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Preliminary Support for Multidimensional Treatment Foster Care in Reducing Substance Use in Delinquent Boys

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Abstract

Although effective outpatient treatments have been identified for the well-documented negative outcomes associated with delinquency and substance use, effective treatments for youths in out-of-home care are rare. In this study, 12- and 18-month substance use outcomes were examined for a sample of 79 boys who were randomly assigned to Multidimensional Treatment Foster Care (experimental condition) or to group care (comparison condition). The boys in the experimental condition had lower levels of self-reported drug use at 12 months and lower levels of tobacco, marijuana, and other drug use at 18 months. Limitations and future directions are discussed.

Keywords

delinquency; substance use; treatment; adolescent

The co-occurrence of delinquency and substance use is prevalent in the juvenile justice system (Belenko & Dembo, 2003; Donovan & Jessor, 1985; Teplin et al., 2005), and the detrimental social, health, and mental health outcomes for youth with such co-occurring problems are well-documented: high risk of both problems escalating (i.e., chronic offending and drug dependence; Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Robins, 1966; Zoccolillo, 1993) and increased risk for a host of additional problems over time (e.g., incarceration and physical and mental health problems; Bardone et al., 1996; Lewis et al., 1991; Mullen, Martin, Anderson, Romans, & Herbison, 1996; Pajer, 1998; White, Loeber, Stouthamer-Loeber, & Farrington, 1999).

A host of risk factors associated with the etiology of delinquency and substance use have been identified, including poor parenting practices, parent criminality and psychopathology, delinquent peer associations, childhood maltreatment, and low IQ (Crosby, Leichliter, & Brackbill, 2000; DiClemente et al., 2001; Gelfand & Teti, 1990; Laub & Sampson, 1988; Loeber & Dishion, 1983; Romer et al., 1999; Smith, Sprengelmeyer, & Moore, 2004). Child and family factors independently contribute to the onset of problem behaviors (Benoit, Jansson, & Anderson, 2007; Jaffee et al., 2005; Leve & Chamberlain, 2004; Piquero, Brame, & Moffitt, 2005). Despite the identification of specific targets for prevention and intervention for youth with these co-occurring problems, effective comprehensive treatment programs are rare, the notable exceptions being Multisystemic Therapy (MST; Schoenwald & Henggeler, 2005), Brief Strategic Family Therapy (BSFT; Szapocznik et al., 1989), and Family Behavior Therapy (FBT; Donohue & Azrin, 2001).

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The efficacy of MST, a home-based intervention for treating a range of serious adolescent problems including delinquency and substance use, has been demonstrated in several randomized clinical trials, showing significantly lower rates of re-arrest (Henggeler, Sheidow, & Lee, 2007), alcohol and drug use (Henggeler, Melton, & Smith, 1992), and substance-related arrests for the MST participants compared to the participants in the treatment-as-usual conditions (Borduin et al., 1995). The efficacy of BSFT, an outpatient intervention developed for Latino youths and their families, has been demonstrated in several trials aimed at treating delinquency and substance use (e.g., Santisteban et al., 2003). The efficacy of FBT, an outpatient behavioral treatment aimed at reducing drug and alcohol use while treating common co-occurring problems (e.g., depression, family discord, and conduct problems), has been demonstrated in several randomized trials, showing significant reductions in drug and alcohol use and conduct problems in youth formally diagnosed with conduct disorder or oppositional defiant disorder (e.g., Azrin et al., 2001).

Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003), the focus of this paper, is a community-based intervention for adolescents with severe and chronic delinquency and their families. It was developed as an alternative to group home treatment or state training facilities for youths with severe and chronic delinquency who require out-of-home care. Although MTFC has demonstrated effectiveness in treating conduct and delinquency problems (reviewed below), the substance use outcomes have not yet been reported. Because of the similarity in key components for the treatment of conduct problems and substance use in adolescence (e.g., parental supervision and discipline and separation from deviant peers), effective interventions for treating conduct problems might also effectively reduce substance use. In this study, the substance use outcomes for adolescent boys in MTFC were examined.

Prior Research on MTFC

The MTFC model is based on almost 50 years of research on the development and treatment of antisocial behavior and delinquency. It is the only community-based placement for youths in out-of-home care that has been identified as an evidence-based intervention (Chamberlain, 1998; Elliott, 1998; U.S. Department of Health & Human Services, 2000). The two major aims of MTFC are as follows: (a) to create opportunities for youth to live successfully in their communities while providing them with intensive supervision, support, and skill-development and (b) to simultaneously prepare their biological parents (or other aftercare parents) to provide effective parenting to facilitate a positive reunification with the family.

The MTFC intervention team is comprised of MTFC parent(s), an MTFC program supervisor, a family therapist (for the biological, adoptive, or other aftercare family), an individual therapist (for the youth), a behavioral skills trainer, and a consulting psychiatrist. MTFC typically lasts 6 to 9 months and is focused on implementing an intensive, well-coordinated set of interventions that across multiple settings (e.g., home, school, peer group, and community) using multiple team members with the goal of coordinating and timing interventions to gradually increase youths' skill levels and decrease youths' problem behaviors across settings. Four key treatment elements are targeted during and after treatment: (a) providing a consistent reinforcing environment where the youths are mentored and encouraged to perform specific behaviors or tasks designed to increase their skill base, (b) providing daily structure with clear expectations and limits and well-specified consequences delivered in a teaching-oriented manner, (c) providing close youth supervision, and (d) avoiding deviant peer associations while providing support and assistance in establishing prosocial peer contacts. The MTFC model focuses specifically on the treatment of delinquency and does not include treatment protocols that are specific to substance use. A detailed description of the MTFC intervention can be found in Chamberlain (2003).

In randomized clinical trials, MTFC participants have been found to be associated with more positive short- and long-term delinquency outcomes, including significantly lower rates of posttreatment institutionalization, fewer days spent incarcerated, and lower rates of incarceration at 2 years posttreatment compared to group care participants (Chamberlain, 1990; Chamberlain, Leve, & DeGarmo, 2007). MTFC participants have also been found to be significantly less likely to commit violent offenses, even when pre-placement risk factors were considered (i.e., age at first arrest, age at placement, official and self-reported prior offenses, and time; Eddy, Bridges Whaley, & Chamberlain, 2004). In addition, the specific targets of treatment have been shown to mediate the MTFC treatment effects (Eddy & Chamberlain, 2000; Leve & Chamberlain, 2007). The potential of MTFC for treating delinquency and conduct problems within a variety of circumstances has been demonstrated in randomized clinical trials with youths from state mental hospitals (Chamberlain & Reid, 1991), with youths in the child welfare system (Chamberlain, Moreland, & Reid, 1992), and with girls in the juvenile justice system (Chamberlain et al., 2007; Leve & Chamberlain, 2007; Leve, Chamberlain, & Reid, 2005).

The MTFC model has received national attention as a cost-effective alternative to institutional and residential care. The results from a series of independent cost-benefit analyses from the Washington State Public Policy group (Aos, Phipps, Barnoski, & Leib, 1999) and from three randomized trials, have led the MTFC model to be selected as an evidence-based National Model Program (i.e., Blueprints; Elliott, 1998) by the Office of Juvenile Justice and Delinquency Prevention, and as a National Exemplary Safe, Disciplined, and Drug Free Schools model program. The MTFC model was also highlighted twice in a U.S. Surgeon's General report (U.S. Department of Health & Human Services, 2000) and was selected by the Center for Substance Abuse Prevention and the Office of Juvenile Justice and Delinquency Prevention as a Strengthening America's Families Exemplary I program (Chamberlain, 1998).

Although prior research with the MTFC model has examined delinquency outcomes for youths with a variety of emotional and behavioral problems, substance use has not been a specific treatment target or a measured treatment outcome. As a result, little is known about the effects of MTFC on substance use outcomes. In the current analyses, we examined substance use outcomes for adolescent boys in MTFC. Based on prior research on key MTFC components (Eddy & Chamberlain, 2000) and on the inverse relationship between adolescent substance use and parenting practices (e.g., improved supervision and lower levels of substance use; Vitaro, Brendgen, Ladouceur, & Tremblay, 2001), we hypothesized that the MTFC boys would show lower levels of substance use at 12 and 18 months posttreatment compared to the group care boys.

Method

Participants

The Participants included 12- to 17-year-old boys (N = 79) with serious and chronic delinquency problems who were referred to MTFC by the juvenile justice system between 1991 and 1995. The participants were referred to the study by the local county juvenile court screening committee after being mandated to out-of-home placement by the juvenile court judge. Eighty-five participants were randomly assigned to MTFC (n = 40) or group care (GC; n = 45). The parents of three boys assigned to each condition declined to give consent, resulting in a final sample of 79 boys (MTFC n = 37; GC n = 42).

The average age at baseline was 14.9 years (SD = 1.3), and the mean age of first criminal referral was 12.6 years (SD = 1.82). The participants had an average of 13.5 prior criminal referrals (SD = 8.7) and more than four felonies. They had spent an average of 76 days in

detention in the year prior to the study. The ethnic distribution of participants was 85% Caucasian (n = 67), 6% African American (n = 5), 3% Native American (n = 2), and 6% Latino (n = 5). At the time of the study, 92% of the boys in the region were Caucasian (U.S. Department of Commerce, 1992). Fifty-six percent of the participants came from single-parent households (n = 44), and 70% of the participants had at least one parent who had been convicted of a crime (n = 55). Seventy percent of the participants had at least one prior out-of-home placement.

Procedure

Following random assignment, the participants and their caretakers were assessed at baseline and at 12 and 18 months post-baseline using a multi-method, multi-agent assessment approach that consisted of a standardized interview and questionnaires for each youth and caretaker, an interview with the juvenile caseworker, and the collection of juvenile court records. The interviews lasted approximately 90 minutes, were aimed at measuring youth and family demographics and youth behaviors, and were conducted in person by assessors who were blind to each participant's intervention condition. The participants were informed of limits to confidentiality for specific types of reported information (e.g., suspected child abuse); outside of these limits, the participants' reported substance use was protected as confidential.

MTFC—The participants were placed singly with MTFC parents who were recruited, screened, trained, and supervised by an MTFC program supervisor. All MTFC parents completed a 20-hour pre-service training conducted by experienced MTFC foster parents and the MTFC program supervisor. The program supervisor provided the MTFC parents with ongoing support and supervision via weekly foster parent meetings and daily telephone contact. The training followed a social learning and behavioral model whereby the MTFC parents were taught to provide youth with frequent reinforcement and clear and consistent limits. All of the MTFC parents implemented daily behavior management systems that were tailored to meet the needs of each youth. The MTFC parents were trained and supervised to use this system to provide feedback to youth on their behavior for a variety of daily expectations (e.g., getting up on time). The youths earned points for positive behaviors and lost points for negative, undesirable, or maladaptive behaviors. The MTFC parents exchanged points for privileges that increased as the youths progressed through the program. Consequences for rule violations and minor behavior problems consisted of privilege removal or work chores. If substance use was suspected during treatment for an MTFC participant, a MTFC program staff member or probation officer conducted a urinalysis; if the urinalysis results were positive, the youth lost a privilege or was given a work chore. The daily point levels were reported to the MTFC program supervisor via a telephone interview using the Parent Daily Report Checklist (Chamberlain & Reid, 1987). Privilege removal and work chores were typically prescribed for short durations to teach and encourage the youths to recover from negative instances and quickly resume positive and adaptive behaviors. The participants were closely supervised and received consistent limit setting and contingency management and positive adult mentoring. Their families were provided with weekly family therapy based on the Parent Management Training treatment model (Bank, Patterson, & Reid, 1987) and on-call support focused on improving parenting skills. The family therapy began at baseline and continued into aftercare to help in the reunification process. Treatment integrity was monitored via the daily Parent Daily Report Checklist calls (data were collected on the implementation of the treatment components and on rates of youth problem behavior) and via the weekly training and supervision meetings conducted with the MTFC parents.

GC—GC consisted of 11 community-based group care programs located throughout Oregon State. The programs used shift staff, had 6 to 15 youths in residence, and employed a variety of theoretically based therapies, with positive peer culture (Vorrath & Brendtro, 1985) being used in 7 (66%) of the programs. The goal of positive peer culture is to improve behavior using

a group format focused on increasing conformity to prosocial norms; it relies on youth, and the group culture in general, to influence positive behavior change. The remaining 4 (33%) programs relied on other theoretically based therapies: reality, eclectic and behavior management, and cognitive. The GC participants were provided with group therapy (n = 32; 77%) and individual therapy (n = 28; 67%), their families were provided with family therapy (n = 23; 55%). Thirty-five (83%) of the GC participants attended schools located within their GC facilities. If substance use was suspected during treatment, the GC participants were subjected to urinalyses and any associated sanctions (e.g., parole/probation violation) by program staff and/or their parole/probation officer.

Measures

Substance use—Self-reported substance use data was collected for all participants at baseline and at 12 and 18 months postbaseline. At the baseline assessment, the participants reported on their substance use for the prior 6 months. At the 12- and 18-month assessments, they reported on their substance use since the previous assessment. Using these reporting timeframes prevented overlap between reported substance use. At each time point, the participants reported on their use of tobacco, alcohol, marijuana, and other drugs (i.e., cocaine, speed, LSD, heroin, mushrooms, PCP, morphine, and inhalants) according to a 5-point Likert scale: 1 (*never*) to 5 (*used 1 or more times per day*).

Analytical Approach

The analyses were aimed at examining treatment condition differences in posttreatment substance use at 12 and 18 months postbaseline. Treatment condition was examined as a predictor of posttreatment substance use. The impact of treatment condition (the independent variable) was examined on post-treatment substance use at 12 and 18 months (the dependent variables) following the baseline assessment. Regression models were calculated in SEM with full information maximum likelihood (FIML) estimation in Amos (Version 5.0; Arbuckle, 2003). The data examined met assumptions of normality and multicollinearity was examined and found not be problematic. FIML estimation permits missing data and uses all available information from observed data, including derived information about means and variances, to estimate missing portions of the covariance matrix. Compared to mean-impution, listwise, or pairwise models, FIML estimation provides more statistically reliable standard errors (Wothke, 2000), assuming that the data are missing at random (Schafer & Graham, 2002). The results of using Little's test of missingness for all data in the SEM models indicated that these data met the assumptions for missing completely at random.

Results

Descriptives

Baseline substance use—At the baseline assessment, 71 (90%) of the participants reported having used at least one substance: 62 (78%) reported having used tobacco, 54 (68%) reported having used marijuana, 57 (72%) reported having used alcohol, and 40 (51%) reported having used other drugs. Of the participants who reported having used tobacco, 50 (81%) indicated daily use. Of the participants who reported having used marijuana, 32 (41%) indicated daily or weekly use. Of the participants who reported have used alcohol, 21 (37%) indicated daily or weekly use. Of the participants who reported having used other drugs, 23 (57%) indicated at least occasional use. On average, the participants reported occasional use of substances at baseline (M = 2.73, SD = 1.01). The means and standard deviations for the substance use variables at each time point are presented in Table 1. There were no significant treatment condition differences on baseline levels of substance use[1].

Covariates

Age was included as a covariate based on prior research demonstrating that early offending behavior is predictive of chronic delinquency problems (Loeber & Farrington, 2000) and to control for age variation (range = 12.1–17.9 years).

Substance Use Outcomes

Treatment condition comparisons in substance use: 12 months postbaseline— In the first SEM model, the effect of treatment condition on substance use at 12 months postbaseline was specified. The results are shown in Figure 1 in the form of standardized path coefficients. As is shown in Figure 1, treatment condition had a significant effect on other drug use at 12 months postbaseline, with the MTFC participants having lower levels of other drug use compared to the GC participants ($\beta = -.26$, $p < .05$). The specified model fit the data, $\chi^2(2) = 1.45$, $p = .23$, comparative fit index = .994, and root mean square error of approximation = .07. The model explained 4% of the variance in 12-month tobacco use, 2% of the variance in 12-month marijuana use, 3% of the variance in 12-month alcohol use, and 7% of the variance in 12-month other drug use.

Treatment condition comparisons in substance use: 18 months postbaseline— In the second SEM model, the effect of treatment condition on substance use at 18 months postbaseline was specified. As is shown in Figure 2, treatment condition had a significant effect on tobacco use ($\beta = -.34$, $p < .01$), marijuana use ($\beta = -.31$, $p < .01$), and other drug use ($\beta = -.24$, $p < .05$) at 18 months postbaseline, with the MTFC participants having lower levels of use compared to the GC participants. The specified model fit the data, $\chi^2(2) = 1.43$, $p = .23$, comparative fit index = .992, and root mean square error of approximation = .07. The model explained 12% of the variance in 18-month tobacco use, 9% of the variance in 18-month marijuana use, 2% of the variance in 18-month alcohol use, and 6% of the variance in 18-month other drug use.

Discussion

In this study, we examined substance use outcomes for adolescent boys who were referred to out-of-home care for the treatment of chronic delinquency. Although they were referred based primarily on problems with chronic delinquent behavior, the study participants were found to have high rates of substance use; 90% reported having used at least one substance at baseline. These rates are in line with previous research (Elgar, Knight, Worrall, & Sherman, 2003) and underscore the interrelation between substance use and offending behavior.

MTFC was developed for the treatment of serious and chronic delinquency problems and has been identified as an evidence-based program in this regard. Although nearly all of the MTFC participants showed high levels of substance use, they neither received specific substance use treatment (e.g., substance use counseling) nor attended substance use support groups (e.g., Alcoholics Anonymous). Despite lacking a specific focus on substance use treatment, a significant effect was found for substance use from the MTFC intervention. There are several possibilities for these effects.

Prior research on the MTFC model has illuminated specific mediators for specific treatment components that are related to reduced delinquency rates (Eddy & Chamberlain, 2000). In particular, parenting practices such as supervision, monitoring, decreased association with delinquent peers, and a positive adult-youth relationship have been shown to mediate the

[1]Two alternate models were run to examine the contribution of baseline substance use as a covariate; the patterns of association in the alternate models were not substantively different than those reported here.

relationship between treatment condition and later arrests. Perhaps these same components play a key role in reducing rates of substance use (Reid, Patterson, & Snyder, 2002). Parents who use effective supervision and monitoring skills might have better information about the locations and peer associations of their children, giving them the opportunity to provide consequences for substance use behavior and reinforcements for prosocial behavior. According to prior research showing an inverse relationship between parental supervision and adolescent substance use (Dishion, Patterson, & Reid, 1988), parents who attempt to reduce associations with delinquent peers and who employ positive, predictable, and nonharsh forms of discipline develop better limit-setting skills and might better support the maintenance or improvement of treatment gains, such as those found in the current study. Because improved parenting practices is one of the key components of MTFC, the MTFC participants were likely to receive more effective supervision and monitoring and more consistent consequences for substance use, resulting in lower levels of substance use found during the posttreatment assessments. Although the urinalyses were conducted in both treatment conditions, their implementation was not measured as part of the study, resulting in questions about the exact nature of their influence on self-reported substance use across treatment conditions. For example, the urinalyses might have improved the accuracy of self-reports due to the increased likelihood that substances would be detected or might have resulted in lower rates of substance use for the participants who received the urinalyses. Although the exact influence of urinalysis on the accuracy of self-reported substance use for the participants is unknown, urinalysis should be considered a component of effective supervision and monitoring for youths with substance use problems.

Further, there were several key differences between treatment conditions in the current study that were likely to lead to better outcomes for the MTFC participants. The MTFC participants were placed one per home and attended public schools. In contrast, the GC participants were placed in settings where delinquent youths congregated together and where most attended on-site schools. Because MTFC reduced the chances for the participants to associate with delinquent peers, the MTFC participants were likely to receive less exposure and social reinforcement for substance use. In contrast, the GC participants might have had more opportunities to receive more exposed and social reinforcement for substance use (i.e., deviancy training; Dishion, McCord, & Poulin, 1999; Dodge, Dishion & Lansford, 2006).

Although the results of the current study do not explain how MTFC functions to reduce rates of substance use, the results provide important preliminary information on the treatment of substance use in delinquent youth populations. In particular, these findings suggest that the MTFC program is an effective component in the treatment of substance use problems among delinquent adolescents. The findings also highlight a strong positive association between delinquency and substance use and suggest that key treatment components for adolescent delinquency might also be important factors in the treatment of adolescent substance use. These findings have important implications for the treatment of co-occurring delinquency and substance use. In particular, treatment costs and client compliance demands might be reduced if effective delinquency treatment reduces associated problems with substance use even without specific substance use treatment.

Limitations and Future Directions

There are several limitations to the current study. First, the measures of substance use were self-reported, which has been found to be related to over- and under-reporting of substance use in adolescents (Rosay, Najaka, & Herz, 2007). Although efforts were taken to reduce the likelihood of inaccurate reporting of substance use (e.g., the participants were informed that their reports of substance use would be kept confidential), the study would be greatly strengthened by multi-method reporting of substance use (e.g., parent reports, saliva tests, and

urinalyses) and the use of standardized self-report measures (e.g., Timeline Followback Interview; see Donohue, Hill, Azrin, Cross, & Strada, 2007). Second, there was a lack of ethnic diversity in the sample. Although the sample was highly representative of the geographic area in which the research was conducted, the lack of diversity introduces potential concerns about generalizability. Patterns of substance use have been shown to differ across racial and ethnic groups (Howard, Balster, Cottler, Wu, & Vaughn, 2008), and the associations between substance use and delinquent behavior might vary as well. Additional research on MTFC with more diverse samples is needed to further explore the potential for this intervention.

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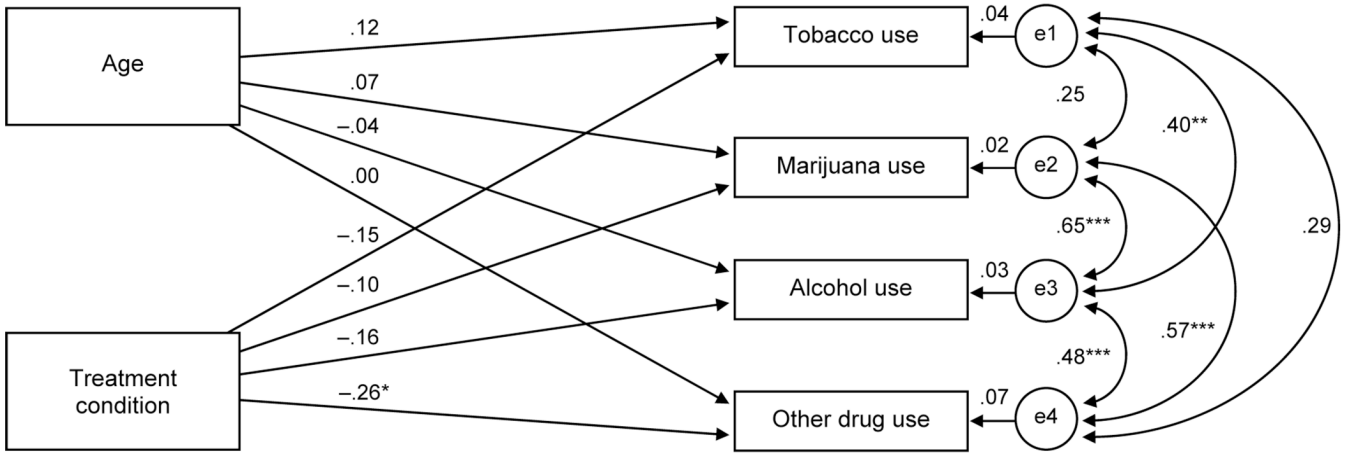

Figure 1.
Substance use outcomes: 12 months postbaseline.
*$p < .05$. **$p < .01$. ***$p < .001$.

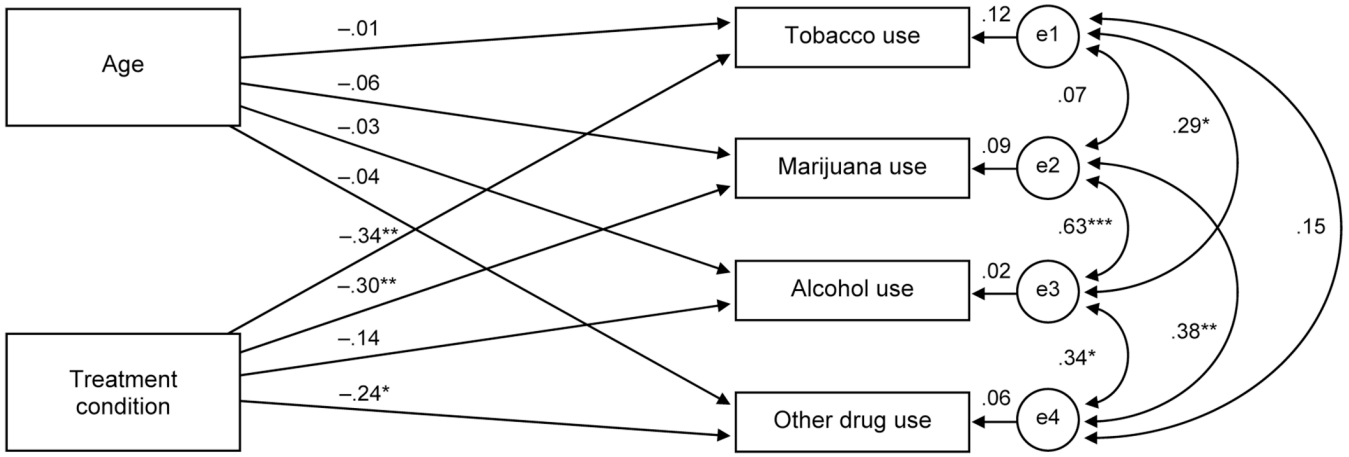

Figure 2.
Substance use outcomes: 18 months postbaseline.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 1

Means and Standard Deviations for Substance Use

	GC			MTFC		
Variable	***M***	***SD***	***N***	***M***	***SD***	***N***
Tobacco						
Baseline	3.98	1.60	42	3.86	1.71	36
12 months	3.79	1.69	39	3.30	1.81	37
18 months	3.87	1.66	38	2.72	1.89	32
Marijuana						
Baseline	2.64	1.45	42	2.46	1.33	37
12 months	1.90	1.27	39	1.57	1.07	37
18 months	2.34	1.48	38	1.50	1.02	32
Alcohol						
Baseline	2.74	1.19	42	2.41	1.21	37
12 months	1.95	1.12	39	1.57	0.99	37
18 months	2.05	1.16	38	1.69	1.03	32
Other Drugs						
Baseline	1.88	1.02	40	1.78	1.02	36
12 months	1.59	1.12	39	1.24	0.55	37
18 months	1.61	1.13	38	1.19	0.54	32

Note. MTFC = Multidimensional Treatment Foster Care. GC = group care.

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