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Change in Parent- and Child-Reported Internalizing and Externalizing Behaviors among Substance Abusing Runaways: The Effects of Family and Individual Treatments

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Abstract

Shelter-recruited adolescents are known to have high rates of substance abuse and co-occurring internalizing and externalizing problem behaviors. Many studies have documented these mental health concerns, but only a small number of studies have tested interventions that may be useful for ameliorating these vulnerabilities. The current study compared three empirically supported psychotherapy interventions, Motivational Interviewing (MI), the Community Reinforcement Approach (CRA), and Ecologically-Based Family Therapy (EBFT) with 179 substance abusing runaway adolescents (47% female, 74% minority) and their primary caretaker recruited through a Midwestern runaway crisis shelter. Examining both child and primary caretaker reports, each treatment was associated with significant reductions in internalizing and externalizing behaviors to 24 months post-baseline. However, the trajectory of change differed among the treatments. Adolescents receiving MI showed a quicker reduction in internalizing and externalizing behaviors but also a quicker increase in these behaviors compared to adolescents receiving EBFT, who continued to evidence improvements to 24 months. The findings provide support for continued evaluation of these treatments for use with this vulnerable population of adolescents.

Introduction

Research has converged on the conclusion that runaway and homeless adolescents report higher rates of internalizing (anxiety and mood) and externalizing problems (conduct disorder, substance use) than their non-homeless counterparts (Edidin, Ganim, Hunter, & Karnik, 2012). Even though most of these adolescents are in need of intervention, researchers have determined that among those adolescents seeking services at runaway shelters, only 22% access mental health services and 6% access substance abuse treatment services (Barber, Fonagy, Fulth, Simulinas, & Yates, 2005). Furthermore, while a significant number of studies describes the mental health status of runaway and homeless youth, only a small cadre of studies reports efforts to improve these youth's mental health (Slesnick, Dashora, Letcher, Erdem, & Serovich, 2009). The lack of research attention on interventions for this population results in little guidance for practitioners on the most effective intervention options. Highlighting the importance of intervention research, studies suggest that efforts to improve mental health in childhood can ameliorate continuing individual and social problems, such as homelessness, into adulthood (Haber & Toro, 2009; Shelton, Taylor, Bonner & van den Bree, 2009). To that end, this study compared the impact of three empirically-supported interventions for reducing internalizing and externalizing problems among substance abusing runaway adolescents. In this study, adolescents recruited from a

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short-term runaway shelter were the focus rather than street-recruited youth who tend to avoid crisis shelters and may require different intervention targets (Slesnick et al., 2009). However, many studies include both shelter- and street-recruited youth in their sample, therefore, below we refer to these youth generally as “runaway and homeless youth.”

Family Factors

Disruptive family relationships are the most commonly cited reason that adolescents leave home and/or reside in a runaway shelter (Edidin et al., 2012). Many runaway and homeless adolescents share a common history of parent-adolescent conflict and abuse, leading to increased internalizing and externalizing disorders, substance use and homelessness (Haber & Toro, 2009; Mallet, Rosenthal, & Keys, 2005). Rates of reported physical abuse range from 50 to 83% and rates of sexual abuse range from 17-39% (Edidin et al., 2012; Gwadz, Nish, Leonard, & Strauss, 2007). As family variables are clearly associated with adolescents' leaving home, family therapy may be uniquely positioned to address these family-level risk factors compared to non-family systems therapies. That is, the goal of family therapy is to address problematic family interaction patterns associated with behavioral problems among individual family members.

Internalizing and Externalizing Problems

Given high rates of trauma, physical and sexual abuse, family dysfunction, parental substance abuse, and school problems among runaway and homeless adolescents, it is not surprising that they also report significant psychological vulnerabilities (Edidin et al., 2012). Several studies document high rates of both internalizing and externalizing problems. In a sample of substance abusing shelter-recruited adolescents between the ages of 12 to 17 years in New Mexico, 60% met diagnostic criteria for a co-occurring substance use and mental health diagnosis, with conduct or oppositional defiant disorder (36%), major depression (18%) and anxiety disorders (32%) being the most commonly reported (Slesnick & Prestopnik, 2005). Cauce et al. (2000) assessed the mental health status of 364 runaway and homeless adolescents (ages 13-21) recruited from shelters and the streets and found that 53% met criteria for conduct disorder or oppositional defiant disorder, 21% for mood disorders, 21% for mania or hypomania and 12% for post-traumatic stress disorder. Other studies of both street and shelter recruited youth up to age 19 report that three-quarters of runaway and homeless youth meet life-time criteria for conduct disorder (Yoder, Whitbeck, & Hoyt, 2008; Yu, North, LaVesser, Osborne, & Spitznagel, 2008). Yoder, Longley, Whitbeck and Hoyt (2008) noted that internalizing and externalizing disorders could indicate suicidality, highlighting the importance of screening this high risk group of adolescents for intervention.

Substance Abuse and Comorbidity

Substance use rates indicate that substance use is the norm among these youth. Data from eleven agencies providing emergency shelter services to adolescents in Missouri, Iowa, Nebraska and Kansas indicated that 95% of adolescents reported the use of marijuana and 76% reported the use of alcohol (Pollio, Thompson, Tobias, Reid and Spitznagel, 2006; Thompson, Pollio, Constantine, Red, & Nebbitt, 2002). Similarly, Steele and O'Keefe (2001) noted that among youth aged 16-21 residing in the shelter Covenant House, 41% were positive on a drug panel measuring recent use of cocaine, amphetamines, opiates and marijuana. As internalizing and externalizing disorders are prevalent, so are comorbid diagnoses in which substance abuse or dependence co-occurs with another mental health diagnosis (Slesnick & Prestopnik, 2005). Comorbidity is associated with a greater number of social and health consequences including homelessness, death, high risk behaviors, victimization and violence (Dennison, 2011). Resolution of substance abuse and mental

health problems are more difficult when both are present and requires comprehensive treatments addressing both domains (Dennison, 2011).

Interventions

Intervention research with runaway and homeless adolescents is sparse, and the majority of the available intervention studies focus on HIV/STD outcomes (Slesnick et al., 2009). The literature also includes service evaluations of shelter outcomes (e.g., Pollio et al., 2006; Thompson et al., 2002) and substance abuse outcomes with street recruited youth (Baer, Garrett, Beadnell, Wells, & Peterson, 2007; Slesnick, Prestopnik, Meyers, & Glassman, 2007) and shelter recruited adolescents (Slesnick & Prestopnik, 2005, 2009). However, the focus of the current study was on mental health outcomes following substance abuse treatment with shelter recruited adolescents. Four intervention studies were identified that reported mental health outcomes with this population, all using the Youth Self-Report (Achenbach, 1991) (Cauce et al., 1994; Slesnick & Prestopnik, 2005, 2009; Slesnick, Prestopnik, Meyers, & Glassman, 2007). These studies showed significant reductions in internalizing and externalizing disorders using case management (Cauce et al., 1994), family systems therapy (Slesnick & Prestopnik, 2005, 2009), and individual therapy (Slesnick et al., 2007). However, the relative impact over the long-term (2 years) of individual and family treatments has not been tested.

Family reunification is a primary goal of runaway shelters, and shelter staff often include the family within their intervention plan, however, most intervention provided by shelter staff is individually-focused (Barber et al., 2005). Whether family systems therapy, compared to viable individual therapy models, is associated with better short and long-term outcomes for internalizing and externalizing problems among substance abusing runaways was of interest in the current study. That is, given that the family has been identified as critical in intervention efforts due to its influence on both risk and protection in adolescent well-being (Hawkins, Catalano, & Miller, 1992), family therapy may be associated with better long-term outcomes than alternative, non-family therapies. In particular, according to the family systems theoretical framework (e.g., von Bertalanffy, 1968), as family communication and interaction patterns improve, related symptoms among individual family members should remit. These family interaction changes are expected to be enduring through negative feedback loops, leading to improved individual functioning over time. Given the powerful contextual influence of the family on adolescent behavior and mental health, and as the Community Reinforcement Approach (CRA) and Motivational Interviewing (MI) do not target these risk and protective factors in treatment, at least to the extent of family systems therapy, we would expect that intervention at the individual level to dissipate more quickly over time.

Unlike EBFT, which theoretically impacts change through family interaction, CRA is a behavioral intervention that assumes change occurs by helping clients identify environmental reinforcers that compete with maladaptive activities (Meyers & Smith, 1995). It has shown positive outcomes across a range of populations including cannabis abusing adolescents (Dennis et al., 2004), alcohol dependent homeless adults (Smith, Meyers, & DeLaney, 1998), and substance abusing street living youth (Slesnick et al., 2007). MI is a brief intervention (2 sessions) that seeks to enhance one's intrinsic motivation to change. Several studies indicate that brief motivational interventions, even with individuals having severe substance abuse problems, do as well as standard, longer-term treatments (Becker & Curry, 2008). For example, a less intensive motivational intervention did as well as more intensive treatments for adolescent cannabis abusers (Dennis et al., 2004) and alcohol problem adults (Project MATCH Research Group, 1998).

Current Study

This study compared the impact of three empirically-supported treatments, brief Motivational Interviewing (MI; Miller & Rollnick, 2002), the Community Reinforcement Approach (CRA; Meyers & Smith, 1995) and Ecologically-Based Family Therapy (EBFT, Slesnick, 1997) on parent- and child-reported internalizing and externalizing behaviors among substance abusing runaway adolescents. Outcomes were measured longitudinally to two years post-baseline using the Youth Self-Report (YSR)/Child Behavior Checklist (CBCL) (Achenbach, 1991). The YSR/CBCL is widely used as an indicator of psychological problems in this and other populations, and is an efficient screening instrument, however, it is not a diagnostic tool (Morgan & Cauce, 1999). Even so, Morgan and Cauce (1999) found that high scores on the YSR subscales predicted DSM diagnoses of depression, mania, attention deficit disorder, conduct disorder, and posttraumatic stress disorder with high rates of specificity and sensitivity, lending support to this instrument as an easy to administer and useful clinical screening tool for mental health problems.

This study therefore tested the impact of these three substance abuse treatment interventions on internalizing and externalizing behaviors. The substance abuse findings are reported separately (Slesnick, Bartle-Haring, Erdem, & Brigham, 2012). The interventions' impact on other important problem domains has been less studied, especially among runaway adolescents, and this study extends that work. Two hypotheses were tested in the current study: (1) internalizing and externalizing problems would be reduced in all treatments, and (2) adolescents who received family therapy would maintain their reductions for a longer period of time compared to CRA and MI. Finally, we are not aware of prior intervention studies with runaway adolescents that have included an examination of parent reports of child behavior, and it is unclear how parents' perceptions of their child's behavior would change over time as a function of treatment condition. Therefore, parent, in addition to child, reports of child problem behaviors were included as dependent variables with the expectation that parents also would perceive greater improvements in their children over time in the family therapy condition compared to the other treatment interventions.

Jacobson et al. (1984) assert that an assessment of the impact of treatment should include whether participants improve enough to score within the "normal" range post-treatment. As research has indicated that internalizing and externalizing behaviors among runaway adolescents are significantly higher than their non-runaway counterparts, we compared the YSR and CBCL scores before and after treatment to the norms of the non-clinic ("nonreferred") and clinic sample ("referred") as provided by Achenbach and Rescorla (2001). Overall, the findings from this study can provide useful information regarding potentially effective treatment options for shelters and providers seeking to intervene with substance abusing runaways who also experience significant internalizing and externalizing problems.

Methods

Participants

Adolescent participants (N=179) were recruited from a short-term crisis shelter for runaway adolescents in a large Midwestern city between 2005 and 2007. Eligible adolescents were between 12 to 17 years old, had the legal option of returning home, had at least one parent/primary caretaker (PC) willing to participate to the study, and met DSM-IV (American Psychiatric Association (APA), 2000) criteria for alcohol or drug abuse or dependence. Participants were required to meet diagnostic criteria for substance use as the larger study focused on testing interventions for substance abusing adolescent runaways and their families. See Table 1 for a summary of demographic characteristics of adolescents and PCs.

On average, the adolescents in the current sample reported 3.21 (range 0-50) runaway episodes. Family problems, in particular “argument/angry with mom/dad,” were the most frequently reported reasons for running away. During the 30 days prior to the baseline assessment, adolescents reported an average of 16.70 nights in their own room or apartment, 8.39 nights with family members, 2.39 nights with friends, and 3.62 nights in a shelter. At the 3-month follow-up assessment, 100 adolescents (55.9%) reported that their *primary* living arrangement was with their parent(s) or guardian(s) in their house or apartment.

Procedure

A research assistant (RA) engaged adolescents at the runaway shelter within 24 hours of their stay and screened them to determine eligibility and interest. For example, all adolescents were asked if they had used alcohol or other drugs, including marijuana, in the last 90 days. If adolescents reported fewer than 5 days of use, they did not proceed to the formal eligibility screening. We sought to screen all adolescents residing at the shelter for eligibility and interest in the study. In total, 467 adolescents were approached. Of those, 113 were not interested or left the shelter before their parents/PCs could be contacted, and an additional 174 did not meet the screening or formal inclusion criteria. Once the adolescent's permission was obtained, RAs contacted the adolescent's parent or legal guardian. If the parent/PC agreed to participate and provided written consent, initial assessments for both parent and adolescent were scheduled within 24 hours when possible. During the initial assessment, written assent was obtained from the adolescent and the RA administered the Computerized Diagnostic Interview Schedule for Children (CDISC; Shaffer, 1992) to determine formal eligibility of the adolescent. This diagnostic interview is based on DSM IV-TR (APA, 2000) and was used to diagnose alcohol, tobacco, and other substance abuse and dependence. Adolescents not meeting eligibility criteria continued with treatment as usual through the runaway shelter. Among those who were eligible, urn randomization (in which the probability of treatment assignment changes based upon the balance of participants assigned to each treatment) with conditions balanced on age, gender and ethnicity, was used to assign adolescents to one of three treatments: (1) Motivational Interviewing (MI) ($n = 61$), (2) the Community Reinforcement Approach (CRA) ($n = 61$), or (3) Ecologically-Based Family Therapy (EBFT) ($n = 57$). All therapy sessions were conducted in the home or any location clients preferred to meet. The average length of stay for adolescents at the runaway shelter was 3.62 days. All therapy had to be completed by six months post-baseline. Adolescents and their parents/PCs were evaluated at 3, 6, 9, 12, 18 and 24-months after the baseline assessment. All assessments were conducted at the participant's home. For each assessment completed, including baseline and all follow-ups, adolescents received a \$40 gift card and parents/PCs received \$25 as compensation for their time. All procedures were approved by the Institutional Review Board of the Ohio State University.

Treatment Interventions

Three therapists provided EBFT, two provided CRA and three provided MI. As noted, each of these treatments were developed for substance abusing populations, but their impact on other important problem domains has been less studied. Each therapist was trained in the respective intervention by that intervention's clinical supervisor. Therapist training included manual review, didactic training and extensive role play over a period of two days, as well as weekly supervision with audiotape review with the intervention supervisor. Therapists (one male, seven female) included master's level independent counselors or social workers ($n = 4$) and graduate or post-doctoral students in couple and family therapy ($n = 4$). Two HIV prevention sessions, based upon Becoming a Responsible Teen (BART; St. Lawrence et al., 1995), were offered in each treatment condition.

MI (Miller & Rollnick, 2002) was offered in 2 sessions, and the therapist's tasks were to create a set of conditions focused on enhancing the client's intrinsic motivation for and commitment to change their alcohol and drug use. MI is based on the principles of expressing empathy, developing discrepancies between actual behavior and desired behavior, rolling with resistance, and supporting the client's self-efficacy (Miller & Rollnick, 2002).

The 12-session CRA (Meyers & Smith, 1995) integrates operant conditioning with skills training to teach adolescents new methods for addressing life problems without using alcohol or drugs. CRA helps the client identify reinforcers (social, personal, financial, etc.) in their environment and helps the client see that drug use is incompatible with their identified reinforcers. Therapists also teach communication, problem solving, social and life skills, including specific sessions on anger management and affect regulation, self-talk and self-guidance, relaxation and stress management, and assertiveness training.

The 12-session EBFT is a family systems intervention which also includes concepts from Bronfenbrenner's theory (1979). The EBFT therapist works with the adolescent, family, and others significant to the family to target specific dysfunctional interactions which correspond to the development and continuation of problem behaviors. In this treatment, problem behaviors such as running away or depression are considered symptoms of maladaptive family interaction patterns. Thus, the intervention focuses on improving social interactions, emotional connectedness and skills among all family members, which is expected to positively impact social interactions across systems and reduce problem behaviors among individual family members.

Assessments

All data for the current analysis were collected using interview and self-administered questionnaires. The entire assessment battery for this longitudinal study included questionnaires on multiple problem domains including substance use, internalizing and externalizing problems and family interaction behaviors. The current study focused only on the internalizing and externalizing behavioral outcomes. Adolescents and PCs completed a demographic questionnaire assessing age, gender, ethnicity, education, income and marital status.

The Youth Self-Report of the Child Behavior Checklist (YSR; Achenbach, 1991) provides a standardized format to quickly elicit reports of children's behavior across a wide range of problem areas. The 112-item scale assesses behaviors in children associated with delinquency, aggression, hyperactivity and schizoid behavior. The measure is highly reliable and effectively discriminates between children referred to clinics for problem behavior and nonclinic children. The YSR provides subscale scores for Internalizing (withdrawn, somatic complaints, anxious/depressed) and Externalizing (delinquent and aggressive) behaviors. The parent/PC was administered the Child Behavior Checklist (CBCL; Achenbach, 1991) in order to assess their perception of adolescent problem behaviors. In the current study, the subscale scores were calculated based on the YSR/CBCL manual, and the raw scores were used. The reliabilities of the CBCL Internalizing subscale ranged from 0.90 to 0.92 across the seven assessment points, while the reliabilities of CBCL Externalizing subscale ranged from 0.91 to 0.94. The reliabilities of YSR Internalizing ranged from 0.88 to 0.92, and those of YSR Externalizing subscale ranged from 0.88 to 0.90.

Analytic strategies

Descriptive analyses were run to check the distribution of internalizing and externalizing scores. If the assumption of normal distribution held, independent sample t-test and

ANOVA were used to examine the baseline demographic differences on internalizing and externalizing behaviors. The significant baseline demographic variables were used as covariates of the intercepts in the multilevel modeling analysis. In addition, in order to examine clinical significance, a series of one sample t-tests were used to compare the current sample means of both parent and adolescent reported internalizing and externalizing behaviors at baseline and at 24-months to the norms of clinically referred and nonreferred adolescents provided by Achenbach and Rescorla (2001). Moreover, a series of paired-sample t-tests were used to compare the differences between CBCL and YSR reports on internalizing and externalizing behaviors at baseline and 24-months.

Multilevel modeling was utilized in this study because the data are nested in structure, with repeated measures nested in individuals. First, a random coefficient model was tested against an empty model, also called the unconditional means model. The random coefficient model included the time-related predictors (intercept, linear and quadratic slopes) in Level-1 only. Because the current data has seven assessment points, and the descriptive analysis of internalizing and externalizing behaviors provided some evidence suggesting that the decrease of internalizing and/or externalizing decelerated to some degree or even relapsed at the end of the 2-year period, the random coefficient model was tested with both linear and quadratic slopes in order to account for the curvilinear change pattern. Based on the definition provided by Raudenbush, Brennan, and Barnett (1995), the linear slope is the average linear rate of change in the outcome variable between any two assessment points during the 2-year period, and the quadratic slope captures the rate of acceleration/deceleration of change. Baseline was used as the reference point and coded as 0; 3-, 6-, 9-, and 12-month follow-ups were coded as 1, 2, 3, and 4; 18- and 24-month follow-ups were coded as 6 and 8 in order to account for the different time intervals between the two follow-ups. The random effects in level-2 were set as free to vary. If the random coefficient model had a better fit than the unconditional means model, as reported by the chi-square test, the significance of the fixed and random effects of level-1 predictors were then checked. If any predictor had neither fixed nor random effect that was statistically significant, it was eliminated from the final random coefficient model. Once the random coefficient model was generated, the two dummy variables representing treatment conditions were entered as level-2 predictors for the Level-1 time effects (linear and quadratic slopes). Adolescents' demographic characteristics were also entered as predictors of the intercept in level-2. The chi-square test was used to compare the model fit of the conditional model versus the random coefficient model. Full maximum likelihood estimation was utilized for all multilevel modeling analyses using the HLM7 software program.

Results

Descriptive Analysis

Means and standard deviations of adolescents' internalizing and externalizing scores reported by adolescents themselves and their PCs across time and treatment groups are presented in Table 2. The only variable with skewness larger than 1 was PC-reported adolescent internalizing scores at the 18-month follow-up (skewness = 1.37). Therefore, the assumption of normal distribution was considered not violated for the following analyses. With a Bonferroni adjusted p ($p = 0.05/4 = 0.0125$), paired-sample t-tests showed that PCs tended to report significantly lower internalizing behaviors than adolescents at both baseline [$t(162) = -5.31, p < 0.001$] and the 24-month follow-up [$t(117) = -4.57, p < 0.001$]. In addition, PCs tended to report significantly higher externalizing behaviors than adolescents at baseline [$t(165) = 3.29, p < 0.0125$], but not at the 24-month follow-up [$t(117) = 0.414, p > 0.05$]. Demographic characteristics differentiating adolescents' and PCs' reports of internalizing and externalizing behaviors at baseline were examined. Female adolescents reported more internalizing [$t(171) = 2.19, p < 0.05$] and more externalizing behaviors

$t(162.65) = 4.07, p < 0.001$] than their male counterparts. However, PCs' report of adolescents' problem behaviors did not differ by adolescent gender. There was no difference between Anglo and minority groups in terms of adolescents' report of internalizing or externalizing behaviors. Anglo parents reported significantly higher levels of adolescent internalizing behaviors than minority parents [$t(171) = 2.50, p < 0.05$], but no difference in terms of externalizing behaviors. Correlation analyses showed that adolescent age was positively associated with their own report of baseline internalizing behaviors ($r = 0.16, p < 0.05$), and negatively associated with their own report of baseline externalizing behaviors ($r = -0.19, p < 0.05$). However, adolescent age was only marginally related to PCs' report of adolescent internalizing ($r = 0.14, p = 0.06$) and externalizing behaviors ($r = -0.13, p = 0.09$) at baseline. Therefore, adolescent gender and age were included as baseline covariates for the multilevel modeling analysis for YSR internalizing and externalizing scores, whereas adolescent ethnicity and age were included as the baseline covariates for CBCL internalizing scores. Finally, only adolescent age was used as the baseline predictor for CBCL externalizing scores.

Multilevel Modeling

Multilevel modeling was run for each outcome variable separately. The random-coefficient model fit the data significantly better than the unconditional means model for all outcome variables [see Table 4 and 5 for χ^2 statistics]. All four outcome variables had a negative linear slope as well as a positive quadratic slope. In other words, the pattern of change in adolescents' internalizing and externalizing behaviors over time, on average, showed a reduction in problem scores, but the speed of this reduction diminished over time. The random effects of both linear and quadratic slopes were significant for all outcome variables. That is, there was significant variance between individuals in their own trajectories.

In the second step, the Level-2 predictors were added into the random-coefficient models in order to explain the heterogeneity in change across individuals. The conditional models with all the Level-2 predictors were found to be a better fit to the data (see Tables 3 and 4 for the χ^2 statistics). For adolescent reported internalizing behaviors, gender was a significant covariate at baseline. On average, female adolescents (with the average age) reported a score of 24.76 on the YSR internalizing subscale at baseline, which was 5.27 points higher than male adolescents' average score. Those in the EBFT group showed a significant and negative linear slope [$\beta_{EBFT} = -1.78, t = -3.04, p < 0.01$]. There was no significant difference between those receiving CRA and those in the EBFT group in terms of their linear trend, however, those in the MI group showed a more negative linear slope than those in the EBFT group [$\beta_{MI} = -1.74, t = -2.18, p < 0.05$]. That is, adolescents receiving MI reported a quicker short-term reduction in internalizing behaviors than their counterparts in the EBFT group. In terms of the quadratic slope, those in EBFT showed a nonsignificant quadratic effect on average [$\beta_{EBFT} = 0.12, t = 1.74, p > 0.05$]. Those in CRA or MI showed a positive quadratic effect [$\beta_{CRA} = 0.14, t = 1.99, p < 0.05$; $\beta_{MI} = 0.33, t = 4.52, p < 0.01$]. In addition, the average quadratic effect among those in the MI group was significantly higher than that among those in the EBFT group, and the group difference between EBFT and CRA was not significant. Overall, by adolescent report, all three groups exhibited a significant reduction in internalizing behaviors. However, increases in internalizing behaviors were observed over time among the CRA and MI groups, whereas in EBFT, reductions continued. Univariate analysis was used to examine the group differences in adolescents' report of internalizing behaviors at the 24-month follow-up, with adolescent gender, age and ethnicity as covariates, and treatment group as the independent variable. Results showed that at the end of the 2-year span, there was no significant group difference in internalizing behaviors by adolescents' reports [$F(2, 123) = 0.20, p > 0.05$].

For adolescent reported externalizing behaviors, both gender and age significantly predicted baseline scores. On average, female adolescents (with the average age) reported an externalizing score of 25.46 at baseline. Being male was associated with a 2.87 lower externalizing score on average [$\beta_{Gender} = -2.87, t = -2.43, p < 0.05$]. For each year older than the mean age, adolescents reported a lower externalizing score of 1.16 [$\beta_{Age} = -1.12, t = -2.38, p < 0.05$]. All three treatments exhibited a negative linear slope [$\beta_{EBFT} = -2.20, t = -4.30, p < 0.001$; $\beta_{CRA} = -2.76, t = -5.16, p < 0.001$; $\beta_{MI} = -2.78, t = -5.24, p < 0.001$], and a positive quadratic slope [$\beta_{EBFT} = 0.18, t = 3.00, p < 0.001$; $\beta_{CRA} = 0.26, t = 4.16, p < 0.001$; $\beta_{MI} = 0.21, t = 0.06, p < 0.001$]. There was no between-group difference in linear slopes, nor in quadratic slopes. Univariate analysis showed that there was no significant group difference in adolescents' report of externalizing behaviors at the 24-month follow-up [$F(2, 123) = 1.42, p > 0.05$]. Although all three treatment groups exhibited a similar pattern of reduction in problem behaviors during the short-term follow-ups, descriptive analyses provided some evidence suggesting different patterns of change during the long-term follow-ups. In particular, among those receiving EBFT, average externalizing scores remained relatively stable between 6- and 18-months, followed by a slight reduction in scores between 18 and 24-months. Among those receiving CRA, average externalizing scores exhibited a slight increase between 3- and 6-months, and another increase throughout the 2nd year. Among those receiving MI, average externalizing behaviors continued to decline until 18-months, and then increased slightly at 24-months.

For internalizing behaviors reported by the PCs, adolescents' ethnicity, but not age, appeared to significantly predict baseline scores. On average, PCs of Anglo adolescents (with the average age) reported a score of 19.64 on externalizing behaviors at baseline. PCs of minority adolescents reported a 4.51 lower externalizing score [$\beta_{Ethnicity} = -4.52, t = -3.35, p < 0.001$]. All three groups showed a negative linear slope [$\beta_{EBFT} = -1.21, t = -2.39, p < 0.05$; $\beta_{CRA} = -1.55, t = -2.91, p < 0.05$; $\beta_{MI} = -1.23, t = -2.38, p < 0.05$]. There were no group differences in terms of the linear effect. The quadratic effect was only significant among those in the CRA group [$\beta_{CRA} = 0.14, t = 2.13, p < 0.05$], but not among those in the EBFT and MI group, although the between-group difference was not significant. Taken together, PCs' report of adolescent internalizing behaviors was significantly reduced among all three treatment groups, but those receiving CRA exhibited an increase at the long-term follow-ups whereas those receiving EBFT and MI did not show an increase. Univariate analysis showed that there was a significant group difference in PCs' report of internalizing behaviors at the 24-month follow-up [$F(2, 115) = 3.37, p < 0.05$]. Post-hoc tests showed that those PCs in the EBFT group reported significantly lower internalizing behaviors than their counterparts in the CRA group [mean difference = -4.94, *S.E.* = 2.09, $p < 0.05$], while there was no significant difference between MI and the other two groups. Descriptive analyses provided further evidence regarding this pattern by showing that there was a 1.63 increase in CBCL internalizing scores in the CRA group between 9- and 12-months (Table 2).

Finally, for externalizing behaviors reported by the PCs, adolescent age was a significant predictor of baseline scores. PCs of adolescents with average ages reported a score of 27.88 on the externalizing scale. With each additional year in age, PCs' report of externalizing behaviors decreased by 1.33 [$\beta = -1.33, t = -2.18, p < 0.05$]. All three groups showed a negative linear slope [$\beta_{EBFT} = -2.18, t = -2.99, p < 0.01$; $\beta_{CRA} = -2.31, t = -3.03, p < 0.01$; $\beta_{MI} = -3.09, t = -4.17, p < 0.001$], though the between-group difference was not significant. Significant quadratic effects were found among those receiving CRA [$\beta = 0.18, t = 2.05, p < 0.05$] and those receiving MI [$\beta = 0.22, t = 2.60, p < 0.01$], but not among those receiving EBFT. Therefore, among those receiving EBFT, the reduction in externalizing behaviors as reported by PCs continued throughout the 2-year span. However, the between-group difference was again not significant. Taken together, according to the PCs' report, adolescents' externalizing behaviors were significantly reduced during the short-term

follow-ups across all three groups. Univariate analysis showed that there was a significant group difference in PCs' report of externalizing behaviors at the 24-month follow-up [$F(2, 115) = 4.11, p < 0.05$]. Post-hoc tests showed that those PCs in the CRA group reported significantly higher externalizing behaviors than those in the EBFT group [mean difference = 7.59, $S.E. = 2.72, p < 0.01$] and those in the MI group [mean difference = 6.26, $S.E. = 2.65, p < 0.05$]. After examining the descriptive information, the average CBCL externalizing scores increased by 2.11 between 9- and 12-months in the CRA group, whereas there was no obvious increase in the MI group. This finding suggests that the significant quadratic effect indicates a decelerated reduction in the average CBCL externalizing scores in CRA and MI.

Clinical Significance

While statistically significant declining slopes in internalizing and externalizing problems were observed, of interest was whether these changes were clinically meaningful as well. A series of one sample t-tests were used to compare the current sample means of internalizing and externalizing scores at baseline and the 24-month follow-up to the norms of clinically referred and nonreferred adolescents provided by Achenbach and Rescorla (2001) (see Table 5). Bonferroni adjustment for p values was used. The current sample means of internalizing and externalizing, as reported by both adolescents and PCs, were higher than the norms of the nonreferred and the referred sample at baseline (with the exception of PC-reported internalizing). At the 24-month follow-up, PC and adolescent scores were still higher than the nonreferred sample (with the exception of PCs' report of male adolescents' internalizing behaviors). However, scores improved at 24 months compared to the clinically referred sample. PCs' reports of internalizing and externalizing behaviors were statistically lower than the norms of the referred sample, whereas adolescents' reports were no longer statistically more severe than the norms of the referred sample. In sum, evidence of clinical improvement in these symptoms was observed.

Discussion

Several studies have assessed internalizing and externalizing problems among runaway youth, indicating that more runaway and homeless adolescents, compared to non-homeless adolescents, score in the clinical or borderline range (e.g., Cauce et al., 2000; Edidin et al., 2012; Yoder et al., 2008). This is of concern as high scores on the YSR reliably predict DSM diagnoses (Morgan & Cauce, 1999), and have been associated with a range of adverse outcomes including suicide (Yoder et al., 2008) and homelessness in adulthood (Craig & Hodson, 1998). However, very few studies have examined interventions with the goal to improve the mental health of these vulnerable adolescents. The current study addressed this gap in the literature and compared family and individual therapies for reducing internalizing and externalizing problems among substance abusing runaway adolescents.

Overall, the first study hypothesis was supported. The three treatments resulted in significant reductions in internalizing and externalizing problems over time. Although statistically significant changes were observed in internalizing and externalizing behaviors, of interest to providers is whether the observed changes are clinically significant. Jacobson et al. (1984) suggested that one measure of clinical significance is whether mental health improvements change from the clinical range to the non-clinical range. In this study, at baseline, parent- and adolescent-reported internalizing and externalizing scores were significantly higher than the norms for non-clinic (or "nonreferred") and clinic samples (with the exception of parent-reported internalizing). At the 24-month follow-up, adolescents remained outside the normal range on these problem behaviors, but were no longer significantly worse than the clinic sample. We consider the findings of this study to suggest that the adolescents were improved but not recovered (Jacobson & Truax, 1991). Although there may be room for improvement,

these three treatments appear to be promising interventions for this population. However, future research should seek to improve upon these findings by increasing the impact of the interventions on these mental health indicators. While targeted interventions may be more effective at changing the behavioral target for which it was developed (Horowitz & Garber, 2006), such interventions may be less practical than interventions that address multiple problem areas. That is, runaway adolescents are beset with multiple challenges that impact a range of life domains including family, peer, substance use, mental health, education, and health. Separate treatments for each domain are not practical, and integrated treatments should be considered. The findings of this study suggest that these three treatments may be promising choices for professionals seeking to intervene in the multiple life areas of runaway adolescents and their families.

The second hypothesis, that runaway adolescents assigned to EBFT would maintain their reductions in internalizing and externalizing problems longer than those assigned to MI and CRA, received partial support. In EBFT, parents reported no increase in internalizing and externalizing behaviors in their children, and adolescents reported no increase in internalizing problems. On average, in EBFT, parent- and child-reported problem behavior scores continued to decline over two years, although the differences in internalizing and externalizing at two years were not significantly different among the three treatments. In other words, overall, the study suggests that the three treatments were not different from each other at reducing internalizing and externalizing behaviors during short-term follow-ups, though some differences were observed in the patterns of change during the long-term follow-up. The lack of observed increase in internalizing and externalizing behaviors in EBFT may be because EBFT targets family interaction patterns shown to be associated strongly with internalizing and externalizing behaviors. That is, family systems therapy seeks to improve family communication, reduce conflict and increase family support and cohesion. These intervention targets within the family have long been, and consistently, associated with childhood depression, anxiety, substance use and conduct problems (e.g., Hawkins et al., 1992), as well as with YSR internalizing and externalizing behavior among runaway and homeless youth specifically (Dadds, Braddock, Cuers, Elliott, & Kelly, 1993; Ryan, Kilmer, Cauce, Watanabe, & Hoyt, 2000). Therefore, the current findings support the family systems theoretical framework (e.g., von Bertalanffy, 1968), with reductions in individual problem behaviors enduring longer in family therapy compared to the individual therapies, possibly due to the continuing and reciprocal reinforcement of the new behaviors among family members.

Parent and child reports of change in internalizing and externalizing were generally similar to one another, but with higher overall parent-reported externalizing problems and lower parent-reported internalizing problems. In general, research shows greater agreement for externalizing behavior, and less agreement on internalizing behaviors (Youngstrom et al., 2000). Presumably, this is because externalizing (but not internalizing) behaviors can be observed. However, in this study, parents reported higher externalizing behaviors than their children reported, which might be due to the population under study. Compared to other populations, adolescents might under-report their externalizing problems given sensitivity to judgment for their behaviors, or parents may over-report problems given the high levels of family stress. Regardless of the discrepancy or similarity in perceptions, many have noted that one's construction of reality, and its similarity or difference with others' perceptions, can be a useful starting point for intervention, as discrepancy has been associated with family conflict (Ferdinand, van der Ende, & Verhulst, 2004). Discrepancy in perceptions of internalizing or externalizing may be a useful indicator of improved individual and family well-being following treatment as well. As communication improves, and problem behaviors decrease - perhaps as a function of treatment, parents may become better informed about their child's experiences because the child communicates and shares more with their

parent, and the parent is more involved with their child, thereby reducing discrepancy in perceptions.

The correspondence between parent and child reports of change over time across the three treatments provides good convergence with only a couple of exceptions. No differences in the quadratic trend were noted for adolescent-reported externalizing problem behaviors among the three treatments, even though parents in EBFT reported no such increase in externalizing behaviors. An examination of the 24-month means for externalizing behaviors reported by EBFT parents ($M = 14.48$), compared to adolescents ($M = 17.86$), also shows that parent report of externalizing problems was no longer significantly higher than adolescent report, as in the other treatments. As family therapy seeks to improve communication and problem solving among family members, future research will need to determine if this finding could be a function of improved family interaction. Another divergent finding was that parents in MI reported no increase in internalizing behaviors even though adolescents reported an increase. This discrepancy could reflect a positive bias among parents and simply reflect the lack of awareness of the child's internal experience. However, it should be noted that MI and EBFT parents also reported less overall internalizing problems among their children. Future research will need to tease out these findings to better understand the change process within each treatment. Possibly, observer report of behaviors, or a formal diagnostic assessment before and after treatment could help to clarify the discrepancies in perception.

Limitations

The study is limited by a sample of convenience. It is unknown whether families with runaway adolescents in different parts of the country with different cultural, racial, and socioeconomic influences would respond similarly to these interventions. Future research should consider conducting comparative effectiveness trials in multiple cities to assess potential differences in outcomes among the interventions by region. Also, adolescents and families who agreed to participate in this study may be more motivated for change than those who refused to participate. This sample included adolescents that met diagnostic criteria for substance use, which as noted earlier, is the norm rather than the exception for this population (Ginzler et al., 2007). Whether this inclusionary criteria greatly limits the generalizability of findings is unknown. For example, this sample may have significantly greater comorbid mental health problems than other samples of runaways. Also, this study required the participation of a parent or PC. Although the majority of shelter-recruited adolescents return home to a family situation (approximately 80% in the Columbus, OH shelter), family therapy may not be possible or ideal for a certain proportion of adolescents accessing the shelter. Therefore, family therapy may not be as widely applicable as individually-based therapies.

This study is also characterized by several strengths. Among the strengths include a randomized design, manualized and viable treatments, valid and reliable assessment instruments, multiple informants, and long-term follow-up that extended for two years post-baseline. With the rigorous statistical analyses and study design, the findings offer information on the treatment response of internalizing and externalizing behaviors for an understudied and high-risk population of adolescents for which little guidance on evidence-based intervention approaches is available.

Conclusions and Future Directions

Findings from the current study provide some support for the utility, and continued evaluation, of these three psychotherapeutic interventions for substance abusing runaways with mental health vulnerabilities as evidenced by high levels of internalizing and

externalizing problems. MI produced a faster rate of change compared to family systems therapy, but adolescents receiving family systems therapy continued to show reductions in mental health problems to 24 months while adolescents in MI and CRA showed some increase in internalizing and externalizing by 24 months. As these internalizing and externalizing problems were still significantly higher than the norms for the nonclinic sample, efforts to further improve the mental health status of these adolescents may be worthy of future investigation. For example, integrating specific procedures that target individualized internalizing and externalizing problems in future intervention efforts might result in additional mental health improvements. Overall, the current findings provide information and guidance regarding how to better serve and treat runaway adolescents. This study contributes to a very small body of literature showing that these vulnerable adolescents can be engaged into treatment efforts and that such efforts result in significant reductions in mental health vulnerabilities.

Acknowledgments

NS conceived of the study, participated in its design and coordination and drafted the manuscript; XG participated in the design and performed the statistical analysis and helped draft the manuscript; XF participated in the statistical analysis and helped draft the manuscript. All authors read and approved the final manuscript.

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Table 1

Demographic characteristics of the current sample

Variable	Frequency (Percentage)	Mean (SD)
Adolescent		
Age		15.35 (1.25)
Gender		
Male	94 (52.51%)	
Female	85 (47.49%)	
Ethnicity		
Anglo	46 (25.70%)	
Minority	133 (74.30%)	
Primary Caretaker		
Age		41.15 (8.38)
Gender		
Male	23 (12.85%)	
Female	156 (87.15%)	
Ethnicity		
Anglo	51 (28.49%)	
Minority	128 (71.51%)	
Relationship to the adolescent		
Father	21 (11.73%)	
Mother	137 (76.54%)	
Other	21 (11.73%)	
Education		
11 th grade and below	50 (27.93%)	
High school graduate	53 (29.61%)	
1 – 3 year full-time post-secondary	52 (29.05%)	
College graduate	16 (8.93%)	
Marital Status		
Single, never married	78 (43.58%)	
Legally married	57 (31.84%)	
Divorced	26 (14.53%)	
Widowed	5 (2.79%)	
Cohabiting with partner	6 (3.35%)	
Total Annual Income		
0 - \$5,000	19 (10.61%)	
\$5,001 - \$15,000	37 (20.67%)	
\$15,001 - \$30,000	44 (24.58%)	
\$30,001 - \$45,000	25 (13.97%)	
\$45,001 and above	19 (10.61%)	

Table 2
Means and Standard Deviations of the YSR and CBCL Internalizing and Externalizing scores over time.

	EBFT		CRA		MI	
	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)
<u>YSR Internalizing</u>						
Baseline	52	21.45 (10.28)	57	21.69 (10.22)	60	23.16 (13.90)
3-Month	49	21.25 (10.25)	45	18.15 (11.15)	45	19.94 (11.98)
6-Month	42	18.32 (11.63)	42	20.81 (13.95)	36	17.65 (10.21)
9-Month	47	17.79 (11.72)	40	16.98 (11.33)	39	14.77 (9.97)
12-Month	45	16.58 (11.20)	39	15.97 (10.80)	39	14.28 (9.93)
18-Month	45	15.93 (10.43)	41	14.63 (8.98)	41	14.32 (8.96)
24-Month	43	15.35 (8.62)	41	15.86 (8.65)	49	15.42 (10.20)
<u>YSR Externalizing</u>						
Baseline	53	25.55 (10.40)	60	26.13 (10.35)	60	23.13 (10.25)
3-Month	49	21.95 (10.05)	46	20.84 (10.40)	45	20.40 (9.44)
6-Month	42	18.99 (11.83)	42	21.17 (11.33)	37	18.42 (8.14)
9-Month	47	18.38 (10.78)	40	19.18 (10.35)	39	15.86 (9.85)
12-Month	46	18.46 (9.43)	39	16.74 (9.77)	39	14.72 (9.46)
18-Month	45	18.45 (10.74)	41	18.10 (9.80)	41	13.67 (7.35)
24-Month	43	17.86 (8.39)	41	19.63 (11.43)	49	14.78 (9.46)
<u>CBCL Internalizing</u>						
Baseline	58	15.35 (10.28)	57	17.23 (10.43)	58	16.67 (12.52)
3-Month	49	14.03 (9.15)	47	15.51 (10.40)	49	15.23 (10.63)
6-Month	42	12.54 (9.65)	43	15.59 (10.60)	45	13.89 (9.49)
9-Month	47	12.17 (10.14)	41	12.34 (8.63)	43	13.17 (11.18)
12-Month	49	11.80 (9.00)	42	13.97 (8.85)	41	13.87 (12.21)
18-Month	44	8.09 (7.06)	40	13.51 (10.11)	45	10.87 (9.21)
24-Month	41	8.28 (8.36)	38	13.21 (10.11)	46	10.46 (9.58)
<u>CBCL Externalizing</u>						
Baseline	58	28.09 (12.68)	56	31.59 (12.40)	58	26.44 (12.68)

	EBFT			CRA			MI		
	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n
3-Month	49	24.69 (13.72)	47	27.09 (12.15)	49	23.59 (13.05)			
6-Month	42	21.58 (14.67)	43	27.69 (13.55)	45	20.10 (12.07)			
9-Month	46	20.85 (13.36)	41	22.41 (13.72)	42	19.47 (14.50)			
12-Month	49	20.60 (12.85)	42	24.52 (12.80)	41	19.28 (14.20)			
18-Month	44	16.74 (12.02)	40	24.50 (13.29)	45	16.78 (12.73)			
24-Month	41	14.48 (10.16)	38	22.07 (13.56)	46	15.81 (11.90)			

Table 3
Results for the multilevel modeling analysis of YSR internalizing and externalizing behaviors over time

Fixed Effect	YSR Internalizing Scale				YSR Externalizing Scale			
	Unconditional Means Model		Random-coefficient Model		Unconditional Means Model		Random-coefficient Model	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	18.10	0.66	22.27	0.85	19.73	0.62	24.10	0.77
Gender								
Age								
Linear slope								
CRA								
MI								
Quadratic slope								
CRA								
MI								

Random Effect	Variance	Variance	Variance	Variance	Variance	Variance	Variance
Intercept	62.11	94.69	80.21	56.64	78.23	72.23	72.23
Linear slope		10.90	10.01		7.47	7.38	7.38
Quadratic slope		0.11	0.10		0.07	0.07	0.07
Level-1 residual	61.39	41.44	41.38	50.50	32.93	32.93	32.93
Estimated parameters	3	10	16	3	10	16	16
Deviance statistic	6572.65	6418.44	6392.73	6411.53	6241.34	6221.53	6221.53
χ^2 test		154.21	25.71		170.18	19.81	19.81

 $p < 0.001$

**
 $p < 0.01$

*
 $p < 0.05$

Table 4

Fixed Effect	CBCL Internalizing Scale						CBCL Externalizing Scale					
	Unconditional Means Model			Random-coefficient Model			Unconditional Means Model			Random-coefficient Model		
	Coefficient	SE		Coefficient	SE		Coefficient	SE		Coefficient	SE	
Intercept	13.56***	0.66		16.29***	0.79		19.64***	1.26		22.89***	0.81	
Age							0.83	0.47				
Ethnicity							-4.52***	1.35				
Linear slope							-1.21*	0.51				
CRA				-1.34***	0.33		-0.34	0.69		-2.53***	0.46	
MI							-0.02	0.68				
Quadratic slope				0.08***	0.04		0.04	0.06		0.16**	0.05	
CRA							0.10	0.09				
MI							0.02	0.09				

 $p < 0.001$

 $p < 0.01$

* $p < 0.05$

Table 5
Comparisons of the current sample means with the clinically referred and nonreferred population

	CBCL-YSR Manual		The current sample	t-test for nonreferred versus the current sample	t-test for referred versus the current sample
	Clinically referred adolescents				
	Nonreferred adolescents	Mean (SD)	Mean (SD)	Mean (SD)	
Baseline					
CBCL internalizing					
Male	6.1 (5.4)	14.5 (9.1)	15.33 (10.50)	8.02 *	0.73
Female	6.8 (5.7)	18.3 (10.5)	17.40 (11.58)	8.69 *	-0.73
CBCL externalizing					
Male	7.8 (7.3)	22.9 (13.0)	28.92 (12.41)	15.41 *	4.39 *
Female	7.0 (6.8)	20.8 (13.3)	28.45 (12.26)	15.63 *	5.57 *
YSR internalizing					
Male	8.4 (6.3)	14.2 (10.2)	18.42 (9.29)	9.58 *	4.03 *
Female	11.6 (7.9)	18.7 (10.5)	25.40 (12.52)	10.45 *	5.08 *
YSR externalizing					
Male	9.7 (6.6)	17.7 (9.7)	23.10 (9.64)	12.52 *	5.04 *
Female	9.9 (7.3)	16.5 (10.3)	26.51 (10.75)	14.83 *	8.93 *
24-Month FU					
CBCL internalizing					
Male	6.1 (5.4)	14.5 (9.1)	9.97 (9.18)	3.16	-3.69 *
Female	6.8 (5.7)	18.3 (10.5)	11.08 (9.79)	3.62 *	-6.13 *
CBCL externalizing					
Male	7.8 (7.3)	22.9 (13.0)	18.10 (12.29)	6.27 *	-2.92 *
Female	7.0 (6.8)	20.8 (13.3)	16.61 (12.26)	6.51 *	-2.84 *
YSR internalizing					

	CBCL-YSR Manual		The current sample		t-test for nonreferred versus the current sample		t-test for referred versus the current sample	
	Nonreferred adolescents		Clinically referred adolescents					
	Mean (SD)		Mean (SD)					
Male	8.4 (6.3)		14.2 (10.2)		13.14 (8.20)		4.41*	-0.98
Female	11.6 (7.9)		18.7 (10.5)		17.38 (9.51)		5.27*	-1.20
YSR externalizing								
Male	9.7 (6.6)		17.7 (9.7)		15.53 (8.77)		5.07*	-1.88
Female	9.9 (7.3)		16.5 (10.3)		18.61 (10.61)		7.11*	1.73

* Bonferroni adjusted $p < 0.05/32 = 0.0016$