

# INTERVENTION FIDELITY IN FAMILY-BASED PREVENTION COUNSELING FOR ADOLESCENT PROBLEM BEHAVIORS

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*This study examined fidelity in multidimensional family prevention (MDFP), a family-based prevention counseling model for adolescents at high risk for substance abuse and related behavior problems, in comparison to two empirically based treatments for adolescent drug abuse: multidimensional family therapy (MDFT) and cognitive-behavioral therapy (CBT). Randomly selected videotapes of 109 MDFP sessions, 57 MDFT sessions, and 31 CBT sessions were observationally rated along two key dimensions of implementation: intervention parameters and intervention techniques. Overall, MDFP was similar to MDFT and different from CBT in a manner congruent with its theoretical principles of interactional, systemic intervention. However, deficiencies in parental*

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*monitoring and developmental knowledge interventions point the way for continued model development. The utility of fidelity process research for conveying intervention technology along the prevention-treatment continuum of mental health services is discussed. © 2005 Wiley Periodicals, Inc.*

Methods for evaluating fidelity in implementing treatment and prevention models have become standard requirements for scientifically rigorous research on behavioral interventions (Rounsaville, Carroll, & Onken, 2001). Intervention fidelity is a multifaceted concept that comprises three interlocking aspects of model implementation: adherence, competence, and differentiation (Dane & Schneider, 1998; Carroll et al., 1998; Waltz, Addis, Koerner, & Jacobson, 1993). *Adherence* (or integrity) is the degree to which a given intervention is implemented in accordance with essential theoretical and procedural aspects of the model. *Competence* is the level of counselor skill in utilizing core intervention techniques and responding to the unique needs of each participant. *Differentiation* is the theoretical distinctiveness of the model's main intervention principles in comparison to those of other models of interest or, within efficacy trials, in contrast to those of competing study conditions.

This study is an intervention fidelity analysis of a family-based preventive intervention for drug use and related behavioral problems: multidimensional family prevention (MDFP; Hogue, Liddle, & Becker, 2002a; Liddle & Hogue, 2000). Family-based approaches to preventing adolescent drug abuse have generated strong empirical support (for reviews see Ashery, Robertson, & Kumpfer, 1998; Hogue & Liddle, 1999), and several family prevention programs are now promoted and disseminated at the national level (NIDA, 2003; SAMHSA, 1998). MDFP is a manualized, indicated prevention model that targets young adolescents identified as "at risk" on the basis of a risk profile derived from individual assessment of psychosocial functioning. Indicated prevention models are used to address significant behavioral problems or symptoms that do not meet diagnostic criteria for mental disorders (Mrazek & Haggerty, 1994) but are highly predictive of clinical dysfunction. MDFP has been tested with a sample of at-risk African American adolescents in a randomized demonstration trial (Hogue, Liddle, Becker, & Johnson-Leckrone, 2002b). Results indicated that MDFP produced gains in four key domains of developmental functioning: self-competence, family functioning, prosocial involvement, and peer associations. These developmental domains encompass the principal risk and protection factors associated with the onset of substance abuse and behavioral problems in adolescence (see Dishion, French, & Patterson, 1995; Hawkins, Catalano, & Miller, 1992; Leffert et al., 1998).

Within the prevention field specifically, fidelity research has been in short supply. Recent empirical reviews suggest that prevention studies often make few provisions for supporting or evaluating model implementation. Durlak (1998) reported that less than 5% of more than 1200 prevention studies reported data on program fidelity. Dane and Schneider (1998) surveyed 162 prevention studies published between 1980 and 1994. Of these, only 20% actively promoted program fidelity by utilizing an intervention manual, counselor training, and counselor supervision; moreover, only 24% described procedures for verifying the level of integrity achieved. Domitrovich and Greenberg (2000) reviewed 34 mental health prevention programs for children and adolescents that had been identified as exemplary on the basis of the excellence of their experimental design, sampling procedures, and outcome evidence. Even among

these methodologically sophisticated programs, 24% presented no data that verified program integrity, and only 59% included fidelity process analysis of some kind. Finally, in prevention studies that do measure program implementation, greater fidelity is consistently associated with better outcomes across a diverse set of prevention models such as social skills training (Botvin, Baker, Dusenberry, Tortu, & Botvin, 1990; Kam, Greenberg, & Walls, 2003), coordinated community-based prevention (Pentz et al., 1990), and classroom ecology intervention (Harachi, Abbott, Catalano, Haggerty, & Fleming, 1999).

Ideally, fidelity research helps to establish the internal validity of intervention studies, allowing investigators to attribute study effects directly to the interventions themselves (Carroll et al., 1994). The most rigorous kind of fidelity research is fidelity process analysis, a subcategory of intervention process research (Tolan, Hanish, McKay, & Dickey, 2002) that investigates how the core, change-promoting elements of a given model are delivered, with the aim of understanding successes and failures in model application as well as the pragmatics of implementation with various populations (Hogue, 2002; Hogue, Liddle, & Rowe, 1996). That is, fidelity process evaluation moves beyond the categorical judgment of manipulation checks—Was the program implemented as planned?—toward a complex assessment of intervention process: What occurred during program implementation? Fidelity process analysis draws upon quantitative measurement procedures that generate multivariate data on the degree or intensity of program implementation, including dimensions such as breadth and depth of program content, frequency and skillfulness of intervention techniques, and number and timing of sessions. Fidelity process analysis has been used primarily with psychotherapy models, examining treatments for depression (Hill, O'Grady, & Elkin, 1992; Startup & Shapiro, 1993), alcoholism (Carroll et al., 1998), cocaine dependence (Carroll et al., 2000), delinquency (Huey, Henggeler, Brondino, & Pickrel, 2000), and adolescent drug abuse (Hogue et al., 1998).

Fidelity process analysis can also play a central role in *intervention development*: systematic efforts by program developers to review, critique, and revise the theoretical underpinnings and technical ingredients of intervention models in connection with an accumulating research base (Kazdin, 1994). Intervention development relies heavily on theory-guided process research that can elucidate the mechanisms of change responsible for program effects: How does the intervention work, and what features are essential to success (Kazdin, 1999)? Process research of this kind can establish an empirical basis not only for model refinement and counselor training (Gaston & Gagnon, 1996; Hogue, 2002) but also for transporting of research-tested models into standard practice settings (Kazdin, 1999; Pentz & Trebow, 1991).

The overall aims of this study were to investigate program fidelity and further the empirical development of the MDFP model by identifying how specific model components were translated into actual practice by trained MDFP counselors during a previous randomized trial (Hogue et al., 2002b). To accomplish these aims, MDFP process components were compared to those of two treatment models for adolescent drug abuse: multidimensional family therapy (MDFT; Liddle, 2002; Liddle & Hogue, 2001) and cognitive-behavioral therapy (CBT; Turner, 1992, 1993). We wanted to determine whether MDFP counselors utilized signature family-based intervention techniques prescribed by the model and avoided cognitive-behavioral techniques that were proscribed by MDFP, in comparison to two psychotherapy models whose fidelity had been established in a previous fidelity process study (Hogue et al., 1998). All three models are integrative, principle-driven interventions that occur in one-to-one (versus group) settings, emphasize clinical assessment of risk and protective factors during

initial sessions, and endorse flexible application of intervention techniques to meet the unique needs of each participant. The MDFT and CBT models were implemented in the same inner-city community as MDFP, albeit with a treatment sample that was older, more male, and troubled by more severe behavioral symptoms and legal involvement.

The benefits of comparing MDFP to MDFT are straightforward. The conceptual framework and intervention strategies of MDFP were adapted from the MDFT model, one of a handful of multisystemic treatments for adolescent drug abuse with strong efficacy evidence (Stanton & Shadish, 1997; Weinberg, Rahdert, Colliver, & Glantz, 1998). It was reasoned that the basic intervention principles of an empirically based family therapy would remain effective if revised for use in prevention settings, wherein at-risk youth are in earlier and often more malleable stages of problem behaviors (Reid, 1993). Moreover, MDFT is grounded in basic developmental theory regarding family-centered processes of risk and protection (Liddle, Rowe, Dakof, & Lyke, 1998; Liddle et al., 2000). The organizing theories constituting MDFT's developmental foundation—risk and resiliency theory, developmental psychopathology, and developmental-ecological theory—are also the foundation of MDFP (Liddle & Hogue, 2000). Alongside these conceptual similarities are important differences related to MDFP being a prevention rather than a treatment model. Specifically, MDFP's prominently features two prevention-oriented intervention goals that are in keeping with the target population of younger adolescents who are not yet demonstrating clinical-level symptoms. First, it augments basic parenting skills, particularly age-appropriate behavioral management and monitoring of the teen's extrafamilial activities. Second, it focuses on family-specific issues related to adolescent development with both parents and teens, reviewing normative developmental expectations and fostering a future-oriented evaluation of existing risk and protective factors. These intervention goals are derived from two axioms of prevention science: Strong parental monitoring skills (Dishion & McMahon, 1998; Webster-Stratton & Taylor, 2001) and, more generally, developmentally responsive parenting practices (Kerr & Stattin, 2000; Liddle et al., 1998) are essential elements of protective family functioning for adolescent problem behavior. Finally, the benefit of including a CBT condition in this study lies in the opportunity to examine similarities and differences between MDFP and MDFT in comparison to an individual-based, cognitive-behavioral model that is a widely practiced alternative approach.

Study hypotheses were as follows. First, we predicted that MDFP and MDFT would be similar to one another, and different from CBT, with regard to two intervention parameters: session composition (who attended sessions) and session content (which adolescent development themes were discussed: family, school, prosocial activities, peers, drug use). Second, we predicted that the three models would be discriminable with respect to implementation of core intervention techniques; that is, counselors would adhere to the prescribed techniques of their respective models and avoid techniques uniquely endorsed by the other two. It was expected that MDFP and MDFT would feature many family-focused techniques in common, but also that MDFP would emphasize a cluster of prevention-oriented interventions to a greater degree than MDFT. Program fidelity was assessed by observational coders naïve to study condition who viewed videotapes of randomly selected sessions and rated the number of minutes spent with each participant, number of minutes discussing any of six developmental themes, and thoroughness and frequency with which counselors utilized 20 specific intervention techniques.

## METHODS

### *Participants*

*Prevention Sample.* Cases in the family prevention condition were drawn from a larger sample of participants in a randomized trial comparing multidimensional family prevention to a no-intervention control (see Hogue et al., 2002b). Participants in the prevention trial were selected from all youths who enrolled in a community-based youth enrichment program that provided after-school tutoring services, sports and club activities, and vocational counseling to adolescents in grades 6–8 living in an inner-city neighborhood within a large northeastern city. At-risk adolescents were identified by using a risk factor screening measure completed by every adolescent applicant to the youth program (for a full description of risk screening and family recruitment procedures, see Hogue et al., 2002b; Hogue, Johnson-Leckrone, & Liddle, 1999).

In the current study, 50 adolescents and families were included in the family prevention condition. The mean age of the adolescents at intake was 12.5 years ( $SD = 0.79$ , range 11–14). There were 24 boys (48%) and 26 girls (52%). A total of 98% identified themselves as African American. Families reported the following caretaking arrangements: single biological parent (54%), grandparent(s) (16%), one biological and one stepparent (14%), two biological parents (12%), and other (4%). Sixty percent of families reported an annual family income of less than \$15,000, and 62% received some form of public assistance. A small proportion of adolescents were diagnosed with mental health disorders at intake on the basis of the Diagnostic Interview Schedule for Children, 2nd edition (Jensen, Roper, Fisher et al., 1995), using combined adolescent and parent reports: oppositional defiant disorder (16%), attention deficit-hyperactivity disorder (16%), overanxious disorder (14%), conduct disorder (8%), dysthymia (6%), and generalized anxiety disorder (6%). Of the 65 families who originally participated in family counseling within the larger prevention trial, 15 were not included in the current study for the following reasons: 4 did not complete a posttest assessment, 1 attended no sessions, and 10 refused to be videotaped. There were no significant differences between the original prevention sample and the current study sample on any demographic variables.

*Treatment Sample.* There were 28 participants in the family therapy condition and 15 in the individual cognitive-behavioral condition. These were both drawn from a randomized controlled trial comparing multidimensional family therapy to cognitive-behavioral therapy for adolescent substance abuse (Liddle & Hogue, 2001). The treatment was conducted within the same inner-city neighborhood as the prevention trial described previously. Treatment referrals were generated primarily from probation officers, juvenile justice officials, and community mental health agencies. The treatment study sample consisted of 31 boys (72%) and 12 girls with the following self-identified ethnicities: 72% African American, 14% European American, and 14% Hispanic. The average age of the adolescent was 14.7 years ( $SD = 0.87$ ). A total of 47% had been arrested or questioned by police in the past year, 47% were on probation at intake, and 40% had been court ordered to attend treatment. Yearly household income was as follows: 21% earned less than \$10,000; 21% earned between \$10,000 and \$20,000; 23% earned between \$20,000 and \$34,000; and 35% earned more than \$35,000. A total of 42% were single-parent households, 14% two-parent, 23% stepparent, and 21% other compositions. Structured diagnostic interviews (Diagnostic Interview Schedule

for Children, 2nd ed.; Jensen et al., 1995) revealed the following incidence of mental health disorders at intake, using combined adolescent and parent reports: substance abuse (72% marijuana dependence, 14% alcohol dependence, 12% other substance dependence, 7% marijuana abuse), conduct problems (72% conduct disorder, 61% oppositional defiant disorder), and mood problems (23% dysthymia, 14% major depression).

*Counselors.* Four male counselors participated in the MDFP condition: two African American, one European American, and one Asian American. Their mean age was 31 years. Three had a master's degree and one had a doctorate, and they averaged 2 years of experience as family counselors before training. Five counselors participated in the MDFT condition: two African American females, one European American male, one African American male, and one European American female (age range 33 to 48 years,  $M = 39$ ,  $SD = 5$ ). Three had a master's degree in social work, one a doctoral degree in psychology, and one a master's degree in psychology. Together, they averaged approximately 7 years ( $SD = 4$ ) of clinical experience in family therapy. Five counselors participated in the CBT condition: two African American males and three European American females (age range 29 to 54 years,  $M = 37$ ,  $SD = 9$ ). Two had earned doctoral degrees in psychology, two a master's degree in psychology, and one a master's degree in social work. Together, they averaged approximately 3 years ( $SD = 2$ ) of clinical experience in CBT.

*Raters.* Observational coding was completed by a team of nine undergraduates recruited from advanced psychology courses and one psychology graduate student. The team included six European American females, two Asian American females, one European American male, and one Asian American male. Raters had no prior experience in observational coding or in the treatment modalities being observed. Undergraduates received course credits for participating.

### ***Intervention Models***

*Multidimensional Family Prevention.* MDFP is a developmental-ecological, family-based intervention for indicated-risk adolescents that seeks to influence within-family interactions as well as interactions between the family and relevant social systems. MDFP is a home-based model (counselors hold sessions in the home, clinic office, or community sites such as schools and churches) that provides all services in a one-to-one setting. Session composition varies on a case-by-case and session-by-session basis, and counselors regularly spend time working individually with family members to accomplish familywide goals. A total of 15–25 sessions are held over a 3- to 4-month period, depending on the nature and severity of issues presented. The initial few sessions are dedicated to assessment of adolescent and family functioning in seven risk/protection domains: family relations, school performance, prosocial activities, peer relations, attitudes about and experiences with drugs, racial and cultural themes, and adolescent health and sexuality. The counselor and family then review the risk profile that emerges and construct a counseling agenda for addressing the most significant themes within four interdependent modules: The *adolescent module* focuses on the teen's status in terms of normative developmental milestones, problem-solving skills, investment in prosocial institutions, and risky behaviors associated with drug use and delinquency. The *parent module* fosters parenting competency by supporting consistency in limit

setting and discipline, teaching age-appropriate behavioral management techniques, and encouraging regular monitoring of school attendance and adolescent behavior outside the home. The *interactional module* is used to build family relationship skills and foster both autonomy and relatedness in the adolescent-parent relationship. In-session conversations among family members are shaped in an effort to increase family cohesion, problem-solving skills, and clarity of communication and roles. Extended family members who have a substantial mentoring role for the adolescent are recruited for sessions in order to foster a stronger protective network. The *extrafamilial module* seeks to develop a more coordinated protective network for the adolescent across multiple ecological systems (e.g., schools, recreational activities, churches). Counselors and families meet directly with key members of these systems to forge more durable familial-extrafamilial system links. This module also addresses issues related to parental knowledge about the adolescent's peer activities as well as the impact of urban stressors in the everyday life of the adolescent.

*Multidimensional Family Therapy.* MDFT (Liddle, 2002; Liddle & Hogue, 2001) is a multi-component treatment that focuses on changing within-family interactions as well as interactions between the family and relevant social systems. Intervention targets have intrapersonal (i.e., feeling and thinking processes) and interpersonal (i.e., transactional patterns between family members or between family member and extrafamilial persons) aspects. As does MDFP, the approach includes four interdependent therapeutic modules that target multiple aspects of adolescent and family functioning. The *adolescent module* focuses on the individual adolescent within the family, as well as his or her membership of other social systems, principally peer groups. Developmental issues such as identity formation and renegotiation of the adolescent-parent relationship, social and problem-solving skills, and consequences of drug use receive attention in both individual and family sessions. Developing a therapeutic alliance with the adolescent, distinct from that developed with the parent, is a cardinal feature of the MDFT approach. The *parent module* enhances parenting skills in the areas of rebuilding emotional attachments with the adolescent and increasing direct participation in the adolescent's life outside the family. This module also explores the intrapersonal and interpersonal functioning of parents apart from the parenting role, so that personal resources are cultivated and impediments to effective parenting addressed. The *interactional module* facilitates change in negative family relationship patterns by providing an interactional context wherein families develop the motivation, skills, and experience to revitalize interpersonal bonds and interact in more adaptive ways. Family members are helped to validate the values and perspectives of other members, and family interactions are influenced to decrease conflict, increase communication effectiveness, and promote improved problem solving. The *extrafamilial module* seeks to increase active family participation within key social institutions that influence the adolescent, primarily school and the juvenile justice system. The impact of these institutions on the adolescent's life course is examined, the past and current functioning of all family members vis-a-vis these systems are assessed, and sessions are convened between family members and extrafamilial figures (e.g., teachers, probation officers) as needed.

*Cognitive-Behavioral Therapy.* The CBT model for multiproblem adolescent substance abusers used in this study is based on a broadly defined cognitive-behavioral framework (Turner, 1992, 1993) that emphasizes adolescent coping skills and a

harm-reduction approach to substance use. Treatment is divided into three stages: *Treatment planning* focuses on identifying and prioritizing adolescent problems and making a treatment contract in conjunction with both adolescent and caregiver. Parents, or their surrogates, participate in the first two sessions to facilitate support for the adolescent's participation in treatment and to get parents' perspectives on the youth's strengths and problem behaviors. Problems described by the adolescent and parents, in addition to problems reported by school and juvenile court, are used to develop a treatment plan. The *intensive CBT program* aims to increase coping competence and reduce problematic behavior, with intervention selection based on clinical need from among multiple therapeutic modules. Typical therapeutic modules include drug education, contingency contracting, coping and relaxation skills, communication and problem-solving skills, self-monitoring and cognitive distortions, and increasing prosocial activities. Specifically regarding substance abuse, harm reduction (Marlatt & Tapert, 1993), not abstinence, is the primary goal. Clients are taught to recognize behavioral and cognitive cues for cravings and drug use, and to increase behavioral self-control. *Termination* focuses on treatment termination issues and relapse prevention. The goal is to enhance clients' long-term self-management skills. Role rehearsal and problem solving are used to strengthen adolescents' ability to resist peer pressure to use drugs and engage in delinquent behavior.

### ***Fidelity Monitoring***

In all three study conditions, counselor training included didactic seminars (reading the respective treatment manuals and related articles), review of videotaped sessions with supervisors and previously trained therapists, and completion of two pilot cases. After training, all counselors received approximately 3 hours of supervision per week with a model expert that included case review, videotape review of active cases, and live supervision.

### ***Instrumentation***

*Therapist Behavior Rating Scale.* The Therapist Behavior Rating Scale—2nd Version (TBRS-2) (available upon request from the first author) is an observational, fidelity process measure designed to capture adherence and differentiation among the MDFP, MDFT, and CBT models. The TBRS-2 is completed during review of videotaped counseling sessions; entire sessions are coded and may be viewed repeatedly during one sitting. Scale items were derived during a three-part instrument development process. First, items contained on an earlier version of the scale, the TBRS-1, were reviewed for their psychometric properties as evidenced during a previous fidelity study comparing MDFT and CBT (Hogue et al., 1998); unreliable items and those that did not distinguish between the two models were deleted. Second, the MDFP intervention manual and training materials were reviewed by study authors in order to develop new items considered both essential and unique to the MDFP model. Third, study authors jointly coded more than 30 hours of videotaped MDFP, MDFT, and CBT sessions by using the pilot items. The final composition of the TBRS-2 was chosen on the basis of theoretical salience and preliminary reliability of the pilot items.

The TBRS-2 contains two parts, an intervention parameters subscale and an intervention techniques subscale. The *intervention parameters* subscale contains a measure of both intervention *modules* and intervention *domains*. Intervention modules are defined

by who attends the counseling session. Module ratings require that raters estimate (without using a timing device) the number of minutes in a given session during which the counselor is (1) with the adolescent only (adolescent module), (2) with the parent only (parent module), or (3) with the parent and adolescent together (interactional module). Some sessions contained only one module (e.g., only the adolescent attended session), whereas others contained multiple modules (e.g., the counselor met with the parent alone first, then with parent and adolescent together). Then, for each observed module, raters estimate the number of minutes during which counselors and participants discuss each of five developmental domains: family relationships, school issues, extracurricular prosocial activities, peer relations, and drug use. Raters are asked to coscore developmental domain categories whenever more than one theme is discussed simultaneously. For example, if a counselor and adolescent spend 20 minutes alone talking about the drug use attitudes of the adolescent's closest friends, then "drug use" and "peer relations" each receive a score of 20 within the adolescent module. A summary score of total number of minutes discussing each domain is then calculated by summing across modules within each session. Interrater reliability for individual parameter ratings was sound for all intervention modules (intraclass correlation coefficient [ $ICC_{(1,2)}$ ] for adolescent = 0.62, parent = 0.91, interactional = 0.85) and developmental domains ( $ICC_{(1,2)}$  for family = 0.80, school = 0.76, prosocial = 0.50, peer = 0.72, drugs = 0.82).

The *intervention techniques* subscale contains 14 items related to intervention techniques that are common to most family-based counseling models (e.g., attempts to understand or enhance communication and attachment between family members), nonspecific facilitative conditions (e.g., tries to understand client's point of view), and cognitive-behavioral interventions specifically proscribed by MDFP (e.g., helps client recognize self-talk and amend cognitive distortions). This subscale also contains five items intended to capture the prevention-focused goals of MDFP: discusses parental discipline and family rules, explores parental involvement in the adolescent ecosystem, presents knowledge about normative adolescent development, explores the adolescent's world outside the family, and encourages a future orientation. Raters estimate the extent to which counselors engage in each intervention during the entire session by using a 7-point Likert scale with the following anchors: 1 = not *at all*, 3 = somewhat, 5 = considerably, and 7 = extensively. Both thoroughness and frequency are considered in making each rating. *Thoroughness* is the depth, complexity, or persistency with which the counselor engages a given intervention. *Frequency* is the number of times during the session a given intervention is executed, regardless of the thoroughness of the intervention in any particular segment. Raters are trained to rate counselor behavior only and disregard participant behavior as much as possible. Raters are also instructed that complex interventions may be characterized by more than one item, although each item is theoretically independent of all others. Interrater reliability for the individual technique items ranged from  $ICC_{(1,2)} = 0.32$  to 0.81 (all  $p < 0.004$ ), with 17 items (85%) above 0.50 and 13 items (65%) above 0.60.

### **Procedure**

*Sampling Design.* Counseling sessions were randomly selected from each of the three study conditions. Each condition prescribed a maximum of 25 sessions per case; however, about half of the cases in each study condition completed less than a full course of counseling. Every available MDFP case (i.e., had posttest data and at least

one videotaped session) was included in the fidelity evaluation. MDFT and CBT cases were then selected for inclusion so that the cases offered a matched profile to MDFP with regard to the number of sessions available for videotape review within three intervention phases: phase 1 (sessions 1–5), phase 2 (sessions 6–12), and phase 3 (sessions 13 and higher). Because of resource limitations, a smaller number of MDFT and CBT cases were eventually sampled; these were randomly selected from all cases that matched the phase profile of the MDFP condition. Then, one session was randomly chosen for videotape review from each available intervention phase for each selected case in each condition. Across the three study conditions, 40% of sessions selected for review were in phase 1, 36% in phase 2, and 24% in phase 3; cross-tabulation analyses found no differences among groups in the number of sessions sampled from each phase ( $\chi^2 = 1.43$ ,  $df = 4$ ,  $\phi$  coefficient = .09, *ns*). The final pool included 109 MDFP sessions from 50 cases by four counselors, 57 MDFT sessions from 28 cases by five counselors, and 31 CBT sessions from 15 cases by five counselors.

*Rater Training.* Raters trained in a group format for 90 minutes per week over a 4-month period to reach adequate prestudy reliability ( $ICC_{(1,2)} > .65$  for most study items). Training consisted of didactic instruction and discussion of the coding manual, trainer and peer review of practice scales by using pilot cases, and coding exercises designed to test and expand understanding of each scale item. Once coding of study tapes commenced, raters reconvened on a weekly basis for the duration of the study for supportive training and prevention of rater drift.

*Ratings.* Raters were kept unaware of the intent of the study, were naïve to all theoretical and procedural differences among the three models being studied, were instructed that family involvement and session composition would vary according to the contingencies of each case, and were informed that each scale item could arise in every session. Raters coded entire videotaped therapy sessions, which ranged from 30 to 90 minutes and averaged approximately 60 minutes per session for each condition. Two raters coded every session; raters were randomly assigned to sessions by following balanced incomplete block design procedures (Fleiss, 1981).

## RESULTS

### *Intervention Parameter Effects: Modules and Domains*

Descriptive statistics (means and standard deviations) representing the three intervention modules and five developmental domains for each intervention model are presented in Table 1. Data for each parameter are averaged across all sessions for each condition; thus, they depict the profile of a typical session for MDFP, MDFT, and CBT, respectively. For example, MDFP counselors on average spent approximately 14 minutes with the adolescent only, 13 minutes with the parent(s) only, and 19 minutes with the adolescent and parent(s) together during sessions. Analysis of variance (ANOVA) comparing average session length revealed no significant differences among the conditions: MDFP:  $M = 51.1$ ,  $SD = 24.1$ ; MDFT:  $M = 52.8$ ,  $SD = 17.9$ ; CBT:  $M = 45.9$ ,  $SD = 11.1$ ;  $F(2, 194) = 1.13$ , *ns*. Homogeneity of variance analysis did find differences in the session length variability among conditions (Levene statistic = 7.97,  $p < .001$ ), with the variability in length for MDFP and MDFT greater than that in CBT.

**Table 1. Descriptive (Statistics and Between-Condition Differences) on Intervention Parameters for All Study Conditions: Average Number of Minutes Spent Per Session**

	MDFP (n = 109)		MDFT (n = 57)		CBT (n = 31)		ANOVA F(2,194)	Post Hoc Contrasts: Dunnnett's C <sup>a</sup>
	M	SD	M	SD	M	SD		
<b>Modules</b>								
Adolescent	14.2	17.8	14.2	16.5	41.9	16.7	33.60*	CBT > MDFP, MDFT
Parent	12.8	18.0	19.0	19.2	2.9	7.3	9.69*	MDFP, MDFT > CBT
Interactional	18.5	20.4	15.8	21.0	1.7	7.8	9.31*	MDFP, MDFT > CBT
<b>Domains</b>								
Family	31.6	19.1	32.9	17.6	11.5	9.8	18.07*	MDFP, MDFT > CBT
School	6.8	7.9	9.4	11.2	10.6	8.4	2.48	
Prosocial	5.0	5.5	4.5	6.3	7.7	8.9	2.74	
Peer	4.9	5.8	5.6	5.9	7.5	6.2	2.07	
Drug use	1.9	5.1	5.6	7.3	15.3	9.3	50.19*	CBT > MDFT > MDFP

Note. MDFP = multidimensional family prevention; MDFT = multidimensional family therapy; CBT = individual cognitive-behavioral therapy.

<sup>a</sup>All reported post hoc contrasts are significant at  $p < .05$ .

\* $p < .006$ .

Individual ANOVAs comparing the three study conditions were conducted for each of the intervention modules and domains. The significance criterion for the F-ratios was conservatively set to  $p = .006$  (.05/8) to account for test multiplicity. Results found between-condition differences in average time spent in each intervention module (adolescent, parent, interactional) and in two intervention domains (family, drugs). Significant omnibus ANOVAs were followed by post hoc contrast testing using Dunnnett's C, a pairwise comparison test based on the Studentized range that does not assume equal variances among groups. Results were fully in keeping with the theoretical tenets of each model (see Table 1). MDFP and MDFT devoted significantly greater amounts of time than CBT to working alone with parents, working with parents and adolescents together, and working on family-related themes; in contrast, CBT devoted more time to working with the adolescent alone. CBT allotted the greatest amount of time per session to substance use themes (about 15 minutes), followed by MDFT (6 minutes) and then MDFP (2 minutes). Overall, MDFP and MDFT produced almost identical profiles of intervention parameters, with each spending about half of every session focusing specifically on family issues. The one difference between them was MDFT's greater emphasis on the drug use domain, as expected for a model treating active substance abusers (versus at-risk youth).

### **Factor Analysis of Intervention Techniques**

In order to examine the dimensionality of the 19 intervention technique items of the TBRIS-2, principal components analysis using maximum likelihood extraction and oblique rotation (Promax; see Fabrigar, Wegener, Macallum, & Strahan, 1999) was conducted on the average scores (mean of two raters per session) of all items for the entire study sample. Exploratory analyses were preferred to confirmatory analyses because this was

the first examination of the TBRS-2 scale and because a major study goal was discovering, rather than predicting, similarities and differences in the implementation of MDFP and MDFT. Including all three modalities in a single factor analysis (i.e., an across-modalities strategy) maximizes differences among conditions on factor scores and thus facilitates investigation of the comparative nuances of each (Startup & Shapiro, 1993). Two-, three-, and four-factor solutions were extracted to determine the best fit; the three-factor solution was strongest with regard to statistical properties and interpretability. The three-factor solution accounted for 39% of total variance, and scree plot examination revealed a substantial drop in the magnitude of eigenvalues between the third and fourth factors (Fabrigar et al., 1999). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.68, indicating that correlations within the factor matrix were sufficient to support the procedure. Eigenvalues were 3.34 for factor 1, 2.81 for factor 2, and 1.67 for factor 3. Items composing each subscale and their factor loadings are listed in Table 2. Following Grice (2000), factor-based subscales were created by interpreting the pattern matrix, setting a minimal factor loading threshold of .30, allowing items to load on one factor only, and employing a unit weighting method. One TBRS-2 item, *Encourages a future orientation*, fell below the loading threshold and was dropped from further analysis (it is not included in Table 2). The mean of the item scores was calculated so that subscales would retain the scaling properties of the original items.

**Table 2. Item Content and Factor Loadings for the Three-Factor Solution for Therapist Behavior Rating Scale—2nd Version Items**

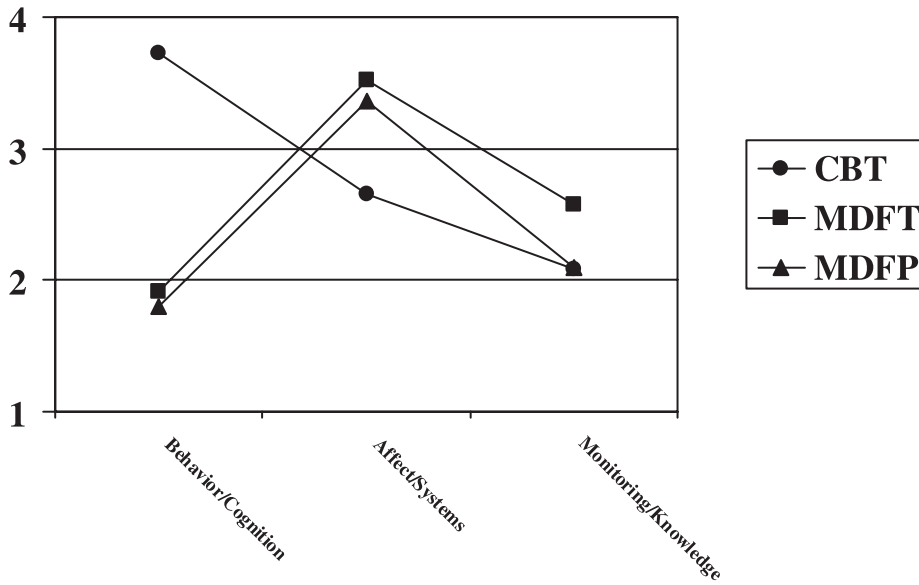
Factor and Item	Factor Loading		
	Factor 1	Factor 2	Factor 3
Factor 1: Behavior/cognition scale			
Utilizes behavioral rewards and structured protocols	<b>.84</b>	-.08	.06
Incorporates homework assignments into session	<b>.71</b>	-.03	.23
Summarizes themes at end of session	<b>.61</b>	.16	-.04
Establishes agenda at beginning of session	<b>.57</b>	.08	.05
Helps client monitor cognitions and cognitive distortions	<b>.51</b>	.13	.07
Explores adolescent's world outside the family	<b>.39</b>	-.14	-.12
Factor 2: Affect/system scale			
Encourages expression of affect in session	.09	<b>.62</b>	-.22
Probes for client's unique point of view	.15	<b>.59</b>	-.19
Listens reflectively	.01	<b>.58</b>	.00
Enhances family communication and attachment	-.29	<b>.53</b>	.20
Coaches multiparticipant interactions in session	.01	<b>.58</b>	.00
Responds to client with warmth and compassion	.01	<b>.50</b>	.18
Validates client's feelings and beliefs	.00	<b>.34</b>	.02
Prepares individuals for upcoming in-session interactions	-.07	<b>.32</b>	-.01
Collaborates with client in setting therapy goals and tasks	.07	<b>.30</b>	.11
Factor 3: Monitoring/knowledge/scale			
Explores parent involvement in adolescent ecosystem	.02	-.11	<b>.50</b>
Discusses parental discipline and family rules	.05	.08	<b>.47</b>
Presents knowledge about adolescent development	-.03	.14	<b>.39</b>

Note. Item loadings for the identified factor appear in boldface.

The first subscale, *Behavior/Cognition Scale*, explained 17% of TBRS-2 variance. It contains six items representing core cognitive-behavioral interventions and session structuring techniques. Factor loadings ranged from .39 to .84 and were highest for utilizing behavioral interventions, incorporating homework assignments, and summarizing session themes. Interrater reliability ( $ICC_{(1,2)} = .84$ ) and internal consistency (Cronbach's  $\alpha = .74$ ) for the subscale were strong. The second subscale, *Affect/Systems Scale*, explained 14% of scale variance. It contains nine items related to working on family relationships and maintaining a facilitative bond with the client. This subscale includes the facilitative conditions items of the TBRS-2 (such as therapist warmth and reflective listening), techniques that appear to be a natural complement to general family-based interventions that center on interpersonal relationships and include multiple participants in session (Hogue et al., 1998). Subscale factor loadings ranged from .30 to .62, and interrater reliability ( $ICC = .74$ ) and internal consistency ( $\alpha = .71$ ) were solid. The third subscale, *Monitoring/Knowledge Scale*, explained 8% of scale variance. It contains three items: explores parental involvement in the youth ecosystem (factor loading = .50), discusses parental discipline and family rules (.47), and presents knowledge about normative adolescent development (.39). Only three items loaded on this factor—below the preferred minimum of five to seven items for constituting a reliable scale—and the factor accounted for less than 10% of total scale variance. It contains only three of the five items originally included as prevention-oriented interventions. One of the five prevention items, Explores adolescent's world outside the family, loaded instead on the first factor; the other, Encourages a future orientation, did not load on any factor. Despite these limitations, the subscale was retained because the three remaining items have strong theoretical coherence as parent-based interventions that focus on parental monitoring and normative development issues. Such interventions are a staple of empirically supported family prevention (see Dishion & McMahon, 1998; NIDA, 2003). As such, they were highly relevant to our comparison of MDFP and MDFT. Interrater reliability for the subscale was solid ( $ICC = .72$ ) but internal consistency was low ( $\alpha = .43$ ), not unexpected for a scale containing so few items. Finally, the pattern of bivariate correlations among the three subscales indicated that they were sufficiently independent of one another. Behavior/Cognition and Affect/Systems were weakly correlated (Pearson's  $r(197) = -.15$ ;  $p < .05$ ); the other two correlations were nonsignificant.

### *Intervention Technique Effects*

Differences among study conditions in their use of signature intervention techniques were examined by using profile analysis, an application of multivariate ANOVA (MANOVA) suitable to multivariate analyses in which all levels of the dependent variable are measured on the same scale. Profile analysis examined whether the three conditions exhibited parallel profiles of scale scores across all three TBRS-2 scales combined. Specifically, we tested for parallelism, which compares adjacent segments of profiles after converting the data matrix into difference scores (Tabachnick & Fidell, 2001). Using Wilks' Lambda ( $\Lambda$ ) criterion, the hypothesis of parallel profiles was rejected,  $F(6,384) = 44.99$ ,  $\Lambda = .345$ ,  $p < .001$ . This result indicates that the study conditions displayed significantly different patterns of peaks and valleys in mean scores across the three TBRS-2 subscales. The profiles are depicted in Figure 1. The proportion of unique variance attributed to independent variables within profile analysis is indicated by partial eta-squared ( $\eta^2$ ), which is derived from Wilks'  $\Lambda$  and represents



**Figure 1.** Profile analysis of mean scores on Therapist Behavior Rating Scale—2nd Version technique scales for all study conditions.

the strength of association for tests of parallelism (Tabachnick & Fidell, 2001). Between-group differences explained a large amount of unique variance ( $\eta^2 = .41$ ) in the weighted combination of the three subscales, confirming that the three models showed very different patterns of implementation.

To investigate model differentiation further, pairwise post hoc contrasts were conducted on all TBRIS-2 technique subscales. Dunnett's *C* is commonly used to follow up profile analysis because (1) it compares mean scores (there is no efficient way to perform individual contrasts on profile segments; Tabachnick & Fidell, 2001) and (2) it does not assume equal between-group variance. Results are summarized in Table 3. As expected, use of behavior/cognition techniques was significantly higher in CBT

**Table 3.** Mean Scores and Between-Condition Differences on Therapist Behavior Rating Scale—2nd Version Technique Scales

Intervention/technique/scale	MDFP (n = 109)		MDFT (n = 57)		CBT (n = 31)		Post Hoc Contrasts: Dunnett's <i>C</i> <sup>a</sup>
	M	SD	M	SD	M	SD	
Behavior/cognition	1.80	0.46	1.91	0.53	3.73	1.08	CBT > MDFP, MDFT
Affect/systems	3.36	0.77	3.52	0.65	2.65	0.50	MDFP, MDFT > CBT
Monitoring/knowledge	2.09	0.77	2.57	0.96	2.08	0.82	MDFT > MDFP, CBT

*Note.* MDFP = Multidimensional family prevention; MDFT multidimensional family therapy; CBT = individual cognitive-behavioral therapy.

<sup>a</sup>All reported post hoc contrasts are significant at  $p < .05$ .

( $M = 3.73$ ) than in MDFP ( $M = 1.80$ ) and MDFT ( $M = 1.91$ ). In contrast, affect/systems interventions were emphasized in MDFP ( $M = 3.36$ ) and MDFT ( $M = 3.52$ ) to a far greater degree than in CBT ( $M = 2.65$ ). Contrary to expectation, use of monitoring/knowledge techniques was greater in MDFT ( $M = 2.57$ ) than in both MDFP ( $M = 2.09$ ) and CBT ( $M = 2.08$ ). Overall, MDFP and MDFT were identical to one another, and predictably different from CBT, in emphasizing interactional and facilitative techniques and avoiding cognitive-behavioral techniques. However, MDFT focused more on parental monitoring and developmental knowledge than MDFP, and MDFP did not differ from CBT in this regard.

## DISCUSSION

The major finding of this study is that multidimensional family prevention (MDFP) demonstrated adherence to its core intervention principles in comparison to multidimensional family therapy (MDFT) and in contrast to cognitive-behavioral therapy (CBT) across two dimensions of model fidelity: intervention parameters and intervention techniques. With regard to intervention parameters, MDFP followed its multidimensional philosophy by devoting substantial amounts of time in session to working alone with adolescents, working alone with parents, and working conjointly with adolescents and parents. MDFP and MDFT were similar to one another, and different from CBT, in their greater emphasis on intervening directly with parents and parent-adolescent dyads and discussing family-related issues and their lesser emphasis on discussing drug use behavior by the adolescent. With regard to intervention techniques, MDFP was identical to MDFT and distinct from CBT in eschewing adolescent-centered behavioral interventions and focusing on interactional and facilitative interventions. This overall pattern of fidelity markers clearly identifies MDFP as a family systems approach and, more specifically, attests to the feasibility of obtaining strong model adherence for MDFP in a manner akin to its more established cousin, MDFT (Hogue et al., 1998).

This is one of the first fidelity studies to examine whether intervention principles from an empirically supported adolescent treatment model can be applied to an at-risk sample in a prevention context. This relatively innovative approach explores the permeability of effective intervention approaches across the *mental health intervention spectrum* (Mrazek & Haggerty, 1994; NAMHC, 1998): a continuum of mental health services research that ranges from epidemiological research on mechanisms of risk and protection, to preventive interventions for nonsymptomatic or subclinical populations, to prevention services used concurrently with treatment interventions (i.e., comorbidity, disability, and relapse prevention), to treatment of clinical disorders and maintenance of treatment gains. The mental health intervention spectrum posits that comprehensive mental health care requires coordinated assessment and intervention planning across the full range of behavioral risk and impairment markers. Additionally, the spectrum offers the intriguing but largely unexplored possibility that effective mental health technology can be fluidly translated across multiple levels of the spectrum. To date only a handful of approaches have been systematically applied to both treatment and prevention populations, notably adolescent skills training (Botvin et al., 1990; Wagner, Kortlander, & Morris, 2001), parent training (Cunningham, Bremner, & Boyle, 1995; Webster-Stratton, 1996), behavioral family intervention (Miller & Prinz, 1990; Spoth, Reyes, Redmond, & Shin, 1999), and brief structural family therapy (Santisteban et al., 1997; Szapocznik & Kurtines, 1989). Exploring when and how to

convey knowledge along the prevention-treatment continuum is one promising way to pursue development of tiered prevention strategies that can assess and stratify youth according to their evidenced need for universal, selected, or indicated prevention (Brown & Liao, 1999; Dishion, Kavanagh, & Kiesner, 1998), as well as to tailor services for those highest-risk groups who fall on the fuzzy border between indicated prevention and early intervention (Tolan, 1996). The potential for translating intervention principles across the border between indicated prevention and treatment is particularly strong for adolescent drug use problems, for which there is a small pool of empirically supported treatments (Deas & Thomas, 2001; Williams, Chang, & ACARG, 2000) but a paucity of prevention models for high-risk populations. Implementation research can be invaluable for informing both researchers and practitioners about the viability of applying hard-won intervention technology from treatment to prevention settings, and vice versa, and in so doing expanding the reach of the most effective approaches.

The main negative finding of this study is prime evidence that little is known about adapting research-proven treatment interventions for use with prevention populations, or vice versa. MDFP utilized fewer parental monitoring and developmental knowledge interventions than MDFT and did not even surpass CBT. There are at least three possible takes on this unexpected result: First, it may simply be a failure in model adherence for this aspect of MDFP. Within its parent module, MDFP prescribes work on reinforcing developmentally appropriate monitoring and limit setting, including parents' being knowledgeable about their teen's friends and extrafamilial activities. This is in keeping with the voluminous empirical literature on parental involvement as a key predictor and moderator of adolescent drug use and antisocial behavior (see Dishion & McMahon, 1998), and these particular goals are fundamental to virtually every science-based prevention model that contains a family focus (e.g., CPPRG, 1999; Dishion & Andrews, 1995; Spoth, Redmond, & Shin, 2001). Second, it may reflect lack of specific knowledge about the risk and protective factors characterizing the at-risk African American youth in the MDFP condition. MDFP counselors were trained to tailor interventions to address the idiosyncratic profiles of adolescent and family developmental functioning for each participant (Becker, Hogue, & Liddle, 2002). To the degree that MDFP families were relatively on track in this area, or at least presented themselves as so, the counselors may have judged monitoring/knowledge interventions to be of low priority on a case-by-case basis. Studies indicating that African American parents are comparatively strong in monitoring and discipline practices (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Garcia Coll, Myer, & Brillon, 1995) lend initial credence to this view. Third, the elevated use of these techniques by MDFT may reflect its maturity as a developmental-ecological model that integrates the knowledge base on normative adolescent development into its core intervention principles (Liddle et al., 2000). It also points to the continued salience of monitoring/knowledge interventions for adolescents whose behavioral symptoms have progressed to clinical status (Liddle et al., 1998).

Confidence in the validity of study findings is bolstered by several methodological strengths. MDFP is a theory-driven, manualized intervention with well-defined parameters and techniques that are readily operationalized for fidelity evaluation. Rigorous process research methods were used to measure model integrity, including nonparticipant ratings by highly trained observers, Likert-type extensiveness ratings of counselor behavior, and random selection of sessions for review. Solid interrater reliabilities and internal consistencies for main study variables helped verify internal validity.

It is important to emphasize that this study did not examine every important aspect of model implementation. For example, working alliance and counselor competence, two fundamental pillars of intervention process research (Orlinsky, Grawe, & Parks, 1994), were not measured. Also, this study did not explore links between model fidelity and participant outcome for the MDFP condition. Sophisticated fidelity-outcome analyses for counseling models need to account for several complex issues, such as dose-effect relations, counselor nesting effects, and clinical and health significance of outcomes. Such analysis was considered beyond the scope of the present study. Still, evidence regarding the impact of fidelity on outcome in preventive interventions is rapidly accumulating (Domitrovich & Greenberg, 2000) and must be considered an essential feature of evidence-based model development and dissemination. In a separate study (Faw et al., in press) we investigate the structure of the adolescent-counselor alliance in MDFP and its relation to outcome.

There is much to gain from intensive focus on model integrity issues in preventive intervention. The current study confirmed the feasibility of translating established principles of family-based, developmental-ecological treatment into a viable prevention model for indicated-risk adolescents, which is an important complement to efficacy findings from a randomized outcome study (Hogue et al., 2002b). Moreover, unexpected findings regarding the poverty of parental monitoring/knowledge interventions have presented a new, empirically grounded starting place for ongoing development and refinement of MDFP. We contend that the fidelity evaluation methods used in this study offer similar value toward model development for other prevention approaches (Hogue, 2002). These methods are particularly suited to counseling-based prevention approaches that feature customized assessment and intervention strategies that address the unique risk/protection profile of individual youths and families. Need for counseling prevention approaches as back-end components of tiered prevention initiatives to be used with indicated populations whose prevention needs exceed the reach of universal and selected interventions (e.g., CPPRG, 1999; Dishion et al., 1998) is becoming increasingly evident. The complexity of delivering intensive, multicomponent preventions to the highest-risk adolescents and families demands rigorous fidelity monitoring and evaluation to ensure successful model implementation and adaptation.

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