recommendations to study and improve implementation fidelity are now standard, this aspect of technology transfer was not heavily emphasized in early dissemination efforts or theoretical formulations [e.g., Rogers (1995) ubiquitous “diffusion of innovation” theory]. It was generally taken for granted that programs would be implemented as stipulated by developers given sufficient

empirical support, organizational interest, and provision of basic information about the intervention through written materials and workshops. Yet subsequent evaluations of drug abuse prevention and treatment in school and community-based systems suggest that fidelity to intervention manuals and protocols in non-research settings has been difficult to establish and sustain (Dusenbury, Brannigan, Falco, & Hansen, 2003; Fals-Stewart, Logsdon, & Birchler, 2004; Riley, Rieckmann, & McCarty, 2008). Documented reasons for poor fidelity of interventions in practice settings include lack of resources, effective leadership, and other organizational barriers (Herbeck, Hser, & Teruya, 2008), competing clinical priorities (Henggeler et al., 2008), and ineffective training methods (Beidas & Kendall, 2010), among others. Thus, implementation is now recognized as a very active and potentially complex undertaking (Powell et al., 2012), in contrast to the more passive process of dissemination. Current conceptualizations of implementation processes and strategies tend to be contextual and multisystemic, recognizing the intersecting levels of intervention and many potential barriers to change (e.g., Beidas & Kendall, 2010; Condon, Miner, Balmer, & Pintello, 2008; Liddle et al., 2002; Simpson, 2002).

Implementation fidelity challenges in drug abuse prevention and treatment raise concern because there is evidence of a link between

* Corresponding author. Tel.: +1 305 243 3653; fax: +1 305 243 5544.
E-mail address: crowe@med.miami.edu (C. Rowe).

model adherence and clinical outcomes. In several studies of multi-systemic therapy (MST), for instance, adherence to the treatment has been associated with more positive outcomes when delivered by community-based practitioners (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Henggeler, Pickrel, & Brondino, 1999). In a large randomized trial within the NIDA Clinical Trials Network (CTN), Robbins et al. (2011) linked adherence to brief strategic family therapy (BSFT) with adolescents' engagement and retention, as well as improvements in family functioning and drug use over time. Drug abuse prevention delivered in school settings also appears to be more effective when teachers follow prescribed curriculum (Dusenbury et al., 2003). However, this observed link is equivocal, according to a recent meta-analysis showing weak mean adherence–outcome and competence–outcome effect size estimates over many therapy studies (Webb, DeRubeis, & Barber, 2010). Thus, although research suggests that research-developed treatments for drug abuse can be effectively implemented by community-based clinicians when treatment protocols are followed (Morgenstern, Morgan, McCrady, Keller, & Carroll, 2001), achieving fidelity is challenging in practice, and greater understanding of fidelity–outcome associations is needed.

Multidimensional Family Therapy (MDFT; Liddle, 2002) is an evidence-based treatment for adolescent drug abuse and antisocial behaviors that is distinguished not only for its strong clinical outcomes with a range of populations, including co-occurring disorders (Austin, Macgowan, & Wagner, 2005; Becker & Curry, 2008; Brannigan, Schackman, Falco, & Millman, 2004; Hawkins, 2009; Vaughn & Howard, 2004; Waldron & Turner, 2008), but also for its empirical attention to implementation processes and outcomes (Garner, 2009; Riley et al., 2008). An analysis of the integration of MDFT within a day-treatment program helped to revise a collaborative, multiple-systems framework for implementation that allows for flexibility within diverse settings and patient populations (Liddle et al., 2002). MDFT was successfully sustained and clinical outcomes were improved over baseline levels more than a year after the training period (Liddle et al., 2006). Liddle, Dakof, Henderson, and Rowe (2010) also demonstrated favorable implementation outcomes of MDFT as a cross-systems juvenile-justice and drug treatment intervention with adolescents in detention who were transitioning home to the community. Consistent with other controlled trials, research on MDFT has shown that stronger adherence to treatment protocols is related to better long-term outcomes. Specifically, Hogue, Dauber, Samoulis, and Liddle (2006) demonstrated that adherence to family-focused techniques was linked to less internalized distress and greater family cohesion 1 year following MDFT. Hogue et al. (2008) also linked MDFT adherence to fewer behavior problems at 1 year follow-up. Thus a strong foundation exists for further study of MDFT implementation in diverse settings.

In the current study, MDFT implementation fidelity was explored in the context of a multi-national randomized clinical effectiveness trial conducted in five Western European countries called INCANT (INternational CAnnabis Need for Treatment; Rigter et al., 2010). This international trial of MDFT began in 2006, when these Western European governments sought to fill a gap in treatment services in their countries and develop an effective treatment program for adolescents with cannabis use disorders. MDFT was selected for this study based on its rigorous empirical development and testing with drug abusing youth in the U.S. The model was initially piloted with success in the five collaborating countries, leading to a test of MDFT in a randomized trial against well-developed individual psychotherapy approaches typically delivered in each country. Beyond establishing integrity of MDFT delivery for the RCT, we were interested in exploring implementation fidelity processes and outcomes of the model as well.

There are notable accounts of successful transportation of U.S.-developed and tested alcohol and drug interventions to other countries (e.g., Cherpitel, Bernstein, Bernstein, Moskalewicz, &

Swiatkiewicz, 2009). Yet previous research has also documented many challenges inherent in the transportation of evidence-based models to new cultural, political, and clinical systems and settings (Schoenwald, Heiblum, Saldana, & Henggeler, 2008). For instance, Assertive Community Treatment (ACT) was found to be less effective when implemented in the U.K. than in Australia and the U.S. Less intensive delivery of active home treatment components may account for the model's diminished efficacy in the U.K., given that client and staff characteristics did not differ significantly from those in an Australian site (Harvey et al., 2011). Other international implementation efforts have highlighted the need to appreciate the cultural context of the new intervention setting, even though universal principles of health promotion, behavior change, and family relations may apply across cultures (Bell, Bhana, McKay, & Petersen, 2007; Kumpfer, Pinyuchon, Teixeira de Melo, & Whiteside, 2008). Finally, effectively addressing broader systemic, funding, regulatory, and policy issues, as well as clinical and medical provider needs and requirements, may be critical to successful international implementation of evidence-based treatments and guidelines (Autrique, Vanderplasschen, Broekaert, & Sabbe, 2009; Coltart et al., 2011; Larney & Dolan, 2009).

In the INCANT pilot study, we met many of these challenges and demonstrated the feasibility of MDFT for these different European practice contexts by training supervisors to adequate adherence levels with a single training case. Yet in the INCANT effectiveness trial, entire teams needed to successfully implement MDFT, address larger systems issues impacting full implementation of all treatment components, and demonstrate fidelity to the treatment parameters and interventions. This study therefore fits within hybrid effectiveness–implementation research, aimed at accelerating the process of transferring clinical research knowledge to real-world settings by examining critical challenges and outcomes of implementation within effectiveness trials (Curran, Bauer, Mittman, Stetler, & Pyne, 2010).

While many types of implementation outcomes are ultimately important to pave the way for more effective implementation strategies (Proctor et al., 2011), we focused on establishing implementation fidelity as an important step in this broader research agenda. Several indicators of implementation fidelity were monitored and evaluated, consistent with expert guidelines (Dusenbury et al., 2003; Proctor et al., 2011), including: (1) adherence to intervention protocols, (2) dose/intensity, or amount of intervention delivered, and (3) program differentiation, or the presence of critical distinguishing features of the intervention. This multidimensional evaluation of implementation fidelity sought to establish the internal validity of the treatment comparison as prescribed by model developers (Carroll, Kadden, Donovan, Zweben, & Rounsaville, 1994). Four questions were explored:

1. Were MDFT therapists in all five sites adherent to MDFT interventions in sessions?
2. Did MDFT therapists in all five sites deliver sufficient dose of MDFT interventions?
3. Would MDFT be differentiated from IP in all five sites as measured by greater family and community/systems focus?
4. Would measures of implementation fidelity be linked to client outcomes?

2. Methods

2.1. Overview

INCANT was a multisite randomized controlled trial that compared MDFT with individual psychotherapy (IP) for adolescent drug abuse in Brussels, Belgium (Brugmann Hospital), Berlin, Germany (Therapie-laden), Paris, France (Centre Emergence and CEDATs), The Hague, the Netherlands (Parnassia Brijder and De Jutters), and Geneva, Switzer-

land (Phénix) (Rigter et al., 2010). Eligible adolescents were 13 to 18 years of age, met criteria for a cannabis use disorder based on a structured diagnostic interview, and had a parent or guardian willing to take part in assessments and treatment. Adolescents were ineligible if they or their parent(s) were unable to understand the local language or they needed inpatient or opiate substitution treatment. Written informed consent was obtained from both adolescents and parents, including consent to have therapy sessions recorded for adherence evaluation purposes.

The INCANT trial was approved by the Ethical Board of Brugmann University Hospital (Belgium), the Chamber of Psychological Psychotherapists and Child and Adolescent Therapists in the state of Berlin (Germany), the Hotel-Dieu Committee for the Protection of Human Subjects in Biomedical Research (France), the medical–ethical committee METiGG (kamerNoord; the Netherlands), the Ethical Board for Clinical and Outpatient Research (Medical Association of the Geneva Canton; Switzerland), and by the Institutional Review Board (IRB) of the University of Miami Miller School of Medicine in the U.S. The International INCANT Study Team (IST) and the IRBs oversaw the conduct of the trial. This study is registered by Current Controlled Trials (ISRCTN51014277; <http://www.controlled-trials.com>).

Questionnaire and interview data were collected at intake, 3, 6, 9, and 12 month follow-ups from adolescents and parents. Instruments were reliable and valid and targeted demographics and clinical history; cannabis, alcohol, and other drug use and related problems; and family functioning. Data were inputted locally at each site and managed centrally in the Netherlands.

Following a baseline assessment, participants were randomized to either MDFT or IP, delivered by different therapists at each site. Treatment services were provided free in both conditions through subsidies from the Health Ministries or health insurance reimbursements. Therapists submitted monthly therapist contact logs detailing all services provided, which were used for ongoing supervision and monitoring, and reported whether cases completed treatment.

2.2. Sample participants

2.2.1. INCANT sample

A total of 450 participants were randomized to the study. MDFT and IP participants were similar on all baseline characteristics examined, including stratification variables (age [average 16 years], gender [86% male], minority ethnicity [61% native Western European], and level of cannabis consumption). All adolescents had a cannabis use disorder and most youth qualified for the diagnosis of cannabis dependence (84% across sites and conditions). Across sites and conditions, 51% of the adolescents were referred by juvenile justice or youth care agencies through which they were mandated to treatment (Phan et al., 2011).

2.2.2. U.S. trials sample

We combined data from three previous MDFT trials conducted in the U.S. that were similar to the INCANT sample based on cannabis use disorders at intake (see Table 1, panel 1 for sample details). First, in the Detention to Community study (DTC; Liddle et al., 2010), youth incarcerated in juvenile detention facilities were randomized to receive MDFT in detention and following release in the community or enhanced services as usual (ESAU). The 76 participants randomized to MDFT and included here were primarily male (83%), were minority ethnicities (78% either African American or Hispanic), averaged 15.5 years of age, and 68% met criteria for a cannabis use disorder. In the second trial of MDFT in juvenile drug court (Dakof et al., submitted), the 55 youth who received MDFT were 89% male, 95% minority ethnicities (African American and Hispanic), averaged 16 years of age, and 91% met criteria for a cannabis use disorder. The third U.S.-based MDFT trial was conducted in New Orleans following Hurricane Katrina and included 40 participants who received MDFT

Table 1

Sample characteristics and implementation variables by study.

Panel 1: sample characteristics		
Variable	INCANT	U.S. trials collapsed ^a
Female <i>n</i> (%)	63 (14)	48 (14)
Age <i>M</i> (<i>SD</i>)	16.3 (1.2)	15.6 (1.1)
Minority ethnicity <i>n</i> (%)	177 (39)	256 (74)**
Cannabis use disorder at intake <i>n</i> (%)	212 (100)	43 (75) ^b
Justice involved <i>n</i> (%)	229 (51)	331 (96)**
Panel 2: implementation fidelity outcomes		
Variable	MDFT in INCANT	MDFT in US Trials Collapsed ^a
Adherence ratings <i>M</i> (<i>SD</i>)	3.06 (0.42)	2.85 (0.61)*
Total hours <i>M</i> (<i>SD</i>)	38.41 (18.74)	50.15 (31.63)**
Adolescent hours <i>M</i> (<i>SD</i>)	11.52 (7.35)	12.49 (11.74)
Parent hours <i>M</i> (<i>SD</i>)	10.97 (7.35)	9.83 (11.52)
Family hours <i>M</i> (<i>SD</i>)	11.81 (7.26)	19.21 (12.57)**
Extrafamilial hours <i>M</i> (<i>SD</i>)	4.10 (5.28)	7.42 (10.43)**
Weeks in treatment <i>M</i> (<i>SD</i>)	27.83 (11.53)	25.14 (11.53)*
Three month treatment retention <i>n</i> (%)	191 (96.5)	154 (91.1)

Note. INCANT = International Cannabis Need for Treatment, JDC = Juvenile Drug Court, DTC = Detention to Community, US = United States, *n* = frequency, *M* = mean, *SD* = standard deviation.

^a Statistical tests are for comparisons between INCANT and US Trials Collapsed.

^b Chi-square test comparing INCANT and US Trials on proportion of adolescents meeting criteria for a cannabis use disorder could not be conducted because all youth in the INCANT trial meet criteria for a cannabis use disorder, producing a constant in the contingency table.

* *p* < .05.

** *p* < .001.

(87% male, 62% minority ethnicities, averaged 15.5 years of age, 68% met criteria for a cannabis use disorder, and 81% were involved in the justice system at intake). Collapsing across the three U.S. trials for the comparison sample here, relative to the INCANT adolescents, adolescents in the U.S. trials were more likely to be from ethnic minority backgrounds and were more likely to be involved in the justice system, but had lower rates of cannabis use disorders overall at baseline (only 75% meeting criteria for a cannabis use disorder vs. 100% in INCANT; see Table 1).

2.3. INCANT therapists and therapist training and supervision

Nested within each treatment condition, INCANT therapists conducted therapy only in the modality in which they were trained and supervised. Of the 41 INCANT therapists total (21 MDFT therapists and 20 IP therapists), 27 (66%) were female. Therapists averaged 39 years of age (*SD* = 8.6) when the study began, with no significant difference between conditions (average age of MDFT therapists = 41.6 [*SD* = 8.3]; average age of IP therapists = 37.5 [*SD* = 8.6]). All clinicians held advanced degrees in psychology, psychiatry, or social work (all completed 7 to 10 years of professional training to become a therapist), and therapists in the two conditions had similar previous experience and educational backgrounds prior to working on this study. Years of experience treating adolescents with cannabis use disorders averaged 6.4 years across conditions (*SD* = 6.1), with no significant difference between conditions (7.1 years experience for MDFT therapists [*SD* = 6.7]; 5.6 years experience for IP therapists [*SD* = 5.4]). Clinicians in both conditions received regular ongoing supervision in their approaches on-site.

MDFT training for the INCANT study was a multi-component and multi-level process, based on the established training system developed in previous U.S.-based MDFT trials. The training involved intensive on-site didactic sessions with accompanying reading materials (two separate weeks of intensive training with all MDFT supervisors and therapists together, and two separate weeks of intensive training with all supervisors, followed by periodic on-site

visits to each site). All trainings included review of exemplary MDFT sessions and joint interactive activities between the MDFT trainers, supervisors, and therapists that gave the trainees many practice opportunities. Interactive exercises included role plays to practice core interventions and re-enact key parts of recorded sessions.

MDFT training involves not only traditional didactic training, but also supervision on clinical cases. Therapists in training begin to apply their new skills and knowledge with clinical cases within the first month of the intensive training process. Thus, in addition to attending didactic trainings, MDFT teams had regularly scheduled telephone supervision sessions with MDFT trainers twice a month over the course of the clinical phase of the study. During these calls, supervisors and therapists presented their work with their cases using the required documentation (MDFT Session Planning and Implementation Logs and Case Conceptualizations). They received feedback and guidance from MDFT trainers on their quality of implementation of MDFT interventions and planned next steps with their cases. Subsequent on-site visits with trainers allowed for more intensive review of cases and supervision, including “live supervision” of actual therapy sessions conducted under the direct guidance of MDFT trainers to shape exemplary MDFT sessions. During these calls and visits, and in monthly supervisor consultations to address supervision skills and challenges, MDFT trainers addressed any implementation concerns in relation to dose or intervention delivery discovered through adherence monitoring and evaluation. All MDFT therapists and supervisors achieved certification in MDFT at the end of training based on objective ratings and exams.

2.4. Treatments

2.4.1. Multidimensional Family Therapy

MDFT (Liddle, 2002) is a developmentally oriented, integrative outpatient treatment that has blended family therapy, individual therapy, drug counseling, and multiple-systems oriented interventions. It is a flexible treatment system designed to be appropriate for various patient populations and client severity levels, with different intensities ranging from prevention and early intervention (e.g., Liddle, Rowe, Dakof, Henderson, & Greenbaum, 2009) to adolescents deeply involved with drugs and the juvenile justice system (Liddle et al., 2010). Whatever the overall intensity, the core interventions are the same, and MDFT therapists work to engineer change in four major life domains, targeting changes in: the adolescent (intrapersonal and development issues), the parent(s) (individual functioning of the parent as well as parenting), the family environment (family transactional patterns), and community systems of influence on the adolescent and family (e.g., working with schools, social service agencies, and juvenile justice). Therapists conduct one to three sessions per week over the course of 3 to 6 months of treatment. Approximately 25–30% of overall time in MDFT is devoted to work with the adolescent alone, 20–30% is spent with parents alone, 30–40% is spent with families together, and 10–20% is spent in community/systems work.

Early-stage interventions that aim to develop multiple alliances with teens, parents, and influential members of community systems, and motivate each to participate and change, have paid off in high retention rates in previous MDFT trials (e.g., Liddle et al., 2009). Previous reviews have noted the consistent effects of MDFT in reducing adolescent drug use and delinquency in rigorous research studies (Austin et al., 2005; Becker & Curry, 2008; Brannigan et al., 2004; Vaughn & Howard, 2004; Waldron & Turner, 2008).

2.4.2. Individual psychotherapy

Individual psychotherapy (IP) was carried out by the same treatment centers offering MDFT, but therapists and interventions were procedurally separated to avoid contamination between conditions. IP was elective, and therefore varied somewhat between

the participating countries, but had elements in common (Rigter et al., 2010). The treatments represented individual outpatient therapy as routinely provided at each site, based on an a priori description of its common activities, which had been reviewed and approved before the beginning of the trial. There were basic requirements for IP, including provision of sessions in the treatment center (not in-home, as in MDFT), individual sessions (not with families, as in MDFT), basic motivational interviewing to engage adolescents, and psychoeducational sessions about drug and alcohol abuse, addressing issues such as consequences of substance use, dealing with cravings, and relapse triggers. Skills training was a major focus, fostering abstinence, increasing coping, managing anger, increasing assertiveness in interpersonal contacts, and addressing thoughts about substance use. In all countries, IP involved three stages: (1) enhancing treatment motivation, establishing therapeutic alliances and formulating treatment goals; (2) working on goals and changing behaviors; and (3) preparing for post-treatment life.

2.5. Measures

2.5.1. Adherence to MDFT

Adherence to MDFT was measured using the Multidimensional Family Therapy Intervention Inventory (MII; Rowe, Dakof, & Liddle, 2007), an extension of a well-validated adherence measure, the Therapist Behavior Rating Scale (Hogue, Liddle, & Rowe, 1996; Hogue et al., 2006, 2008). This observational rating system explicitly reflects the core interventions of MDFT for clinical supervision and adherence monitoring. It measures the fundamental interventions of MDFT as outlined in the treatment manual—its core therapeutic goals and operations. The MII has been used extensively in MDFT clinical supervision, training efforts, and randomized clinical trials since 2007 (e.g., Liddle et al., 2010).

The most rigorous means to evaluate treatment adherence is observational ratings by objective, nonparticipant raters (Hogue et al., 1998). In INCANT, we relied on discrete ratings of specific therapy techniques (Carroll et al., 2000), following empirical guidelines about the importance of obtaining objective measures of adherence (Martino, Ball, Nich, Frankforter, & Carroll, 2009). This observational measure focuses on the behavior of the therapist in order to minimize confounding with severity of clinical cases (Hogue et al., 1998). Raters evaluate therapy sessions on the extensiveness (frequency/thoroughness) of 16 core MDFT interventions using a seven-point Likert-type scale ranging from 1 (not at all) to 7 (extensively). MII ratings have been completed across several different U.S.-based MDFT studies and many training efforts. Inter-rater reliability analyses show that the MII is consistent across raters ($ICC = .81$). Based on over 650 MII ratings, we have established a standard average adherence rating of 3.0 ($M = 2.95$, $SD = 0.56$), which falls at the rating anchor of “somewhat” on the MII extensiveness scale. This reflects that averaged across items, all 16 MDFT interventions are at least “somewhat” present.

Ratings are conducted by trained raters viewing videotapes of therapists' MDFT sessions. Prior to rating MDFT therapy sessions, raters study all aspects of the MDFT intervention and the MII rating manual. As in previous adherence studies (Hogue et al., 1998, 2008), raters are trained in small groups for 2 hours per week over a 2-month period to reach reliability. Training includes didactic instruction and discussion of the coding manual, trainer review of practice scales, and coding exercises designed to test and expand understanding of each scale item. Raters reconvene regularly for supportive training and calibration to prevent rater drift.

We rated one family session from 25% of MDFT cases in the INCANT study to sample a sufficient range of therapy cases and sessions from each MDFT therapist, following treatment adherence research guidelines (Hogue et al., 1998). Sessions for analyses included 7 from Belgium (of 30 MDFT cases), 10 from France (of 38 MDFT cases), 15 from Germany (of 60 MDFT cases), 14 from the Netherlands (of 55

MDFT cases), and 7 from Switzerland (of 30 MDFT cases). To establish MDFT adherence, MDFT session ratings from three U.S.-based trials and those obtained from INCANT were used (INCANT $n=53$ ratings; total $N=165$ ratings).

2.5.2. Dose of MDFT delivered

Dose of intervention was measured based on number, length, and type of service provided (e.g., adolescent, parent, group, and family sessions), obtained from the contact logs and clinical records from MDFT and IP therapists. We also examined treatment retention versus premature dropout to provide additional measures of dose, based on three indicators. First, retention was based on the number of weeks retained in treatment as measured using contact logs and clinical records from MDFT and IP therapists. Second, we examined site and treatment differences in retention of adolescents in treatment for at least 3 months, a minimum recommended dose based on large-scale drug treatment studies with adolescents (Hser et al., 2001). Finally, we compared the two conditions on retention as measured by therapist reports obtained at the end of treatment indicating whether treatment had stopped due to completion according to treatment plan or due to premature dropout for a variety of reasons.

2.5.3. Program differentiation

In order to differentiate MDFT from IP, we measured the extent of time spent with parents and families (family focus), which is essential to MDFT, as well as time spent working with community systems (e.g., school, courts), in line with MDFT ecological principles and interventions. The type of service provided (e.g., adolescent, family sessions) was measured using clinical logs and records from MDFT and IP therapists.

2.5.4. Treatment outcomes

Two indices of substance use were assessed, self-reported frequency of substance use, measured by the Timeline Follow-Back (TLFB; Waldron, Slesnick, Brody, Turner, & Peterson, 2001), and cannabis dependence diagnoses, measured by the Adolescent Diagnostic Interview-Light (Winters & Henly, 1993). Both measures have been widely used in adolescent drug abuse treatment trials and have strong psychometric properties.

2.6. Data analytic approach

We examined our primary research questions concerning adherence, treatment dose, and treatment differentiation primarily using between subjects analysis of variance (ANOVA). In these models, treatment served as the independent, between-subjects effect, and the treatment implementation variables (adherence, dose, and differentiation) as dependent variables. Because treatment sites frequently differ from each other in multi-site studies (Ball et al., 2007), we also included site as a between-subjects effect in these models. We also examined the site-by-treatment interaction effect, which addressed whether MDFT was implemented more successfully in some sites than others. When a statistically significant site-by-treatment interaction was found in one of the ANOVA models, we decomposed the interaction by testing simple effects consisting of examining treatment differences within each site. Most of our implementation variables were continuous measures. Exceptions to this general pattern were therapist reports of treatment dropout and 3 month retention rates, which we tested using χ^2 tests.

To examine our hypotheses, we conducted nine significance tests, each of which has a 5% probability of type one error (assuming the conventional level of .05). Therefore, we performed a Bonferroni's adjustment and adopted an alpha level of .005 to determine whether an individual test was statistically significant. Further, we elected to run univariate tests because they were consistent with our research questions. However, following these tests, we combined weeks in

treatment and hours of treatment in each MDFT domain (adolescent, parent, family, and community) in a multivariate ANOVA to examine thoroughness of MDFT treatment delivery.

Finally, we also examined relationships in the MDFT condition between two fidelity measures (adherence and dose) and treatment outcomes, namely self-reported frequency of substance use and cannabis dependence diagnoses, our two primary outcomes in the main outcomes trial (Rigter et al., submitted). Adherence- and dose-outcome relationships were examined using latent growth curve (LGC) modeling. We examined MDFT adherence ratings and total treatment hours (dose), INCANT or U.S. study membership (dichotomous variable), and their interaction as predictors of change in frequency of substance use and the proportion of adolescents meeting criteria for cannabis dependence between intake and 12 months. The variance of the slope parameter was fixed at zero in order to achieve model convergence. We centered the fidelity variables and study membership indicator and then multiplied them to create the product interaction (Aiken & West, 1991). When interactions were significant, we examined adherence/dose-outcome relationships separately in the INCANT and U.S. trials data to probe the source of the significant interaction.

3. Results

3.1. Adherence to MDFT interventions

MII ratings of videotaped within-session interventions showed that MDFT therapists in INCANT achieved an average adherence score of 3.1 across sessions ($SD=0.4$), which is consistent with established average MII ratings (3.0). Sites did not differ on this measure: $F[4, 48]=1.0$, *ns*. A between-subjects ANOVA revealed that therapists in INCANT had slightly higher average adherence ratings across their sessions than therapists in the three U.S.-based MDFT trials, although this comparison was not significant at an alpha level of .005 (INCANT: $M=3.1$; US-based trials: $M=2.9$, $F[1, 163]=4.8$, $p=.03$; see Table 1, panel 2).

3.2. Treatment dose

Treatment dose in INCANT was first measured based on total number of treatment hours in each condition. The ANOVA revealed a significant site by treatment interaction [$F(4, 422)=9.57$, $p<.001$]. Youth enrolled in MDFT received significantly more treatment at each site than youth enrolled in IP (see Table 2). The magnitude of this difference was greater in some countries than others, which was also reflected in a significant main effect for site [$F(4, 422)=17.46$, $p<.001$]. Post hoc tests revealed that youth in the Netherlands received more treatment than youth in the other countries. Youth in Germany received more treatment than youth in France and Switzerland. Youth in France received the least amount of treatment overall.

Comparing MDFT dose delivered in INCANT to the three U.S. trials indicated that MDFT therapists in the U.S. trials ($M=50.15$, $SD=31.62$) provided more treatment overall than those in INCANT ($M=38.41$, $SD=18.74$), $t(376)=-4.48$, $p<.001$; see Table 1, panel 2). However, INCANT MDFT met minimum average dose of one session per week (average 1.35 hours/week).

Treatment retention versus dropout was also examined as an additional indicator of dose. Pre-treatment dropout was rare in INCANT, in which cases did not receive a single therapy session after being randomly assigned. Across sites, pre-treatment dropout happened in only three MDFT cases (1.4% of total) and in 20 IP cases (8.4% of total). However, this difference between treatment conditions was statistically significant ($\chi^2[4, 450]=11.3$, $p=.001$).

We compared the INCANT conditions on number of weeks retained in treatment. With respect to treatment duration, an ANOVA model revealed that the site-by-treatment condition interaction was

Table 2
Means and standard deviations for total hours in treatment and hours within domain by Site and condition.

Variable	Belgium			France			Germany			Netherlands			Switzerland		
	MDFT M (SD)	IP M (SD)	Total M (SD)	MDFT M (SD)	IP M (SD)	Total M (SD)	MDFT M (SD)	IP M (SD)	Total M (SD)	MDFT M (SD)	IP M (SD)	Total M (SD)	MDFT M (SD)	IP M (SD)	Total M (SD)
Total hours	41.16 (17.17)	6.54 (6.50)	23.85 ^{***} (21.69)	26.01 (13.58)	8.08 (5.08)	15.21 ^{***} (12.86)	36.78 (16.63)	20.12 (11.46)	28.24 ^{***} (16.44)	49.83 (19.33)	14.62 (13.38)	33.60 ^{***} (24.34)	33.25 (16.82)	9.71 (7.11)	21.48 ^{***} (17.46)
Adol. hours	11.12 (5.62)	5.41 (5.92)	8.27 ^{***} (6.41)	8.06 (3.99)	5.01 (3.34)	6.22 ^{***} (3.90)	9.40 (5.12)	14.89 (9.51)	12.22 ^{***} (8.14)	17.89 (9.29)	10.67 (9.43)	14.57 ^{***} (9.99)	8.57 (3.78)	6.65 (4.57)	7.61 (4.27)
Parent hours	14.17 (7.05)	0.22 (0.59)	7.20 ^{***} (8.61)	8.60 (4.83)	0.87 (0.98)	3.95 ^{***} (4.91)	10.54 (7.05)	3.94 (2.83)	7.16 ^{***} (6.25)	11.51 (8.38)	1.59 (2.80)	6.94 ^{***} (8.11)	10.67 (7.97)	0.99 (1.87)	5.83 ^{***} (7.53)
Family hours	11.41 (5.04)	0.91 (1.00)	6.16 ^{***} (6.41)	7.59 (4.52)	1.68 (1.25)	4.03 ^{***} (4.17)	11.60 (6.63)	0.26 (0.59)	5.79 (7.34)	15.81 (9.29)	1.10 (1.63)	9.03 (10.08)	10.49 (5.13)	1.18 (1.61)	5.84 ^{***} (6.02)
EF hours	4.45 (4.94)	0.00 (0.00)	2.23 ^{***} (4.12)	1.73 (3.32)	0.52 (1.57)	1.00 [*] (2.48)	5.24 (5.43)	1.02 (2.01)	3.08 ^{***} (4.56)	4.61 (6.25)	1.04 (1.44)	2.96 ^{***} (5.00)	3.52 (4.62)	0.88 (1.32)	2.20 ^{***} (3.62)

Note. MDFT=multidimensional family therapy, IP=individual psychotherapy, n=number of participants, M=mean, SD=standard deviation, EF=extrafamilial/community.

* p<.05.
** p<.01.
*** p<.001.

statistically significant [$F(4, 401)=3.83, p=.005$]. Simple effects analyses revealed that the significant interaction effect was due to a disordinal interaction in which adolescents receiving IP in Germany remained in treatment longer than those receiving MDFT (difference not statistically significant), and adolescents receiving MDFT in the Netherlands remained in treatment longer than those receiving IP [$F(1, 99)=11.01, p=.001$] (see Table 3). There were no significant site differences for weeks in treatment.

We also compared the proportion of adolescents in INCANT who were retained in treatment for 3 months or more, based on minimum recommended duration for outpatient adolescent drug treatment in the U.S. (Hser et al., 2001). MDFT retained cases more successfully than IP (96.5% vs. 73%: $\chi^2[1, 401]=34.7, p<.001$; no site differences $\chi^2[4, 401]=9.3, ns$).

Based on therapists' judgments of successful treatment completion versus premature dropout, MDFT had higher treatment completion rates than IP across INCANT sites (90 vs. 48%: $\chi^2[4, 404]=83.2, p<.001$). Completion rates varied between INCANT sites ($\chi^2[4, 404]=23.9, p<.001$), primarily due to differences in IP completion rates ($\chi^2[4, 205]=32.0, p<.001$). IP completion rates were highest in Germany and Switzerland.

Comparing MDFT retention across the INCANT and three U.S. trials revealed that INCANT clients in MDFT ($M=27.83, SD=11.53$) remained in treatment significantly longer than MDFT clients in U.S. trials ($M=25.14, SD=11.53, t(365)=2.22, p=.027$). Consistent with this finding, INCANT MDFT clients were more likely to complete 3 months of treatment ($n=191, 96.5%$) than MDFT clients in these U.S. trials ($n=154, 91.1%$), $\chi^2[1, 367]=4.61, p=.032$.

3.3. Treatment differentiation

A fundamental aspect of intervention implementation is whether the treatments as delivered can be distinguished in accordance with model parameters. MDFT requires sufficient contact with adolescents alone (approximately 25–30% of total time), parents alone (20–30% of total time), families together (30–40% of total time), and work with community systems (10–20% of total time) in order to do all of the therapeutic work prescribed. As reported above, youth in MDFT received more treatment overall than youth receiving IP at each site. Regarding treatment in the different MDFT domains in INCANT, there were significant site-by-treatment interactions: adolescent alone sessions [$F(4, 422)=13.78, p<.001$]; parent alone sessions [$F(4, 422)=5.33, p<.001$]; family sessions [$F(4, 422)=10.42, p=.001$]; and sessions with community systems [$F(4, 421)=7.04, p<.001$]. Simple effects revealed that with the exception of the number of hours spent with adolescents alone in Switzerland, youth in MDFT received more treatment in each domain at each site (see Table 2). Youth in the Netherlands received more treatment (adolescent and family sessions), and youth in France received less.

In differentiating the INCANT treatment conditions, family focus (both with parents alone and conjoint family sessions) and community interventions were of particular importance. Consistent with MDFT model parameters, time with parents alone and families together averaged over cases significantly distinguished MDFT from IP. Consistent with its ecological, systemic focus, MDFT therapists achieved significantly greater time in working with influential social systems (e.g., school, courts, health, mental health care). See Table 2 for more details.

MDFT clients in the U.S. trials received a greater number of family treatment hours ($M=19.21, SD=12.57$) than MDFT clients in the INCANT trial ($M=11.81, SD=7.26, t(376)=-7.16, p<.001$, but as demonstrated by lower standard deviations, MDFT therapists in INCANT were more consistent in providing family sessions across clients. MDFT clients in U.S. trials received more community intervention ($M=7.42, SD=10.43$) than MDFT clients in INCANT ($M=4.10, SD=5.28, t(376)=-4.01, p<.001$). INCANT MDFT was

Table 3
Number and percentages of clients retained in treatment for 3 months (minimum), and means and standard deviations for number of weeks in treatment by site and condition.

Variable	Belgium			France			Germany			Netherlands			Switzerland		
	MDFT	IP	Total	MDFT	IP	Total	MDFT	IP	Total	MDFT	IP	Total	MDFT	IP	Total
Weeks in treatment <i>M (SD)</i>	25.66 (12.35)	21.39 (26.23)	23.77 (19.63)	25.20 (13.59)	24.39 (20.09)	24.69 (17.84)	24.32 (9.63)	29.70 (14.16)	27.06* (12.39)	35.09 (12.35)	24.26 (20.11)	30.16** (17.14)	24.76 (6.83)	24.75 (14.56)	24.75 (11.21)
Treatment retention for 3 months (minimum) <i>n (%)</i>	28 (97)	6 (24)	34 (63)	24 (83)	13 (28)	37** (49)	51 (91)	43 (74)	94* (83)	52 (95)	18 (39)	70*** (69)	24 (80)	18 (60)	42 (70)

Note. MDFT = multidimensional family therapy, IP = individual psychotherapy, *n* = number of participants, *M* = mean, *SD* = standard deviation.

* *p* < .05.

** *p* < .01.

*** *p* < .001.

delivered within established MDFT parameters (30% of total time spent with adolescents alone; 28% of total time spent with parents together; 31% spent in family sessions; 11% spent with community systems).

Finally, to examine overall thoroughness of implementation of MDFT, a MANOVA examining a linear combination of weeks in treatment and hours of treatment in the four MDFT treatment domains was conducted. Results indicated that MDFT therapists in INCANT were more thorough in their treatment delivery than IP therapists [Wilks Lambda = 0.39, *F*(5, 387) = 119.82, *p* < .001], with univariate effects specific to each of the variables in the MANOVA.

3.4. Adherence/dose–outcome relationships

To investigate links between specific fidelity markers and clinical outcomes, we examined associations between both dose and adherence ratings and substance use outcomes in the INCANT and U.S. trials. Latent growth curve modeling revealed a significant adherence by trial location (INCANT versus U.S. trials) interaction for both substance use frequency (slope coefficient = -1.99, *SE* = 0.71, pseudo *z* = -2.81, *p* = .005) and cannabis dependence diagnoses (slope coefficient = -0.45, *SE* = 0.22, pseudo *z* = -2.01, *p* = .044). Simple effects analyses using LGC models conducted with the MDFT INCANT clients alone revealed that MDFT adherence ratings predicted decreases in substance use frequency (slope coefficient = -2.62, *SE* = 0.93, pseudo *z* = -2.81, *p* = .005) and lower rates of cannabis dependence diagnoses at 12 months (slope coefficient = -0.41, *SE* = 0.19, pseudo *z* = -2.15, *p* = .031). Analyses conducted across the three U.S. MDFT trials using MDFT adherence ratings as a predictor of outcome were not significant (substance use frequency: slope coefficient = 0.81, *SE* = 0.59, pseudo *z* = 1.37, *ns*; cannabis dependence: slope coefficient = 0.35, *SE* = 0.11, pseudo *z* = 0.31, *ns*). LGC models examining MDFT dose as a predictor of outcome were not significant for either INCANT or the U.S. trials.

4. Discussion

These findings support the implementation fidelity of MDFT in diverse Western European clinical settings, and increase confidence in the internal validity of this family-based treatment as delivered in the INCANT trial (Rigter et al., submitted). Building on the INCANT pilot study, which showed that INCANT site supervisors could be trained in MDFT and achieved adherence to model interventions, these results suggest that the indicators of MDFT fidelity tested here were achieved in the five INCANT sites. Specifically, MDFT session ratings demonstrated adherence to specified model guidelines. Sufficient treatment dose was achieved overall (average of at least 1 session per week) and in each of the domains of treatment, and was consistently higher than in IP (with the exception of individual time spent with the adolescent in Switzerland). Adequate dosage was also reflected in lower treatment dropout in MDFT than in IP, with more adolescents in MDFT than IP completing treatment (90% versus 48%). Finally, MDFT was differentiated from IP based on greater family and community focus.

When compared with fidelity markers from U.S.-based MDFT trials with similar samples based on rates of cannabis use disorders, INCANT therapists fared well. Adherence ratings of within-session interventions were comparable to the average across U.S. studies. Treatment retention rates of at least 3 months were higher in MDFT in INCANT than in these three U.S. studies averaged together (96.5 versus 91%). Finally, while MDFT in the U.S. trials was delivered with greater overall intensity, MDFT therapists in INCANT achieved minimum overall dose and a sufficient balance of work in each domain. Because MDFT is a flexible treatment system with different intensities indicated for different severity levels, there is not an empirically established threshold for optimal dose. Instead, dose is determined on a case-by-case basis by the clinician based on the needs of the youth

and family. In our analyses, treatment dose did not predict cannabis use outcomes with either the INCANT or U.S.-based samples. Within-session adherence was linked with outcomes in INCANT but not in the U.S. trials. As Webb et al. (2010) previously reported, the adherence–outcome link remains an important question for further study.

While these results are encouraging markers of MDFT implementation success in Western Europe, this effort was certainly not without challenges and lessons. Clinical partners at each collaborating site have documented their own unique perspectives on the implementation of MDFT within their local site, region, and country (see Gantner & Spohr, 2010; Mos & Kaptijn, 2008; Nielsen & Croquette-Krokar, 2010; Spapen et al., 2010). Some of the immediate challenges encountered during the INCANT pilot phase included variable therapist receptivity to changing set ways of working, pessimism about implementing specific aspects of the treatment model in certain settings and cultures (e.g., doing home-based work, working actively with other systems), and establishing procedures for effective coordination with referral sources. These initial challenges were largely met over time with regular supervision, monitoring, and consultation with trainers, demonstrating the importance of close partnerships and problem solving. As in previous MDFT implementation efforts (see Liddle et al., 2006; Liddle et al., 2010) and other initiatives such as NIDA's CTN (Tai et al., 2010), bidirectional, collaborative relationships and strong alliances among researchers and practitioners are critical to moving effective models into practice (Schoenwald et al., 2008).

In our collaborative approach, as in the MDFT treatment itself, MDFT trainers do not see themselves as the experts on any local context or system, but rather as partners who learn and benefit equally in the unfolding implementation process (Liddle et al., 2002). This lends itself to flexibility in implementation, such as MDFT therapists relying on external case management conducted by other social service systems in Berlin out of necessity. Over time, those who adopt the model take ownership of the approach as practiced in their program, and MDFT trainers become consultants to these teams. MDFT continues to grow in Europe well after the end of the INCANT trial, and these clinicians are keenly aware that any procedural changes in MDFT go hand in hand with continuous joint quality assurance efforts. A necessary dialogue continues about how to maintain integrity to the core aspects of the model given local circumstances and challenges, guided by solid research on family functioning and universal change principles.

Beyond the close working relationships and regular communication achieved over the training period and the course of the study, therapists' receptivity to the model increased as they achieved positive outcomes with adolescents and their families. Successful implementation efforts are fundamentally rooted in the shared aspiration and common objective to improve treatment outcomes (Condon et al., 2008). There may be implementation hurdles, but providers, stakeholders, and policy makers appreciate good results, and with targeted communication and collaboration efforts, many are willing to support effective treatment approaches such as MDFT. This has been our experience with teams and policy makers in the INCANT study and beyond.

Certain study limitations need to be acknowledged. First, due to funding and resource constraints, we were not able to rate therapy sessions from every MDFT case, nor did we rate therapy sessions from the IP condition. Thus we are limited in our ability to distinguish actual interventions delivered in individual therapy sessions with adolescents in the two conditions. We know from content analyses of the INCANT IP approaches that basic requirements were met, with certain basic cognitive–behavioral interventions common to individual therapies for adolescent drug abuse. Another limitation of the current study is the absence of competence ratings, which requires extensive time and resources from experts in MDFT. Competence ratings were done as part of the training and all

therapists met minimum competence requirements for MDFT certification, yet we did not include competence ratings as part of this formal fidelity evaluation. Competence findings would go a step beyond establishing adherence to the interventions to knowing more about the quality of the interventions delivered (Dusenbury et al., 2003), potentially providing more solid evidence of implementation fidelity. These research areas would be fruitful avenues for future implementation research.

These findings paint a promising picture of the feasibility of implementing MDFT internationally. Indeed, MDFT implementation efforts in the Netherlands have been underway for several years now and the demand continues to grow for more training. Other INCANT countries are also responding to the enthusiasm over MDFT from providers and its apparent success in preliminary reports of effectiveness. As of this writing, MDFT teams have been trained and are operational in 43 sites in the U.S. and Canada (45 supervisors and 190 therapists), as well as 50 MDFT programs across Europe (53 supervisors and 200 therapists), for a total of 93 MDFT programs, 98 supervisors, and 390 clinicians worldwide. Positive outcome data from the INCANT trial may further increase the potential of MDFT international implementation.

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References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Austin, A. M., Macgowan, M. J., & Wagner, E. F. (2005). Effective family-based interventions for adolescents with substance use problems: A systematic review. *Research on Social Work Practice, 15*, 67–83.
- Autriquer, M., Vanderplasschen, W., Broekaert, E., & Sabbe, B. (2009). Practitioners' attitudes concerning evidence-based guidelines in Belgian substance abuse treatment. *European Addiction Research, 15*, 47–55.
- Ball, S. A., Martino, S., Nich, C., Frankforter, T. L., Van Horn, D., Crits-Christoph, P., et al. (2007). Site matters: Multisite randomized trial of motivational enhancement therapy in community drug abuse clinics. *Journal of Consulting and Clinical Psychology, 75*, 556–567.
- Becker, S. J., & Curry, J. F. (2008). Outpatient interventions for adolescent substance abuse: A quality of evidence review. *Journal of Consulting and Clinical Psychology, 76*, 531–543.
- Beidas, R. S., & Kendall, P. C. (2010). Training therapists in evidence-based practice: A critical review of studies from a systems-contextual perspective. *Clinical Psychology: Science and Practice, 17*, 1–30.
- Bell, C. C., Bhana, A., McKay, M. M., & Petersen, I. (2007). A commentary on the Triadic Theory of Influence as a guide for adapting HIV prevention programs for new contexts and populations: The CHAMP–South Africa story. *Social Work in Mental Health, 5*, 241–267.
- Brannigan, R., Schackman, B. R., Falco, M., & Millman, R. B. (2004). The quality of highly regarded adolescent substance abuse treatment programs. *Archives of Pediatrics & Adolescent Medicine, 158*, 904–909.
- Carroll, K. M., Kadden, R. M., Donovan, D. M., Zweben, A., & Rounsaville, B. J. (1994). Implementing treatment and protecting the validity of the independent variable in treatment matching studies. *Journal of Studies on Alcohol, 12*, 149–155.
- Carroll, K. M., Nich, C., Sifry, R. L., Nuro, K. F., Frankforter, T. L., Ball, S. A., et al. (2000). A general system for evaluating therapist adherence and competence in psychotherapy research in the addictions. *Drug and Alcohol Dependence, 57*, 225–238.
- Cherpitel, C. J., Bernstein, E., Bernstein, J., Moskalewicz, J., & Swiatkiewicz, G. (2009). Screening, brief intervention, and referral to treatment (SBIRT) in a Polish emergency room: Challenges in cultural translation of SBIRT. *Journal of Addictions Nursing, 20*, 127–131.
- Coltart, C., Anderson, I., Barh, B., Dewhurst, N., Donohoe, J., Dukat, A., et al. (2011). An international consensus for medical leadership on alcohol. *Lancet, 378*, 1215.

- Condon, T. P., Miner, L. L., Balmer, C. W., & Pintello, D. (2008). Blending addiction research and practice: Strategies for technology transfer. *Journal of Substance Abuse Treatment*, 35, 156–160.
- Curran, G., Bauer, M. S., Mittman, B. S., Stetler, C., & Pyne, J. (2010). A new “hybrid”? Combining elements of clinical effectiveness and implementation research trials. *Enhancing Implementation Science*. Washington, DC: VA QUERI Research Meeting.
- Dakof, G.A., Henderson, C.E., Rowe, C.L., Boustani, M., Greenbaum, P., Wang, W., et al. (submitted). A randomized controlled trial of Multidimensional Family Therapy to treat adolescent substance abuse and delinquency in juvenile drug court. *Journal of Consulting and Clinical Psychology*.
- Dusenbury, L., Brannigan, R., Falco, M., & Hansen, W. (2003). A review of research on fidelity of implementation: Implications for drug abuse prevention in school. *Health Education Research Theory & Practice*, 18, 237–256.
- Fals-Stewart, W., Logsdon, T., & Birchler, G. R. (2004). Diffusion of an empirically supported treatment for substance abuse: An organizational autopsy of technology transfer success and failure. *Clinical Psychology: Science and Practice*, 11, 177–182.
- Gantner, A., & Spohr, B. (2010). Multidimensionalefamilietherapie (MDFT) in der Praxis. *Sucht*, 56, 71–76.
- Garner, B. R. (2009). Research on the diffusion of evidence-based treatments within substance abuse treatment: A systematic review. *Journal of Substance Abuse Treatment*, 36, 376–399.
- Harvey, C., Killaspy, H., Martino, S., White, S., Priebe, S., Wright, C., et al. (2011). A comparison of the implementation of Assertive Community Treatment in Melbourne, Australia and London, England. *Epidemiology and Psychiatric Sciences*, 20, 151–161.
- Hawkins, E. H. (2009). A tale of two systems: Co-occurring mental health and substance abuse disorders treatment for adolescents. *Annual Review of Psychology*, 60, 197–227.
- Henggeler, S. W., Chapman, J. E., Rowland, M. D., Halliday-Boykins, C. A., Randall, J., Shakelford, J., et al. (2008). Statewide adoption and initial implementation of contingency management for substance-abusing adolescents. *Journal of Consulting and Clinical Psychology*, 76, 556–567.
- Henggeler, S. W., Melton, G. B., Brondino, M. J., Scherer, D. G., & Hanley, J. H. (1997). Multisystemic therapy with violent and chronic juvenile offenders and their families: The role of treatment fidelity in successful dissemination. *Journal of Consulting and Clinical Psychology*, 65, 821–823.
- Henggeler, S. W., Pickrel, S. G., & Brondino, M. J. (1999). Multisystemic treatment of substance-abusing and dependent delinquents: Outcomes, treatment fidelity, and transportability. *Mental Health Services Research*, 1, 171–184.
- Herbeck, D. M., Hser, Y., & Teruya, C. (2008). Empirically supported substance abuse treatment approaches: A survey of treatment providers' perspectives and practices. *Addictive Behaviors*, 33, 699–712.
- Hogue, A. T., Dauber, S., Samouilis, J., & Liddle, H. A. (2006). Treatment techniques and outcomes in multidimensional family therapy for adolescent behavior problems. *Journal of Family Psychology*, 20, 535–543.
- Hogue, A. T., Henderson, C. E., Dauber, S., Barajas, P. C., Fried, A., & Liddle, H. A. (2008). Treatment adherence, competence, and outcome, in individual and family therapy for adolescent behavior problems. *Journal of Consulting and Clinical Psychology*, 76, 544–555.
- Hogue, A. T., Liddle, H. A., & Rowe, C. L. (1996). Treatment adherence process research in family therapy: A rationale and some practical guidelines. *Psychotherapy*, 33, 332–345.
- Hogue, A. T., Liddle, H. A., Rowe, C. L., Turner, R. M., Dakof, G. A., & LaPann, K. (1998). Treatment adherence and differentiation in individual versus family therapy for adolescent substance abuse. *Journal of Counseling Psychology*, 45, 104–114.
- Hser, J. I., Grella, C. E., Hubbard, R. L., Hsieh, S. C., Fletcher, B. W., Brown, B. S., et al. (2001). An evaluation of drug treatments for adolescents in 4 U.S. cities. *Archives of General Psychiatry*, 58, 689–695.
- Klein, K. J., & Sorra, S. S. (1996). The challenge of innovation implementation. *Academy of Management Review*, 21, 1055–1080.
- Kumpfer, K. L., Pinyuchon, M., Teixeira de Melo, A., & Whiteside, H. O. (2008). Cultural adaptation process for international dissemination of The Strengthening Families Program. *Evaluation & the Health Professions*, 31, 226–239.
- Larney, S., & Dolan, K. (2009). A literature review of international implementation of opioid substitution treatment prisons: Equivalence of care? *European Addiction Research*, 15, 107–112.
- Liddle, H. A. (2002). Multidimensional family therapy treatment (MDFT) for Adolescent Cannabis Users. (Volume 5 of the Cannabis Youth Treatment (CYT) manual series). Rockville (Md): Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration.
- Liddle, H. A., Dakof, G. A., Henderson, C. E., & Rowe, C. L. (2010). Implementation outcomes of multidimensional family therapy—detention to community: A reintegration program for drug-using juvenile detainees. *International Journal of Offender Therapy and Comparative Criminology*, 55, 587–604.
- Liddle, H. A., Rowe, C. L., Dakof, G. A., Henderson, C. E., & Greenbaum, P. E. (2009). Multidimensional family therapy for young adolescent substance abuse: Twelve-month outcomes of a randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 77, 12–25.
- Liddle, H. A., Rowe, C. L., Gonzalez, A., Henderson, C. E., Dakof, G. A., & Greenbaum, P. E. (2006). Changing provider practices, program environment, and improving outcomes by transporting multidimensional family therapy to an adolescent drug treatment setting. *American Journal on Addictions*, 15, 102–112.
- Liddle, H. A., Rowe, C. L., Quille, T. J., Dakof, G. A., Mills, D. A., Sakran, E., et al. (2002). Transporting a research-based adolescent drug treatment into practice. *Journal of Substance Abuse Treatment*, 22, 231–243.
- Martino, S., Ball, S., Nich, C., Frankforter, T. L., & Carroll, K. M. (2009). Correspondence of motivational enhancement treatment integrity ratings among therapists, supervisors, and observers. *Psychotherapy Research*, 19, 181–193.
- Morgenstern, J., Morgan, T. J., McCrady, B. S., Keller, D. S., & Carroll, K. M. (2001). Manual-guided cognitive-behavioral training: A promising method for disseminating empirically supported substance abuse treatments to the practice community. *Psychology of Addictive Behaviors*, 15, 83–88.
- Mos, K., & Kaptijn, E. (2008). Multidimensionalefamilietherapie. Een evidence based intensievegezinsmethodiekvoorgezinnen van jongeren met meervoudigcomplex-problematiek. In J. Hermans, & A. van Montfoort (Eds.), *Gezinsinterventies, aan de slag met problematischeopvoedingskwesties*. Amsterdam: Uitgeverij SWP.
- Nielsen, P., & Croquette-Krokar, M. (2010). Phénix—la prise en charge d'adolescents surconsommateurs de cannabis: La thérapie familiale multidimensionnelle (MDFT). In C. Al Curdi, K. Carrasco, & J. F. Savary (Eds.), *Intervention précoce* (pp. 62–64). Yverdon-les-Bains: GREA.
- Phan, O., Henderson, C. E., Angelidis, T., Weil, P., van Toorn, M., Rigger, R., et al. (2011). European youth care sites serve different populations of adolescents with cannabis use disorder. Baseline and referral data from the INCANT trial. *BMC Psychiatry*, 11, 110.
- Powell, B. J., McMillen, J. C., Proctor, E. K., Carpenter, C., Griffey, R. T., Bunge, A., et al. (2012). A compilation of strategies for implementing clinical innovations in health and mental health. *Medical Care Research and Review*, 69, 123–157.
- Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunge, A., et al. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Research*, 38, 65–76.
- Rigger, H., Henderson, C., Pelc, I., Tossman, P., Phan, O., Hendriks, V., et al. (submitted). Multidimensional Family Therapy lowers the rate of cannabis dependence in adolescents: A randomized controlled trial in Western European outpatient settings. *Drug and Alcohol Dependence*.
- Rigger, H., Pelc, I., Tossman, P., Phan, O., Grichting, E., Hendriks, V., et al. (2010). INCANT: A transnational randomized trial of multidimensional family therapy versus treatment as usual for adolescents with cannabis use disorder. *BMC Psychiatry*, 10, 28.
- Riley, K. J., Rieckmann, T., & McCarty, D. (2008). Implementation of MET/CBT 5 for adolescents. *Journal of Behavioral Health Services & Research*, 35, 304–314.
- Robbins, M. S., Feaster, D. J., Horigian, V. E., Puccinelli, M. J., Henderson, C. E., & Szapocznik, J. (2011). Therapist adherence in Brief Strategic Family Therapy for adolescent drug abusers. *Journal of Consulting and Clinical Psychology*, 79, 43–53.
- Rowe, C. L., Dakof, G. A., & Liddle, H. A. (2007). *The Multidimensional Family Therapy Intervention Inventory*. Miami (Fla): Unpublished Rating Manual.
- Rogers, E. M. (1995). *Diffusion of innovations*. New York: The Free Press.
- Schoenwald, S., Heiblum, N., Saldana, L., & Henggeler, S. (2008). International implementation of multisystemic therapy. *Evaluation & the Health Professions*, 31, 211–225.
- Simpson, D. D. (2002). A conceptual framework for transferring research to practice. *Journal of Substance Abuse Treatment*, 22, 171–182.
- Spapen, P., Angelidis, A., Antoniali, V., van Gerwen, K., Pelc, I., & Verbanck, P. (2010). La thérapie familiale multidimensionnelle des adolescent(e)s dépendants du cannabis. *Thérapie familiale*, 31, 117–132.
- Tai, B., Straus, M. M., Liu, D., Sparenborg, S., Jackson, R., & McCarty, D. (2010). The first decade of the National Drug Abuse Treatment Clinical Trials Network: Bridging the gap between research and practice to improve drug abuse treatment. *Journal of Substance Abuse Treatment*, 38(Suppl 1), S4–S13.
- Vaughn, M. G., & Howard, M. O. (2004). Adolescent substance abuse treatment: A synthesis of controlled evaluations. *Research on Social Work Practice*, 14, 325–335.
- Waldron, H. B., Slesnick, N., Brody, J. L., Turner, C. W., & Peterson, T. R. (2001). Treatment outcomes for adolescent substance abuse at 4- and 7-month assessments. *Journal of Consulting and Clinical Psychology*, 69, 802–813.
- Waldron, H. B., & Turner, C. W. (2008). Evidence-based psychosocial treatments for adolescent substance abuse. *Journal of Clinical Child and Adolescent Psychology*, 37, 238–261.
- Webb, C. A., DeRubeis, R. J., & Barber, J. P. (2010). Therapist adherence/competence and treatment outcome: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 78, 200–211.
- Winters, K. C., & Henly, G. A. (1993). *Adolescent diagnostic interview schedule and manual*. Los Angeles: Western Psychological Services.