

Early Intervention for Adolescent Substance Abuse: Pretreatment to Posttreatment Outcomes of a Randomized Clinical Trial Comparing Multidimensional Family Therapy and Peer Group Treatment†

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Abstract—This randomized clinical trial evaluated a family-based therapy (Multidimensional Family Therapy, MDFT; Liddle 2002a) and a peer group therapy with 80 urban, low-income, and ethnically diverse young adolescents (11 to 15 years) referred for substance abuse and behavioral problems. Both treatments were outpatient, relatively brief, manual-guided, equal in intervention dose, and delivered by community drug treatment therapists. Adolescents and their parents were assessed at intake to treatment, randomly assigned to either MDFT or group therapy, and reassessed at six weeks after intake and at discharge. Results indicated that the family-based treatment (MDFT, an intervention that targets teen and parent functioning within and across multiple systems on a variety of risk and protective factors) was significantly more effective than peer group therapy in reducing risk and promoting protective processes in the individual, family, peer, and school domains, as well as in reducing substance use over the course of treatment. These results, which add to the body of previous findings about the clinical and cost effectiveness of MDFT, support the clinical effectiveness and dissemination potential of this family-based, multisystem and developmentally-oriented intervention.

Keywords—adolescent, MDFT, Multidimensional Family Therapy, substance abuse

Early adolescence is a period of significant developmental reorganization (Cicchetti & Toth 1992) and a time

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when vulnerable youth are at considerable risk for developing serious substance abuse and conduct problems (Hser

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et al. 2003). Regular drug use in early adolescence sets the stage for later drug abuse and antisocial behavior (Brook, Balka & Whiteman 1999). The clinical challenge is to slow or halt the progression of early stage problems before these destructive behavioral patterns become ingrained and highly resistant to change (Loeber & Farrington 1998). This is best accomplished by intervening at the earliest stages of problems to reduce risk and promote protective factors in as many functional domains as possible (Bukstein 1998). For these reasons, policymakers, researchers, and clinicians agree that early adolescence is a critical period for interventions to reduce early-stage drug use and delinquency (Lynam 1996; Lerner 1993).

A new, empirically-based foundation exists in contemporary intervention science, and this research base has been used to create a new generation of developmentally specific prevention and treatment approaches (Liddle In press). Research has identified a number of risk and protective factors for the development of antisocial behavior and drug taking in adolescence (Patterson, DeBaryshe & Ramsey 1989). Clustering into four important domains—individual, family, peer, and school influences—these factors are interrelated, and they have cumulative and synergistic effects on the development of drug abuse and delinquency (Brook et al. 1998; Wills et al. 1996; Zigler, Taussig & Black 1992).

- *Individual risk factors.* Early behavioral and emotional problems are among the most consistent predictors of substance abuse and delinquency in adolescence. These problems interact with individual factors such as temperament and poor family functioning and potentiate relational challenges in the peer and school environments, which may culminate in substance abuse and delinquency in adolescence (Loeber 1989).
- *Family risk factors.* Family relationships are well-established protective factors against child and adolescent problem behaviors (Hoffman, Cerbone & Su 2000; Resnick 2000). Research consistently links substance use and abuse in early adolescence to teen-parent relationship qualities (e.g., emotional disengagement), as well as ineffectiveness in parental disciplining and monitoring (Steinberg 1991). Because of developmentally normative changes in the ways parents and teens interact (compared to parent-child interaction), and the youth's natural and adaptive desire for more autonomy, some increases in parent-adolescent conflict are expected during early adolescence (Laursen, Coy & Collins 1998). But serious conflict, parent-child disconnection, lack of communication, disagreement about fundamental values and morals, and frequent turmoil in families is not normative (Hill 1985). Young adolescents who have conflictual or emotionally disengaged relationships with their parents and receive insufficient or ineffective parental monitoring drift toward social settings in which antisocial behaviors are accepted,

encouraged, and indeed taught (McClun & Merrell 1998).

- *Peer risk factors.* Peers become a significant source of influence and support during the early adolescent years (Brendt & Perry 1990). Youths form friendships with those who have the same attitudes and values (Steinberg 2001). Teens with drug-free life styles are apt to select prosocial peers, whereas those who are already oriented toward drug use and antisocial behaviors are likely to select similarly deviant peers (Dishion & Owen 2002). Also, younger adolescents are more susceptible to the influence of antisocial peers than are older adolescents (Bush, Weinfurt & Ianotti 1994).
- *School risk factors.* Because schools play an important role in socializing youth and promoting competence in skill areas necessary for positive adjustment in adulthood, they represent a critical context for early interventionists to understand and include in intervention models. As youth enter adolescence, they typically transition to larger schools that provide less structure, less monitoring and less individual attention from teachers, and greater opportunity to associate with deviant peers. Other school-related risk factors for drug use include chronic academic failure, lack of bonding to school, behavior problems and acting out in school, and low aspirations for academic success or dropping out altogether (Hawkins, Catalano & Miller 1992).

Given the importance of these developmental domains in short- and long-term adolescent adjustment (Brook et al. 2002; DeWitt et al. 2000), treatment developers recommend that early interventions target change across these influential social systems (Bry & Greene 1990). Considerable evidence supports the effectiveness of multisystemic family-based approaches in preventing and treating teen adolescent substance abuse and delinquency (e.g., Kumpfer & Alvarado 2003; Szapocznik & Williams 2000; Williams & Chang 2000). A new generation of interventions has been designed to target risk behaviors and promote competence and buffer risk across multiple realms of adolescent and family functioning (Liddle In press). Yet the potential for early intervention with problem youth has not been realized (Institute of Medicine 1994). Early adolescence, and the developmental problems that appear during this life stage, remain a "lost opportunity" for intervention research (Horwitz & Hoagwood 2002).

One approach that holds considerable promise as an early intervention is Multidimensional Family Therapy (MDFT; Liddle 2002a). MDFT has been recognized as a "best practice" in drug abuse prevention and intervention (SAMHSA 2003; Drug Strategies 2003; CSAP 2003; NIDA 1999; OJJDP 1999). Developed as an intervention system rather than a narrow, one size fits all approach, different versions of MDFT, including both prevention and treatment

approaches, have been developed, tested, and proven efficacious with diverse clinical populations (different ages, males and females, comorbid youth, multiethnic backgrounds) and in different treatment delivery settings (Dennis et al. In press; Hogue et al. 2002; Liddle In press, 2002b; Liddle et al. 2002, 2001). In all its versions, MDFT exemplifies the multisystemic approach described above in that it targets multiple risk and protective factors and multiple domains of adolescent and family functioning. For the current clinical trial MDFT was adapted to address the unique developmental issues of young adolescent drug abusers (Rowe et al. 2003).

The comparison intervention, designed and executed as an active treatment versus a treatment-as-usual comparison condition, was a peer-based group treatment that addressed risk factors mainly in the peer and individual domains of functioning. Peer-based group models are the most common intervention provided for drug-abusing youth (Grella In press). Like other peer-based interventions, the model was developed from the premise that positive peer influences can buffer the young adolescent from drug abuse (Wentzel & McNamara 1999) and provide positive behavioral alternatives to substance use (Youniss, McLellan & Strouse 1994). Considerable work has been done in specifying cognitive behavioral therapy (CBT) theory and methods for use with adolescent substance-abusing samples (Sampl & Kadden 2001; Kaminer et al. 1998; Monti et al. 1989). While some group interventions have been shown to be effective in adolescent substance abuse prevention and treatment studies (Dennis et al. In press; Kaminer et al. 1998), other findings offer mixed empirical support for their use. In fact, some evidence suggests that peer-based interventions may inadvertently reinforce deviant behaviors for high-risk young adolescents (Dishion, McCord & Poulin 1999).

Both treatments use a harm reduction rather than an abstinence-only 12-Step facilitation model/philosophy, and also target research-established contributors to risk and problem behavior development. However, the family-based intervention was designed to be more comprehensive and, consistent with the literature's recommendations, to cover as many functional domains of risk as possible. Another critical difference, perhaps one that has implications for understanding the mechanisms of action that account for the effects achieved by both treatments, is that the family-based treatment has direct access to and is designed to target and change key aspects of the adolescent's social environment, including the teen and family's interaction with school and juvenile justice systems. By contrast, the peer group therapy has access to and primarily targets a different aspect of the teen's social ecology—peer relations—an arena of functioning known to drive adolescent drug use and delinquency. The authors hypothesized that over the course of treatment: (1) The family-based treatment (MDFT) would more effectively decrease risk factors and

promote protective factors in the individual, family, peer, and school domains than the peer-group therapy, and (2) MDFT would be more effective in reducing substance use and delinquency than the peer-group therapy.

METHODS

Participants

This study was carried out at the Village, Inc., a non-profit community drug abuse treatment clinic that provides a range of outpatient services to adolescents and their families. In order to qualify for the study, adolescents had to be: (a) between the ages of 11 and 15 years old, (b) referred for outpatient treatment for a substance abuse problem consistent with ASAM criteria, (c) living with at least one parent or parent-figure who could participate in the assessments as well as the family therapy if assigned to that condition, (d) not in need of inpatient detoxification or other intensive services, (e) not have had more than three previous arrests, (f) not report using any substance more than three times per week during the month before admission, and (f) not be suicidal, psychotic, or mentally retarded.

Referrals to the study were made from juvenile justice (45%), the school system (41%), other substance abuse/mental health facilities (2%), or other sources such as family (12%). A total of 130 adolescents and families were screened for the study. Of those, 80 (62%) were eligible and consented to participate. The rest did not meet the study eligibility criteria, either because their delinquency or drug use were too severe ($n=42$) or they did not have substance use levels requiring outpatient drug treatment ($n=8$) and were referred to other appropriate services.

Fifty-eight males and 22 females living in Miami, Florida with an average age of 14 ($M = 13.73$, $SD = 1.1$) participated in this study. The youth were ethnically diverse: 42% were Hispanic, 38% African American, 11% Haitian or Jamaican, 3% non-Hispanic White, and 4% other. Forty-seven percent were involved in the juvenile justice system by either being on probation or awaiting a court hearing. Just over half (53%) resided in single parent homes, and the yearly median family income was \$19,000. At intake, 47% of the participants met ASAM criteria for substance abuse, and 16% met criteria for substance dependence. Even in this early intervention study, many youth met criteria for a comorbid psychiatric disorder (39% for conduct disorder, 29% for ADHD, and 9% for a depressive disorder).

Research Procedures

Initial eligibility was established through a telephone screening process. Project staff then met with eligible youth and parents in their homes to describe the study and obtain written informed consent prior to the first assessment session. After the baseline assessment, adolescents were randomly assigned to either the peer-group therapy ($n = 41$) or MDFT ($n = 39$). Random assignment was conducted

using a balancing procedure to ensure equivalence of the groups on four key variables related to treatment outcome: gender, age, ethnicity, and family income. Equivalence was confirmed by preliminary analyses of variance (for continuous variables) or chi-square tests (for categorical variables) showing no significant ($p < .05$) differences between the groups on any of these variables at baseline.

Therapists

While all therapists were employed by the Village, a community-based drug treatment center, clinicians in the two intervention conditions had little contact since their offices were at different locales. Nested within each treatment condition, therapists conducted therapy only in the modality in which they were trained and supervised. All clinicians held masters degrees in counseling, social work or a related field, and had similar previous experience and educational backgrounds prior to working on this project. Clinicians received approximately 30 hours of initial training as well as ongoing supervision in their respective approaches. Study therapists ranged in age from 26 to 47 years ($M = 33$), and were mostly female (71%). Fifty-seven percent were Hispanic, 14% were Caucasian, and 29% were Black.

Treatment Conditions

The therapy provided to youth in both conditions was home- and clinic-based, and conducted twice per week (approximately 90-minute sessions) for 12 to 16 weeks. The majority of the MDFT sessions were conducted in the home, while the peer group therapy was conducted mainly at the Village clinic offices. Case management services were provided throughout as needed, and a case manager was assigned to each treatment condition to assist with these activities. All treatment was free of charge, and transportation assistance was made available to reduce barriers to treatment participation.

Peer group therapy. The peer group therapy used in this study was a manual-guided intervention based on social learning principles (Bandura 1999), and cognitive behavioral therapy. It drew from empirically established guidelines and manuals for conducting group CBT with substance abusers (Carroll 1998) and adolescents (Nowinski 1990). One therapist led each session and between four and six male and female adolescents participated. The groups were "open" in that new members were admitted on a rolling basis as previous members completed treatment.

The treatment used a risk and protective factor framework, seeking to reduce adolescent substance use both by targeting it directly and by focusing on accompanying risk factors such as low self-esteem, school failure, and poor social functioning. Themes of self management, self efficacy, and coping with difficult and stressful everyday life events and circumstances were addressed throughout the treatment in all six content modules: drug education, self esteem, values and identity, decision making, personal

control, and interpersonal communication. Education (e.g., about drug effects and consequences) was combined with skills training (in school, work, and relationship domains), and social support (peer sharing and feedback).

There was a dual focus on individual skill development and group participation in each session. Teaching and practice (behavioral rehearsal), with an emphasis on repetition, were key. Each module presented core materials, and provided opportunities to develop skills in several intrapersonal and interpersonal domains (e.g., managing thoughts about drug use, self care, and troubleshooting crisis situations). Worksheets and role-plays helped to make the content personal and meaningful. Emphasis was placed on exploring beliefs about drugs, understanding the roots and triggers of drug use, reevaluating and eventually avoiding friends who use drugs, improving refusal techniques, recognizing automatic thoughts about drug use, increasing prosocial, nondrug-related ways to have fun and feel good, and other relapse prevention methods. Handouts and videotape segments (contemporary movies, drug use/abuse videotapes) supplemented group discussions. The therapist's stance was active and directive but not confrontational.

Multidimensional Family Therapy. MDFT is a comprehensive, developmental/ecological, family-based, multicomponent, stage-oriented intervention (Liddle 2002a; 1995). A multiple systems intervention, MDFT targets intrapersonal aspects including those of the adolescent (e.g., drug use as a means of coping with distress), the parent(s) (e.g., parenting practices), and other family members (e.g., drug-using adults in the home), as well as those interactional patterns (e.g., parent and teen conflict and relationship problems; see Liddle 1994) that contribute to the development and continuation of drug use and related problems. The treatment also addresses the adolescent's and family's functioning vis a vis the social systems influencing the teen's life, such as school, work, antisocial/drug using peer networks, and the juvenile justice system.

Treatment is phasic. The initial emphasis is on engagement and establishing a foundation for treatment. Success in developing multiple therapeutic alliances with the adolescent, parent(s), and other family members is a vital aspect of the intervention (Diamond et al. 1999). Clinicians use knowledge of normative and atypical development in crafting therapeutic content foci that must be personally meaningful for each family member (Liddle 1999). The cooperation of family members and others is enlisted in a highly focused and sustained effort to reorganize the teenager's daily life. Helping to arrange school meetings and academic testing, tutoring, and vocational assessments and training, for example, are all part of therapy's purview (Rowe et al. 2002).

To reduce treatment barriers, facilitate a personal engagement between therapist and all family members, and to gain practically useful information about the teen's

day-to-day natural ecology, individual sessions with the teen and parent and family sessions are held in the home and treatment clinic, or at community locations such as school or court throughout therapy. Individual sessions focus on drug-taking, peer and family relations, school, and the teen's involvement with juvenile justice. Overall the focus is on the facilitation of developmentally appropriate competence across areas of the teen's life. New communication and problem-solving skills are taught in an individually tailored way. In addition to an individual and family foci, the therapist motivates the teen to access extrafamilial resources (e.g., job training, GED acquisition) to provide concrete alternatives to drug using and antisocial lifestyles. Parenting practices also are prime intervention targets. Parents are helped to examine their current relationship with their teenager and their strategies to influence their teen. Therapists work to change negative family interaction patterns as a way to change the everyday family environment. They coach parents on new ways of reaching out to their teenagers and help adolescents address the issues that separate them in developmentally non-normative ways from their parents.

In the third and final treatment phase, the emphasis is on generalizability and facilitating the durability of the in-treatment changes. Teens and families are helped to translate the new ideas, skills, and behaviors initiated in treatment to new real-world situations.

Treatment Fidelity

Supervisors in each condition reviewed all of their cases on a weekly basis during group supervision and reviewed technique and content checklists completed by therapists at the end of each session. Research assistants conducted additional adherence assessments. Group sessions were randomly attended by research staff and rated using an observational checklist. Videotapes of family sessions were randomly selected for rating using the Therapist Behavior Rating Scale (Hogue et al. 1998), an observational adherence coding system used in previous MDFT controlled trials. Treatment parameter adherence (i.e., session frequency and duration, domains targeted) was assessed by therapist-completed client contact logs. The project coordinator reviewed these logs weekly. Adolescents in the group condition averaged 1.73 hours per week of group treatment. Youth in the MDFT condition averaged 1.71 hours per week of family and individual therapy. Both treatments were delivered over a three to four month period. These results confirm that a high degree of treatment fidelity (i.e., manual adherence) was achieved in the study.

Measures

Except for the background and demographic measures (which were administered only at treatment intake), all assessments were done at intake, at six weeks post-intake, and at treatment discharge. They were administered to youth

and parents by trained assessors, blind to treatment condition.

Background and demographic information. The Global Appraisal of Individual Needs (GAIN; Dennis 1999) is an integrated biopsychosocial model of treatment assessment, planning and outcome monitoring divided into eight areas: background and treatment arrangements, substance use, physical health, risk behaviors, mental health, environment, legal, and vocational. The GAIN also asks detailed questions about lifetime and current (past 90 days) service utilization, as well as changes in the client's cognitive state. In adolescent outpatient and inpatient samples with a range of cultural groups, the GAIN has repeatedly demonstrated excellent psychometric properties.

The Parent and Adolescent Interviews (CTRADA 1998) gathered information on family composition, history of drug use and mental health problems in the family, adolescent substance abuse and juvenile justice involvement, treatment history, high-risk sexual behaviors, school problems, and peer relationships.

Individual risk factors: Externalizing and internalizing symptoms. Adolescent externalizing and internalizing symptoms were measured by the Youth Self-Report (YSR; Achenbach 1991) administered to the teens. The YSR is a well-established, widely used instrument that provides a standardized format for assessing child and adolescent behavior. The externalizing dimension includes the delinquent acts and aggressive behavior subscales. The internalizing factor includes withdrawn, somatic complaints, and anxious/depressed subscales.

Family risk and protective factors. The Family Environment Scale (FES; Moos & Moos 1986) is a widely used self-report questionnaire designed to assess the social environment of all types of families. The cohesion and conflict subscales were administered in the current study. The instrument demonstrates adequate psychometric properties in hundreds of studies (see Grotevant & Carlson 1989).

Peer risk factors. The National Youth Survey Peer Delinquency Scale (Elliot, Huizinga & Ageton 1985) was used to assess youths' association with deviant peers. The scale has been well validated with a range of populations.

School risk factors. The Adolescent Interview, described above, also assessed the extent to which youth experienced a range of school-related problems in both academic (e.g., not motivated to do well, classes too difficult, not doing homework) and conduct realms (e.g., cutting classes, problems with teachers, disciplined by principal, disrupting class).

Drug use. The youth's consumption of drugs was measured by the Timeline Follow-Back Method (TLFB; Sobell & Sobell 1992) as adapted for adolescents (Waldron et al. 2001). The TLFB obtains retrospective reports of daily substance use by employing a calendar and other memory prompts to stimulate recall. Youth report on specific substances used daily for the 30-day period just prior to each assessment.

Delinquency. A validated instrument that has been used extensively with African-American and Hispanic populations, the National Youth Survey Self-Report Delinquency Scale (SRD) is a self-report delinquency scale that was part of the National Youth Survey (Huizinga & Elliot 1983). It assesses adolescent criminal behavior according to five subscales: total delinquency, general theft, crimes against persons, index offenses, and drug sales.

RESULTS

Analytic Approach

The primary aim of the study was to examine the comparative effects of two active, theoretically and technically distinct treatments for early adolescent substance abuse: a family-based treatment (Multidimensional Family Therapy) and peer group treatment. After first comparing the impact of each treatment on four domains of risk and protective factors (i.e., individual, family, peer, and school), the authors then compared their effects on substance abuse and delinquency. Individual client change was primarily analyzed using latent growth curve modeling (LGM) techniques. These analyses proceeded in three stages. First, a series of growth curve models, representing different possible forms of growth (e.g., no change, linear change, curvilinear change), was tested to determine the overall shape of the individual change trajectories. Overall, clients showed improvement during treatment on all dependent measures; as a result, all growth models included both intercept (i.e., initial status) and slope (i.e., change) parameters. Growth curve modeling was done using Mplus software (Version 2.13; Muthén & Muthén 2002).

Second, to test the study hypotheses, treatment condition was added to the models to test the impact of type of treatment on initial status and change over time (i.e., the intercept and slope growth parameters). Treatment effects were based on the significance of the slope parameter associated with treatment condition (indicating that one treatment produced more rapid change in the dependent variable than the other). Finally, additional covariates—adolescent age, gender, ethnicity, and number of weeks in treatment—were added to the model to determine if treatment effects remained after adjusting for these variables. Table 1 presents descriptive statistics for the main outcome variables. Table 2 presents the *t*-ratios and *p*-values for the test of treatment comparisons as well as intercept and slope main effects (unrelated to treatment condition).

Engagement and Retention

Both interventions were successful in engaging and retaining teens in the program. No clients refused treatment in MDFT and only three adolescents refused treatment in the group therapy condition (7% failing to

attend at least one session). MDFT clients completed treatment at a higher rate than group clients (97% versus 72%; Dakof et al. 2003). These findings are in accord with other findings that have found attrition to be higher in group than in family-based therapies (Crits-Cristoph & Siqueland 1996). Adolescents in both conditions remained in treatment at a significantly higher rate than the 27% 90-day retention rate reported in a national survey of community-based outpatient treatment for teen drug abusers (DATOS-A; Hser et al. 2001). Given the well documented difficulties of engaging and retaining teens in treatment (e.g., adolescents follow through with prescribed medical treatments at rates that range from 11% to 50%; Varni, La Greca & Spirito 2000, see also Armbruster & Kazdin 1994), the present findings for both the family-based and group therapies are very promising. In terms of the family-based treatment, they are in accord with other very high treatment retention rates in the literature for well established family-based interventions (Rowe & Liddle 2003; Henggeler et al. 1996).

Individual Risk Factors

Youth receiving MDFT showed a more rapid decrease in self-reported externalizing symptoms than youth receiving group therapy (i.e., significant slope associated with treatment effect). While MDFT clients on average decreased approximately seven *t*-score points per assessment (over half of a standard deviation) group clients decreased approximately three *t*-score points per assessment. With respect to adolescent-reported internalizing symptoms, treatment was not a significant predictor of change; however, the significant main effect for slope indicates that both treatments were effective in decreasing internalizing symptoms. The covariate analyses indicated no significant predictors of the growth factors for either externalizing or internalizing symptoms. Additionally, unless specified, no significant covariates were found for subsequent dependent variables.

Family Risk Factors

Treatment condition was a significant predictor of change in family cohesion, with youth receiving MDFT reporting more rapid improvement than youth receiving group therapy. While MDFT clients generally improved in family cohesion at each successive assessment, group clients reported less family cohesion at each successive assessment. Treatment condition was not associated with change in family conflict.

Peer Risk Factors

Peer delinquency was modeled by a three-category categorical growth curve (CGC) model, an LGM model with a categorical dependent variable (see Muthén & Asparouhav 2002; Muthén 1996). The analysis revealed

TABLE 1
Descriptive Statistics for Main Outcome Variables over the Three Assessment Points

	Intake		Six Week Follow-up		Termination	
	N (%)	Mean (SD)	N (%)	Mean (SD)	N (%)	Mean (SD)
Self-reported externalizing symptoms						
MDFT		56.61 (12.65)		47.90 (9.57)		44.72 (7.35)
Group		54.67 (13.39)		50.98 (11.40)		48.90 (9.21)
Self-reported internalizing symptoms						
MDFT		52.15 (14.62)		44.57 (7.08)		42.70 (8.71)
Group		50.81 (13.21)		47.68 (12.00)		45.65 (8.64)
Family cohesion*						
MDFT		11.89 (2.39)		11.02 (2.11)		10.94 (1.91)
Group		11.24 (1.67)		11.17 (2.02)		11.54 (2.15)
Family conflict						
MDFT		14.53 (2.01)		15.26 (2.05)		15.20 (2.24)
Group		11.24 (1.67)		11.17 (2.02)		11.54 (2.15)
School disruption						
MDFT						
None	16 (42)		30 (73)		37 (91)	
Disruptive	24 (58)		11 (27)		4 (9)	
Group						
None	29 (71)		31 (75)		32 (79)	
Disruptive	13 (29)		10 (25)		9 (21)	
Academic problems						
MDFT		5.71 (1.31)		5.18 (1.13)		4.86 (1.03)
Group		5.38 (1.19)		5.33 (1.25)		4.78 (1.07)
Discipline problems						
MDFT		8.37 (1.81)		7.33 (1.53)		7.09 (1.29)
Group		8.18 (1.87)		7.53 (1.37)		7.58 (1.55)
Peer delinquency						
MDFT						
None	11 (31)		30 (83)		35 (98)	
Very few	7 (19)		3 (9)		1 (2)	
Some	18 (50)		3 (8)		0 (0)	
Group						
None	22 (55)		26 (66)		30 (75)	
Very few	11 (28)		9 (23)		7 (18)	
Some	7 (17)		5 (11)		3 (7)	
Marijuana use						
MDFT						
Less than weekly	16 (44)		33 (88)		36 (99)	
1-2 uses per week	2 (6)		4 (12)		1 (1)	
More than two uses	19 (50)		0 (0)		0 (0)	
Group						
Less than weekly	14 (34)		24 (59)		33 (80)	
1-2 uses per week	7 (16)		6 (15)		4 (9)	
More than two uses	20 (50)		11 (26)		4 (10)	
Delinquency						
MDFT						
None	13 (33)		28 (73)		36 (94)	
Mild	6 (17)		4 (12)		2 (6)	
Moderate	19 (50)		6 (15)		0 (0)	
Group						
None	22 (52)		26 (61)		30 (69)	
Mild	13 (30)		11 (26)		9 (21)	
Moderate	8 (18)		6 (13)		4 (10)	

*Lower scores reflect more family cohesion.

Outcome Variable	Intercept		Linear Slope	
	t-ratio	p	t-ratio	p
Self-reported externalizing symptoms				
Main effect	30.10	<.001	-6.18	<.001
Treatment effect	-0.52	Ns	2.28	<.05
Self-reported internalizing symptoms				
Main effect	25.30	<.001	-3.93	
Treatment effect	-0.16	Ns	1.32	
Self-reported family cohesion				
Main effect	31.06	<.001	-2.81	<.001
Treatment effect	-1.35	Ns	2.70	<.001
Self-reported family conflict				
Main effect	28.16	<.001	1.42	Ns
Treatment effect	0.33	Ns	1.04	Ns
Peer delinquency				
Main effect*			-4.01	<.001
Treatment effect	-0.54	Ns	2.57	<.01
School disruptive behavior				
Main effect*			-4.71	<.001
Treatment effect	-2.65		3.06	<.01
School academic problems				
Main effect	28.15	<.001		
Treatment effect	-0.76	Ns		
School conduct problems				
Main effect	31.34	<.001	-4.31	
Treatment effect	-0.56	Ns	1.67	
Marijuana use				
Main effect*			-3.13	Ns
Treatment effect		Ns	2.66	<.05
Self-reported delinquency				
Main effect*				<.001
Treatment effect	0.33	Ns		<.10

*The intercept mean is fixed at zero as a requirement of Categorical Growth Curve model estimation (Muthén & Asparouhov 2002; Muthén 1996).

that youth receiving MDFT decreased association with delinquent peers more rapidly than youth receiving group treatment. Figure 1 graphically depicts the change in percentage of involvement with delinquent peers from intake to discharge. Youth receiving MDFT reported a 68% decrease in association with delinquent peers (71% at intake, 3% at discharge), whereas youth receiving group therapy reported a 54% decrease in association with delinquent peers (72% at intake, 18% at discharge).

School Risk Factors

MDFT was more effective than group treatment in decreasing disruptive classroom behaviors. In addition, both treatments were effective in decreasing academic and discipline problems with a nonsignificant trend for discipline problems associated with MDFT. Finally, the covariate analysis showed that more rapid decreases in disruptive behavior were associated with fewer weeks in treatment.

Cannabis and Alcohol Use

Cannabis use was modeled with a three-category CGC model, with the categories representing an average of use less than once per week, between one and two occasions per week, and more than two times per week over the last 30 days. MDFT was associated with more rapid decreases in cannabis use than group treatment. Figure 2 shows that at intake, 57% of youth receiving MDFT reported using marijuana at least once per week (over the previous 30 days), whereas at discharge only 1% reported weekly or more frequent use (a 56% decrease). By contrast, 66% of youth receiving group therapy reported weekly or more use at intake and 20% reported weekly or more use at discharge (a 46% decrease). For that subset of teens who reported using alcohol at any point during treatment ($n=22$), it was found that treatment condition also was a significant predictor of change: clients receiving MDFT showed a more rapid decrease in alcohol use than clients receiving group treatment ($t=2.01, p<.05$).

FIGURE 1
Percentage of Youth Reporting Delinquent Peer Involvement

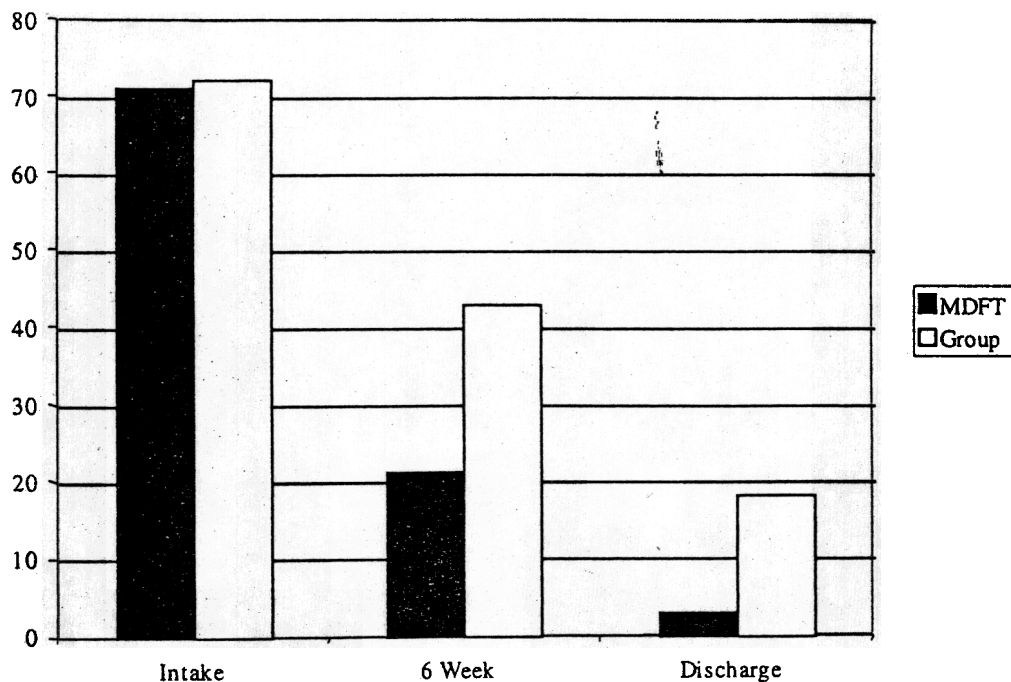
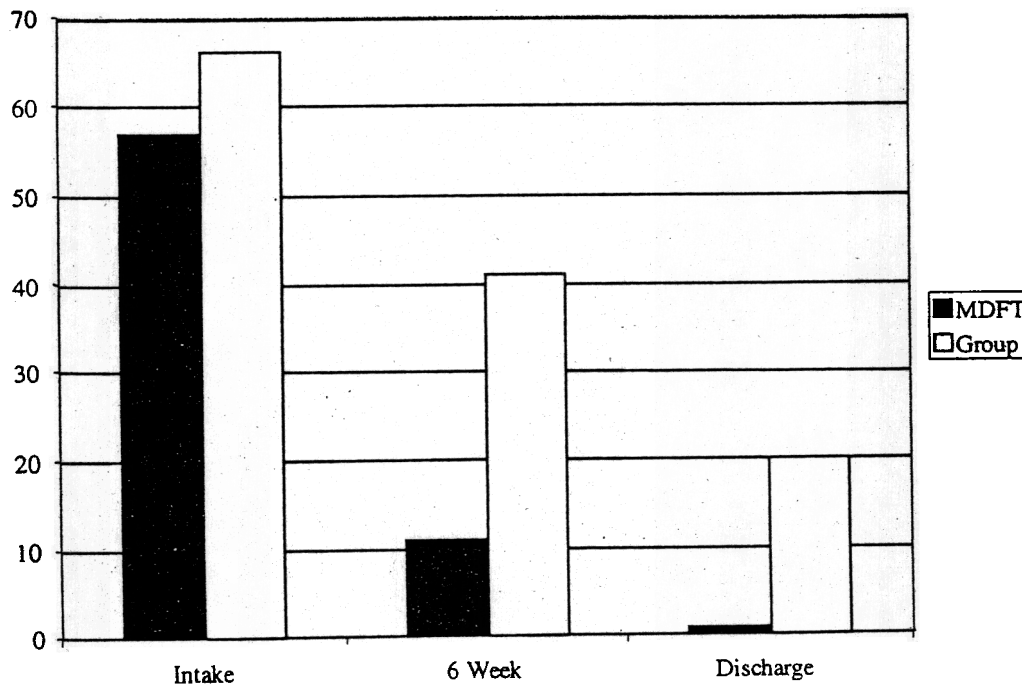


FIGURE 2
Percentage of Youth Reporting Weekly or More Frequent Marijuana Use



Delinquent Behavior

Self-reported delinquency was modeled as a three-category CGC model, with categories representing no delinquency, between one and five delinquent acts, and more than five delinquent acts in the past 30 days. The analysis of treatment effects on delinquent behavior in this early adolescent sample revealed a nonsignificant trend favoring MDFT (see Table 2). While 66% of youth receiving MDFT reported having committed a delinquent act in the previous 30 days at intake, 7% reported committing a delinquent act in the previous 30 days at discharge, representing a 59% decrease. In contrast, 72% of youth receiving group treatment reported committing a delinquent act in the previous 30 days at intake, and 22% reported committing a delinquent act in the previous 30 days at discharge, a 50% decrease.

DISCUSSION

The results of this randomized controlled trial with an early adolescent clinically-referred sample add to an accumulating body of evidence supporting the effectiveness of Multidimensional Family Therapy (MDFT) in the prevention and treatment of adolescent drug abuse (Dennis et al. In press; Hogue et al. 2002; Liddle 2002b; Liddle & Dakof 2002; Liddle et al. 2002, 2001). This study was the first to demonstrate MDFT's potential as a relatively brief early intervention approach for young adolescents who were referred for substance abuse and related problems. Family-based interventions such as MDFT target change in the very domains involved in the development and maintenance of adolescent problems (Hser et al. 2003; Conger & Ge 1999), not only in the individual but in family members, peer, and extrafamilial social systems. There is evidence suggesting that some of the prime target areas in family-based treatments such as Multisystemic Therapy (e.g., family cohesion, family functioning, and parent monitoring; see Huey et al. 2000), and MDFT (e.g., family conflict [Diamond & Liddle 1999, 1996], parenting practices [Schmidt, Liddle & Dakof 1996], adolescent engagement [Jackson-Gilfort et al. 2000; Diamond et al. 1999], and teen-therapist and parent-therapist therapeutic alliance [Robbins et al. Under review]) do indeed undergo change in the course of treatment. Although far from conclusive, given the early stage of this research area, findings from process studies of this kind give credence to the putative mechanisms of action in family-based therapies.

In this study, MDFT was adapted to target risk factors across domains and to address the unique developmental issues associated with substance abuse during the early adolescent transition. As the results indicate, this version of MDFT for young adolescents outperformed a theory-driven, manual-guided peer group therapy model in reducing specific substance abuse-related problem behaviors and risk factors, and in promoting protective factors for substance

abuse. Clinically-referred early adolescents randomly assigned to MDFT improved more rapidly in four targeted domains: individual, family, peer, and school. MDFT-treated teens also reduced substance use to a significantly greater extent than peer-based group therapy youths and demonstrated a trend toward less delinquency.

These findings are consistent with previous research which has shown that MDFT reduces substance use, problems related to substance use, and delinquent behavior significantly more than comparison treatments, and enhances research-established protective factors such as family functioning, parenting practices, and school performance (Dennis et al. In press; Hogue et al. 2002; Liddle 2002b; Liddle et al. 2001). This study provides further support for MDFT not only as a treatment model for youth with established substance abuse and related problems, but also as an appropriate and promising intervention for indicated samples at high risk for worsening substance abuse and delinquency (CSAP 2003).

In this study, MDFT more effectively impacted individual risk for continued substance use and delinquency than peer group therapy as evidenced by a more rapid decrease over the course of treatment in MDFT-assigned youths' externalizing symptoms. A number of studies suggest that conduct problems in adolescence are among the most intractable to intervention and highly predictive of chronic antisocial behaviors into adulthood (Crowley et al. 1998; Myers, Stewart & Brown 1998). Externalizing disorders during childhood and early adolescence are strongly linked to escalation in substance use and greater severity of substance-related problems during adolescence (White et al. 2001). Thus the demonstration of MDFT's capability to reduce externalizing symptoms at the developmental phase of early adolescence not only reinforces this treatment's intervention potential, but also its prevention possibilities (also see Hogue et al. 2002).

Family cohesion, an important protective factor, and a known mechanism for producing desirable outcomes with substance abusing and delinquent teens (Huey et al. 2000), increased more rapidly over the course of MDFT therapy than during peer-group therapy. There is consistent evidence that protective factors within the family can help to insulate early adolescents from substance abuse; these factors include strong identification with parents (Brook et al. 1999), a responsive and involved parent-adolescent relationship (Eccles, Freemantle & Mason 1999), and effective and clear communication (Fletcher & Jefferies 1999). These results are consistent with research findings indicating that even among teens who have engaged in substance experimentation, improvements in parenting can alter the youth's negative trajectory and reduce substance use and problem behaviors (Schmidt, Liddle & Dakof 1996; Steinberg, Fletcher & Darling 1994).

Association with deviant peers—which consistently ranks among the most salient risk factors for acceleration

in substance use throughout adolescence (Stice, Myers & Brown 1998), is of particular relevance in early adolescence (Fergusson, Horwood & Swain-Campbell 2002; Lynskey et al. 2003), and is known to be a critical dimension of needed change in clinical work with teens (Huey et al. 2000)—was also more significantly impacted in MDFT than in peer-group therapy. This outcome is particularly important in light of the fact that the peer-based group therapy was specifically designed to reduce risk and promote protective factors in the peer relations developmental domain. According to group intervention models, the peer system is viewed as a safe outlet for expressing feelings, learning new social-cognitive processing and interpersonal skills and practicing these new skills and behaviors, and communicating more effectively; it is also seen as an important source of emotional support and personal validation. However, previous research has shown that at least with certain kinds of peer group therapy interventions, group interventions can have iatrogenic effects related to deviancy training within the antisocial peer context, particularly for early adolescents (Dishion, McCord & Poulin 1999). The findings presented here are consistent with studies linking improvements in the parent-child relationship (i.e., increased family cohesion) to less association with delinquent peers (e.g., Huey et al. 2000). Thus, consistent with theoretical and empirical models of family influence in early adolescence (e.g., Dishion, Reid & Patterson 1988), this study demonstrated that a family-based intervention that increased family cohesion, communication, and improved parenting skills more successfully reduced deviant peer association than a group therapy model that intervened directly in the peer system (i.e., in the form of peer group therapy) and did not attempt to include or intervene into the youth's family.

Risk factors in the school domain were also reduced to a greater extent in MDFT than in group therapy. As part of the treatment in the extrafamilial social system domain, MDFT therapists worked actively with parents to facilitate their support of behavioral changes related to their teen's school attendance, academic achievement, and positive school behavior. While both treatments impacted teens' academic difficulties equally, MDFT more effectively reduced the risk of conduct problems at school. Specifically, disruptive classroom behavior decreased more rapidly in MDFT than in group therapy. These results are consistent with previous research demonstrating the close relationship between family processes and school outcomes, which together account for 40% of the variance in delinquency among early adolescents (Vazsonyi & Flannery 1997). These findings are also consistent with and extend previous research indicating the favorable impact of MDFT on another important school-related variable, school grades (Liddle et al. 2001). The promotion of positive school behavior and academic success are among the most important factors in youths' long-term developmental outcomes (Greenberg et al. 2003).

Finally and most importantly, MDFT was more effective than peer group therapy in reducing teens' substance use. The significance of this finding can be understood in the context of what is now known about when and how substance abuse problems develop, as well as the deleterious developmental consequences of these problems if they progress through adolescence and into early adulthood. Research consistently demonstrates that the earlier youth begin to use and abuse substances, the more likely they are to progress to substance dependence (Grant, Stinson & Harford 2001) and the more intractable their problems and serious the consequences of substance misuse tend to be (Tarter et al. 1999; Duncan et al. 1997). In addition, a trend toward statistical significance was found for the greater impact of MDFT on delinquent behavior. Thus the success of MDFT in reducing substance use and delinquency as well as the range of risk factors described above evidences its significant promise as a means of altering early on the negative trajectory of adolescents with emerging substance abuse and delinquency.

This article presents the short-term effects of two interventions in altering the risk status of young adolescent substance abusers. Since six- and 12-month follow-up assessments on this sample of youth and families are still ongoing, the treatments' longer-term impact cannot yet be determined. Nonetheless, the immediate effects of MDFT in reducing risk and promoting protective factors across domains may forecast favorable long-term drug use and delinquency outcomes.

The authors are also encouraged by the results presented here because in previous controlled trials the benefits of MDFT actually *increased* following the completion of treatment, while the benefits of the comparison treatments studied (e.g., individual CBT [Liddle 2002b], or individual Motivational Enhancement Therapy [MET] plus group CBT [Dennis et al. In press]) did not. Thus, we are very encouraged about the effects of MDFT presented here over the course of this relatively brief, community-based outpatient therapy, which, as in previous studies, may be even more pronounced when long-term outcomes are examined.

It should be noted, given the controversy surrounding this topic in the field, that the group treatment in this study did produce some improvement in the teen's substance abuse. This is in accord with findings about the potential for group therapy in studies by Waldron and colleagues (2001) and Kaminer and colleagues (Kaminer, Burleson & Goldberg 2002; Kaminer et al. 1998). Thus, although deleterious outcomes for group interventions have been reported by Dishion and colleagues (Dishion et al. 1999, 1996), the effects of group interventions need to be examined and interpreted according to the nature of the group intervention that is being tested, as well as the study's sample characteristics (e.g., level of impairment, comorbidity status; see Waldron et al. 2001).

Certain limitations in the current study need to be acknowledged. First, the study relied on teens' self-reports of drug use. The case could be made that since many of these adolescents were involved with the courts, they might have been less than candid about their drug and antisocial activities. The parents' self-reports of their own family problems likewise must be interpreted with caution. At the same time, self reports remain a standard and accepted way of collecting treatment outcome data. The Time Line Follow Back (TLFB) Procedure in particular has shown more than adequate psychometric properties (Fals-Stewart et al. 2000), including convergent validity with other measures of adolescent drug and problem behavior (Waldron et al. 2001). A meta analytical review by Magura and Kang (1996) concluded that cannabis, perhaps due to its lesser degree of social stigma compared to other drugs, was less likely to be under-reported than other illicit drugs in adolescent and adult studies. This supports the validity of the self reports of drug use in the current study, where the sample was more involved with cannabis and alcohol than drugs such as cocaine or methamphetamine. Data also indicate that with similar populations of substance using teens, including the same ethnic minority groups represented in the present study, self report procedures constitute a valid assessment method (Kim & Hill 2003; Dembo et al. 2000; Fendrich & Xu 1994; Dembo et al. 1990). In addition, the conditions proven to maximize response accuracy (Del Boca & Noll 2000) were incorporated into the study's methodology. Data were collected by trained independent research staff in a safe and private environment, and teens were made aware that their responses constituted privileged information and would not be shared with school or juvenile justice authorities.

A second limitation concerns generalizability. Our sample was low-income and urban, and composed of primarily males from ethnic minorities. Thus, it is not known whether the results would generalize to adolescents with other demographic characteristics. As with any treatment outcome study, these results need to be replicated with other treatment populations. Finally, the results might be interpretable from a regression to the mean perspective, given that the authors did not include a no treatment or wait list treatment control condition. But longitudinal studies of similar adolescent populations suggest that the observed improvements are not likely to reflect spontaneous remission. Youth do not simply grow out of early stage drug, alcohol, and other problem behaviors of this sort. In fact, the evidence indicates the opposite. Without intervention, these problems continue to grow in scope and durability, and when developmental difficulties of this type continue to snowball and interact with and potentiate other, deeper and more lasting problem behaviors, their treatment becomes more difficult—hence the case for early and multiple systems-oriented intervention.

The study has several strengths that give confidence to the validity of the findings. The study used a randomized design, state of the science, intent to treat statistical analyses, and standardized assessments tapping different symptom and prosocial domains of functioning with different respondents. The tested treatments are frequently used, theory-based modalities. Both were equal in dose, delivered by community treatment providers and monitored carefully for adherence to their respective manual, designed specifically for early adolescents, and each treatment systematically addressed research-established risk behaviors.

In sum, the MDFT model as adapted for early intervention with young adolescents demonstrates significant promise in reducing substance abuse and delinquency and related problem behaviors, and promoting the growth of protective factors in key developmental arenas. These results support existing research demonstrating the impact of family-based models generally (Williams & Chang 2000; Stanton & Shadish 1997; Waldron 1997), treatments that address impairments in multiple domains of functioning (Grella In press; Randall et al. 1999), and MDFT specifically (Liddle & Hogue 2001) for substance-abusing and high-risk youth. This study, as well as previous MDFT outcome studies, included significant numbers of teens from ethnic minority groups. Given the call to develop treatments that will address the client groups that appear in public sector mental health and substance abuse settings, which very frequently includes Hispanic and African-American teens and families, the success of MDFT with these client groups should be considered an advantage and further evidence about the cultural sensitivity of the MDFT approach.

Family-based treatments such as MDFT, by design, are more comprehensive than some other existing treatments, and they conform to the empirically-based recommendations in the literature to construct and implement interventions with high-risk as well as drug-using youth that target known risk and protective factors (Grella In press). At the same time, although there is complexity and challenge involved in the transportation of science-based practices into real world clinical environments (Burke & Early 2003), there is evidence that empirically supported and research developed therapies such as MDFT can be adapted and transported with success to community treatment settings (Liddle et al. 2001). Taken together, the empirical evidence in support of family-based models for reducing substance abuse and delinquency and deterring the development of future problems is very strong. Policy makers—particularly those making decisions about the allocation and training of public sector clinicians delivering adolescent services—must decide on whether or not this body of work (Williams & Chang 2000; Stanton & Shadish 1997; Waldron 1997) can instigate the systems changes that will be needed to bring these effective treatments into nonresearch, community settings.

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