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Two-Year Predictors of Runaway and Homeless Episodes Following Shelter Services among Substance Abusing Adolescents

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Abstract

Given high levels of health and psychological costs associated with the family disruption of homelessness, identifying predictors of runaway and homeless episodes is an important goal. The current study followed 179 substance abusing, shelter-recruited adolescents who participated in a randomized clinical trial. Predictors of runaway and homeless episodes were examined over a two year period. Results from the hierarchical linear modeling analysis showed that family cohesion and substance use, but not family conflict or depressive symptoms, delinquency, or school enrollment predicted future runaway and homeless episodes. Findings suggest that increasing family support, care and connection and reducing substance use are important targets of intervention efforts in preventing future runaway and homeless episodes amongst a high risk sample of adolescents.

Keywords

runaway shelter services; runaway and homeless adolescents; recidivism; substance abuse; family

In the U.S., approximately 1.7 million adolescents runaway each year, with an estimated 19.4% of adolescents experiencing a runaway/homeless episode by the time they are 18-years-old (Hammer, Finkelhor, & Sedlack, 2002; Pergamit, 2010). Furthermore, 51.2% of runaway adolescents report multiple runaway/homeless episodes (Pergamit, 2010). While some adolescents chose to leave home, others are forced or encouraged to leave home (Hammer et al., 2002). Runaway adolescents are exposed to several risks both prior to and after leaving home (Hammer et al., 2002). The majority of these adolescents report negative family environments, with high rates of family conflict and low rates of support and connection (Slesnick et al., 2009). While away from home, adolescents are exposed to further risks, with many adolescents reporting substance abuse and depressive symptoms (Greene, Ennett, & Ringwalt, 1997; Thompson, Pollio, Constantine, Reid, & Nebbit, 2002; Yates, MacKenzie, Pennbridge, & Cohen, 1988). In order to address the risks experienced by these adolescents, interventions have been developed to address both family and individual challenges.

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Crisis shelters are the primary intervention for runaway adolescents (Greene, Ringwalt, & Iachan, 1997). Since the majority of adolescents return home following their stay in a shelter, family therapy interventions have also been developed and recommended for these families (Slesnick & Prestopnik, 2005). Following participation in treatment, adolescents report improved outcomes, including reduced substance use and improved behavioral and emotional functioning (Barber et al., 2005; Slesnick & Prestopnik, 2005; Slesnick, Erdem, Bartle-Haring, & Brigham, in press). However, many of the positive effects of treatment fade over time and repeat runaway/homeless episodes are common (Baker et al., 2003; Pollio, et al. 2006). Among a study of shelter using youth, Baker and colleagues (2003) found 18% of first time runaways and 34% of repeat runaways returned to the shelter within a year following discharge. While previous studies have identified factors that predict an initial runaway episode, less is known about factors that predict repeat runaway and homeless episodes following participation in treatment. Since both individual and family factors predict initial runaway episodes, the current study sought to identify both individual and family factors that predict repeat runaway and homeless episodes across time following adolescents' stay in a runaway shelter and participation in treatment.

Family Factors Associated with Runaway/Homeless Episodes

As noted, runaway adolescents often come from dysfunctional family environments with many adolescents citing family problems as a contributing factor for them not to be living at home (National Runaway Switchboard 2008; Safyer, Thompson, Maccio, Zittel-Palamara, & Forehand, 2004). In addition to contributing to initial runaway episodes, family environment also might be associated with repeated runaway or homeless episodes. Baker and colleagues (2003) found that repeat runaway adolescents reported significantly higher levels of family conflict than first time runaway adolescents. In addition to the influence of negative family interactions, adolescent runaway/homeless episodes also appear to be influenced by the lack of positive family interactions. For example, adolescents who felt little security or trust with their parents were 30% more likely to run away multiple times in comparison to adolescents who had a trusting and secure relationship with their parents (Thompson & Pillai, 2006). In comparison to housed adolescents, runaway adolescents also report less family cohesion, less parental love, and lower levels of parental support (Wolfe, Toro, & McCaskill, 1999). Overall, family environment appears to play a critical role in influencing runaway behaviors, with both high levels of family conflict and low levels of family cohesion being associated with adolescents' runaway/homeless episodes.

Individual Factors Associated with Runaway/Homeless Episodes

Adolescent problem behaviors such as substance abuse, depression, school absenteeism and delinquency appear reciprocally related with runaway/homeless episodes (De Man, 2000; Hammer et al., 2002; Robertson and Toro, 1999; Thompson et al., 2002; Tyler & Bersani, 2008). For example one of the few longitudinal studies examining running away behaviors found that substance use, school disengagement, and depressive affect predicted runaway episodes at grade 10 or 11 (Tucker, Edelen, Ellickson, & Klien, 2011). Tyler and Bernsani (2008)) found delinquency and school suspension among housed youth during early adolescence (12–13) predicted frequency of runaway episodes during mid-adolescence (14–16). In addition to predicting future runaway episodes of housed youth, similar problem behaviors are also predictive of repeat runaway episodes among youth with a history of running away. Among youth utilizing a crisis shelter, youth who reported more school problems and alcohol were more likely to also report multiple runaway episodes (Baker et al., 2003; Thompson & Pillai, 2006). Furthermore, youth who reported more emotional problems were more likely to return to the crisis shelter within one year following their initial discharge (Baker et al., 2003). While youth problem behaviors are predictive of future

runaway episodes, some problem behaviors are also exacerbated by runaway behavior. For instance, previous research indicates that adolescent runaway/homeless episodes contribute to substance dependence and depression as a young adult (Tucker et al., 2011), highlighting the importance of preventive care.

Current Study

While several individual and family characteristics have been found to predict initial runaway/homeless episodes among runaway adolescents, little is known about the factors that predict runaway/homeless episodes across time following a shelter stay and treatment. Identifying predictors that continue to influence the frequency of runaway/homeless episodes across time is important for directing intervention strategies. Since treatments aim to improve both individual and family characteristics that predict runaway behavior, it is plausible that some of the predictors of runaway/homeless episodes, as identified in the literature, may change as a function of treatment. As we were interested in identifying individual and family predictors of future runaway/homeless episodes following intervention, treatment was used as a control variable in the analyses. In summary, the current study sought to identify individual and family characteristics that predict runaway/homeless episodes across a two year follow-up period following adolescent's shelter stay and participation in one of three treatment conditions for substance abuse. Individual (depressive symptoms, substance abuse, delinquency, and school enrollment) and family factors (family conflict and cohesion) were expected to predict future subsequent runaway/homeless episodes. These factors are commonly reported in the literature as predictors and correlates of runaway episodes. From a Social Ecological perspective (Bronfenbrenner, 1979), individuals are viewed as being nested within a network of interconnected systems that encompass individual, family, and extrafamilial factors. Microsystem interactions, or those that occur within specific settings, have the greatest impact on the life trajectories of individual participants because they are the most immediate, common and omnipresent, and were therefore the focus of this study.

Methods

Participants

Data used in the current study are from a clinical trial that evaluated the effectiveness of three different treatments among substance-abusing runaway adolescents and their families recruited from a large Midwestern city (Columbus, Ohio) ($N = 179$). As the original study was an examination of substance abuse treatment outcomes among runaway adolescents, in order to be eligible for the study, the adolescent had to be between the ages of 12 to 17 years, reside at a local runaway shelter, have the legal option of returning home, meet DSM-IV criteria for substance abuse or dependence, and have a primary caretaker willing to participate and complete the assessment interview. The mean age of adolescents was 15.35 ($SD = 1.25$). Approximately half of the adolescents were female ($n = 94$, 52.2%) and two-thirds of the adolescents were African American ($n = 117$, 65.4%). Due to attrition and missing data, analyses included a sample of $N = 156$ (details about missing data are included in "Analytic Strategies").

Procedure

Research assistants (RAs) approached adolescents admitted to the runaway shelter to determine eligibility for the study. Permission to contact the adolescent's PC was obtained from those adolescents who showed interest. The primary caretaker (PC) and/or legal guardian was contacted, and if he or she provided consent, assent was obtained from the adolescent. Of the 467 adolescents who were approached, 62.7% ($n = 293$) were eligible,

and 61.1% of those eligible ($n = 179$) were enrolled in the project. In general, adolescent assessments were conducted in private offices at the shelter while PC assessments were conducted in their home. As part of the larger study, participants were randomly assigned to one of the three home-based project interventions: Ecologically-Based Family Therapy (EBFT) ($n = 57$), the Community Reinforcement Approach (CRA) ($n = 61$) or Motivational Interviewing (MI) ($n = 61$). Participants who were randomly assigned to either EBFT or CRA were offered 12 therapy sessions and 2 HIV prevention sessions while participants assigned to MI were offered 2 therapy sessions and 2 HIV prevention sessions. The average number of treatment sessions attended was 6.8 among those assigned to EBFT ($SD = 5.5$), 5.3 for CRA ($SD = 4.6$) and 1.6 for MI ($SD = 1.6$).

Participants were tracked over a 2-year period with assessments conducted at baseline and 3, 6, 9, 12, 18 and 24 months post-baseline. The follow-up rate for adolescents at the 24-month post-baseline assessment was 74%. At baseline, adolescents received a \$40 gift card to a local retail store and at each follow-up assessment, adolescents received \$40 cash. All procedures were approved by The Ohio State University's Institutional Review Board. Participant's data were identified by numbers to protect anonymity, and all databases were password and fire-wall protected to prevent security breaches. Parents and adolescents were told that the information they provided was confidential, except when risk of harm to self or others was detected, and if child abuse was suspected.

Interventions

Details of the three treatment interventions are provided elsewhere (Slesnick et al., in press). Briefly, EBFT (Slesnick & Prostopnik, 2005, 2009) is a home-based family systems therapy that incorporates family systems theory by attempting to create more positive connections among members of the family through interrupting damaging negative feedback loops. The therapist targets specific interactions, which correspond to the damaging continuation of problematic behaviors. Three randomized trials have shown that EBFT is effective for reducing substance use and other problem behaviors among drug and alcohol abusing runaway adolescents and their families (Slesnick & Prostopnik, 2005, 2009; Slesnick et al., in press). CRA (Meyers & Smith, 1995) is an operant-based therapy that helps the client identify reinforcers in their environment and helps the client understand that drug and alcohol use is incompatible with the identified reinforcers. The therapist helps to uncover specific intrinsic and extrinsic reinforcers for each client with the goal to increase alternative reinforcing activities in the client's life, which compete with maladaptive behaviors. Finally, MI (Miller & Rollnick, 2002) is a brief motivational intervention that assumes that the responsibility and capability for change lie within the client, and need to be evoked (rather than created or installed). In MI, the therapist's task is to create a set of conditions that will enhance the client's own motivation for and commitment to change.

Three therapists provided EBFT, two provided CRA and three provided MI. 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) were master's level independent counselors or social workers ($n = 4$) and graduate or post-doctoral students in couple and family therapy ($n = 4$).

Measures

Participants completed a demographic questionnaire at baseline and the Homeless Experiences Form at each follow-up assessment. The dependent variable of the current study, whether they experienced a runaway episode or homelessness during the past three

months (0 as no, 1 as yes) was measured at 3, 6, 9, 12, 18 and 24 months after the baseline assessment. The same question was asked at baseline, but referred to youth's lifetime runaway episodes. Therefore, the baseline data was not comparable to the follow-up data, and was not used in the current study. Two questions in the Homeless Experiences Form were used to generate an estimate of 'recidivism' or the experience of running away and homelessness between the two assessment periods. One question asked, "How many times did you run away in the last 3 [or 6] months?" For those adolescents who reported that they ran away at least once, their experience of running away/homelessness was coded as 1. Because some adolescents couch surf, living temporarily with their friends, and do not consider themselves to be runaways or homeless, the reports from those who reported zero runaway episodes were further examined. In particular, examination of a question querying specific living situations was used to further classify youth into the 'recidivism' category. Adolescents were asked about the number of nights during the last 3 months that they spent in (1) a shelter or mission, (2) with friends in their home, (2) in an abandoned building, or (3) someplace else indoors, such as in a park or alley. If respondents reported one of the above experiences, they were coded as 1 (runaway/homeless), otherwise they were coded 0 (no runaway/homeless episodes). The number and percentage of participants who fell in each category at each follow-up assessment is shown in Table 1.

Other baseline characteristics used as independent variables included school enrollment (dummy coded with 0 as not enrolled, 1 as enrolled) and a baseline delinquency index which was created by three questions from the baseline demographic questionnaire. The three questions queried whether they had ever been kept in juvenile detention or jail, and whether they were involved with a gang. For those who answered "yes" to either one of these three questions, their baseline delinquency index was coded as 1; for those who answered "no" to all three questions, their baseline delinquency index was coded as 0. Treatment condition is represented by two dummy variables with EBFT as the reference group (CRA equals 1 if the adolescent received CRA, and MI equals 1 if the adolescent received MI). In this way the intercept of the time slope represents the time effect of the EBFT condition.

Depressive symptoms among adolescents were assessed by the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). BDI-II is composed of 21 items rated on a scale of 0 to 3. BDI-II total scores range from 0 to 63, with higher scores indicating higher levels of depressive symptoms. In the current study, coefficient alphas of the BDI-II ranged from 0.91 to 0.95.

The Family Environment Scale (Moos & Moos, 1986) was used to assess social and environmental characteristics of the families. For the current study, the Cohesion and Conflict subscales were used. There are nine true/false items on each subscale, with higher scores indicating higher levels of cohesion/conflict in the family. The reliability of the Cohesion subscale ranged from 0.63 to 0.75 across the six assessment points, while the reliabilities of the Conflict subscale ranged from 0.62 to 0.71.

Frequency of substance use of the adolescents was measured by the Form-90. The Form-90 (Miller, 1996) is an interviewer administered, semi-structured instrument which combines the timeline follow-back method (Sobell & Sobell, 1992) and grid averaging (Miller & Marlatt, 1984). The measure documents the quantity of alcohol consumed. It has shown excellent test-retest reliability for indices of drug and alcohol use in major categories (Tonigan, Miller, & Brown, 1997) and convergent validity among a sample of runaway/homeless adolescents (Slesnick & Tonigan, 2004). This measure was administered at both baseline and follow-up assessments. The current study used the percent days of any drug and alcohol except tobacco during the previous 90 days across all follow-up assessments as a time-varying covariate.

Analytic Strategies

The current study utilized all follow-up data in the original project, therefore the 3-month follow-up assessment was considered the “baseline” or “starting point” of the current study. The dependent variable in the current study was a dichotomous variable representing whether or not the participant had a runaway or homeless episode in the previous 3 months. Therefore, in the preliminary analyses, those who reported having a runaway or homeless episode and those who did not at the 3-month follow-up were compared in order to identify factors related to the baseline level of the dependent variable. Independent samples t-tests were used to compare the levels of all time-varying variables at the 3-month follow-up, including depressive symptoms, family cohesion and conflict, and frequency of substance use, between adolescents who reported a runaway or homeless episode at the 3-month follow-up and those who did not. Chi-square tests were used to examine the differences in the distribution of school enrollment and delinquency at baseline between the group who experienced a runaway/homeless episode at 3-month follow-up and the group who did not. In addition, the differences between the two groups in demographic variables, including gender, age and ethnicity were examined. If any significant difference among the demographic variables was observed, the corresponding variable was controlled as a covariate of the intercept in the hierarchical linear modeling analysis, as described below.

The main research question of the current study was to examine the predictors of experiencing a runaway or homeless episode following treatment completion. A two-level Bernoulli Generalized Hierarchical Linear Model (HGLM) was used for the primary analysis since the outcome variable of the current study, having a runaway or homeless episode, was dichotomous and was measured at multiple times. In other words, the current data was nested in nature, with repeated measures nested within individuals. One advantage of using HGLM analysis is that HGLM can use all data, even with attrition, as long as there are at least two data points per case (Raudenbush, Bryk, & Congdon, 2009). Therefore, HGLM is preferred given that there were many participants with at least one missing data point during the follow-ups.

Bernoulli HGLM models binary outcome variables (0, 1) using log-odds transformation. Therefore, the beta-coefficients generated using Bernoulli HGLM are the log-odds of the “success” (1 as outcomes), which refers to experiencing runaway and homelessness in the current study. The beta-coefficients must be exponentiated to odds-ratios in order to provide a meaningful interpretation. In the current study, the odds-ratio of experiencing a runaway or homeless episode is defined as the ratio of the odds of experiencing a runaway or homeless episode (coded as 1) to the odds of experiencing no runaway or homeless episode (coded as 0). First, an unconditional model was estimated with the time effect as the only predictor (Model 1) to explore whether the odds-ratios of experiencing a runaway or homeless episode changed over time. The unconditional model was compared to an empty model without the time effect as a Level-1 predictor. If there was neither a significant fixed nor random effect of time, the time effect was removed, and the empty model was used for model building in the next step. In the second step, a conditional model (Model 2) was estimated. All time-varying variables were entered into Level 1 and were group centered, including FES cohesion and conflict, BDI and frequency of substance use. Model comparison was made between Model 2 and Model 1 if the time effect was retained in Model 2 or between Model 2 and an empty model without any variables if the time effect was not retained. If Model 2 fit the data better, then in the next step, Model 3 would be built by adding potential Level 2 predictors of the intercept and the slopes of the Level-1 predictors. That is, age, gender, ethnicity, treatment condition, school enrollment and delinquency were entered as potential predictors of the slopes of the Level-1 predictors at Level-2 using the “exploratory analysis” function of HLM7. In this step, the moderating role of constant variables, including age, gender, ethnicity, treatment condition, school enrollment and delinquency at baseline, were

probed on the effects of time-varying Level-1 predictors. Variables with a t-value larger than 1.96 or smaller than -1.96 were considered potential significant predictors and included in the subsequent model testing. All slopes and the intercept were allowed to vary in this step. If any variable in the model was identified as a potential Level-2 predictor, the fit of Model 3 would be compared to that of Model 2. The one that provided a better fit, or the one that provided a similar fit but with more parsimony, would be kept as the final model. The unconditional Level-2 model was of the following form:

$$\text{Prob}(\text{HOMELESS}_{ii}=1|\pi_i)=\phi_{ii}$$

$$\log[\phi_{ii}/(1-\phi_{ii})]=\eta_{ii}$$

$$\eta_{ii}=\pi_{0i}+\pi_{1i}*(\text{TIME}_{ii})+\pi_{2i}*(\text{BDI}_{ii})+\pi_{3i}*(\text{COHESION}_{ii})+\pi_{4i}*(\text{CONFLICT}_{ii})+\pi_{5i}*(\text{DRUG}_{ii})$$

Level-1
Model

$$\pi_{0i}=\beta_{00}+r_{0i} \quad \pi_{5i}=\beta_{50}+r_{5i} \quad \text{Level-2 Model}$$

In the Level-1 model, ϕ_{ii} represents the intercept, or the average of the dependent variable at baseline. The parameter estimates $\beta_{00} \dots \beta_{50}$ represents the slopes, or the effects of time-varying predictors on the dependent variable. In other words, $\beta_{00} \dots \beta_{50}$ represents the effects of changes in depressive symptoms, family cohesion and conflict, and substance use on changes in runaway or homeless episodes over time. In the Level-2 model, β_{00} represents the estimate of population averages for the dependent variable at baseline. The parameter estimates $\beta_{10} \dots \beta_{50}$ represent the intercepts of the slopes, or the estimated average effects of time-varying Level-1 predictors in the sample. The analysis was done with HLM7 software (Raudenbush, Bryk, and Congdon, 2011). Only the results of the final model are presented in the current paper. The whole process of model fitting and comparison is available from the first author upon request.

Missing data analysis

Because HGLM analysis can use all usable data with at least two data points per case, missing data analysis was conducted to compare the differences among baseline characteristics among those with at least two data points and those with only one or no data points. Among the sample of 179 adolescents, 23 had only one or no data points from the 3-month to 24-month follow-ups and were not included in the HGLM analysis. Therefore, the sample size for Bernoulli HGLM was 156. Independent-sample t-tests showed that those adolescents who were not included in HGLM and those who were included did not differ significantly in terms of their age, BDI scores, FES cohesion and conflict, frequency of substance use, or number of runaway episodes at baseline (all p 's > 0.05). Chi-square tests showed that the distribution of the number of adolescents who were included in the HGLM analysis and of those who were not did not differ based on gender, ethnicity or treatment condition (all p 's > 0.05). Little's MCAR test was conducted using SPSS version 19 (2010) with BDI, FES cohesion and conflict, frequency of substance use and runaway and homeless episodes from the 3- to 24-month follow-up. The nonsignificant result [$\chi^2(894) = 951.11$, $p > 0.05$] suggests that the current data were missing completely at random.

Results

Descriptive Analysis

At baseline, 18 adolescents (10.05%) reported no prior runaway or homeless episode. Also, 147 adolescents (82.12%) were enrolled in school, 24 adolescents (13.41%) were not, and the other 8 adolescents (4.47%) had missing values on this question. Among the total sample, 43 adolescents (24.02%) reported that they had stayed in juvenile detention, 28

(15.64%) reported that they had been to jail, and 22 (12.29%) adolescents reported involvement with a gang. In total, 57 adolescents (31.84%) were involved in delinquent behaviors. Based upon completed follow-up assessments, 54 (30.16%) adolescents reported no additional runaway/homeless episodes at any follow-up point. Ten adolescents did not complete any follow-up assessment, and the remaining adolescents ($n = 115$, 64.25%) reported at least one runaway/homeless episode from 3 to 24 months. The number of adolescents with/without a runaway or homeless episode at each assessment point is presented in Table 1.

Compared to those without a runaway/homeless episode, independent-samples t -tests showed that at the 3-month follow-up, adolescents who had a runaway/homeless episode had significantly higher levels of depressive symptoms [$t(138) = -2.47$, $p < 0.05$] and family conflict [$t(135) = -2.16$, $p < 0.05$], and tended to report lower family cohesion [$t(134) = 1.73$, $p = 0.086$]. There was no significant difference between the two groups in terms of age or frequency of substance use. Chi-square tests did not show significant differences between those with and without a runaway or homeless episode at the 3-month follow-up in terms of the distribution of gender, ethnicity, school enrollment, and delinquency (all $ps > 0.05$). Chi-square tests did not show a significantly different distribution among the three treatment groups on runaway and homeless episodes at the 3-month follow-up [$\chi^2(2) = 1.68$, $p > 0.05$].

Bernoulli HGLM

A series of Bernoulli HGLM analyses were conducted to examine the effects of time-varying variables, including time, family cohesion and conflict, depressive symptoms, and frequency of substance use in predicting changes in running away and homelessness. In order to test whether there was significant variance in the outcome variable, and whether the change over time in the outcome variable was significant, an unconditional model with time as the only Level-1 predictor was estimated and compared against an empty model. Bernoulli HGLM analysis showed that the fixed effect and random effect of the time effect were not significant, and that including the time effect in the model did not improve the model fit significantly [$\chi^2(3) = 1.19$, $p > 0.05$]. Therefore, the empty model with no predictor was retained (Table 2). The intercept without any predictor was -1.04 [$S.E. = 0.11$, $t(155) = 09.44$, $p < 0.001$], with a corresponding odds-ratio of 0.35. That is, the average odds that an individual had a runaway and homeless episode were 0.35 times as likely as the odds of having no such episode across the time period.

As the next step of model building, Model 2 with all Level-1 variables was compared against the empty model. Chi-square test showed that Model 2 fit the data significantly better than the empty model [$\chi^2(18) = 35.85$, $p < 0.01$]. The intercept was significantly different from zero [$\beta = -1.16$, $S.E. = 0.15$, $t(155) = -7.72$, $p < 0.001$], with an odds-ratio of 0.31. That is, the average odds of having a runaway or homeless episode were 0.31 times the odds of not having such an episode when accounting for other variables in the model. Among the Level-1 predictors, family cohesion and frequency of substance use were both significant. With one unit increase in family cohesion, a 17% decrease in the odds of having a runaway or homeless episode was expected [$\beta = -0.18$, $S.E. = 0.07$, $t(155) = -2.45$, $p < 0.05$, OR = 0.83, 95%CI: (0.72, 0.97)]. In other words, higher family cohesion was associated with lower odds of experiencing a runaway or homeless episode over time. With a one unit increase in substance use, the odds of having a runaway/homeless episode increased by 1.87% [$\beta = 0.02$, $S.E. = 0.01$, $t(155) = 3.29$, $p < 0.05$, OR = 1.02, 95%CI: (1.01, 1.03)]. In other words, higher frequencies of substance use were associated with higher odds of running away/homelessness. There was no significant effect for depressive symptoms [$\beta = 0.04$, $S.E. = 0.02$, $t(155) = 1.67$, $p > 0.05$] or family conflict [$\beta = 0.06$, $S.E. = 0.10$, $t(155) = 0.62$, $p > 0.05$] on the experience of running away or homelessness across time.

In the following step, the Model 3 with treatment conditions, school enrollment and delinquency at baseline, as well as youth's age, gender, and ethnicity as potential Level-2 predictors of the intercept and slopes were tested. However, none of these predictors, including demographic variables, treatment condition, school enrollment, or delinquency was found to have a significant *t* value. In other words, none of these variables moderated the effects of depressive symptoms, family cohesion and conflict, or substance use. Therefore, Model 2 was retained as the final conditional model (Table 2).

Discussion

This is one of the few longitudinal analyses that identifies predictors associated with running away and homelessness among a sample of shelter-recruited adolescents. At baseline, only 10% of adolescents had no prior runaway or homeless episode, therefore, these adolescents may represent a more severe sample of youth than those samples with predominantly first-time runaways. Between three and 24 months, 64% of adolescents returned to the shelter, ran away, or experienced an alternate homeless living situation, indicating a high rate of repeat runaway/homeless episodes. Individual (substance use, depressive symptoms, delinquency and school enrollment) and family variables (conflict and cohesion) identified in the literature as potential predictors of adolescents' runaway and homeless episodes were examined. Findings showed that lower levels of family cohesion and higher levels of substance use significantly predicted repeat runaway and homeless episodes. The high number of adolescents reporting a repeated runaway or homeless episode across the two year period highlights the importance of improving efforts to prevent homelessness into young adulthood.

Many have noted that the family is central to intervening in runaway behavior, given high levels of family conflict and low levels of family cohesion reported among these families (Wolfe et al., 1999). Using a longitudinal design, this study provides evidence linking perceived family cohesion and running away/homelessness across a two-year period, supporting prior cross-sectional observations. That is, increasing family support and connection among family members can prevent future homelessness. Of interest is that conflict was unrelated to future running away and homeless episodes. Research with couples suggests that the ratio of positive to negative communications is associated with couple relationship satisfaction, with negative behaviors being key to understanding relationship distress and predicting divorce (Gottman, 1993). Parent-child relationship dynamics associated with distress might emphasize different relational patterns from that observed among couples given the difference in family roles and power differential. That is, the presence of conflict might be an expected experience by these adolescents while the experience of not feeling connected or supported by family members is not acceptable and therefore has more devastating effects. However, this is a hypothesis that needs to be tested in future research. In conclusion, at least in this sample, the presence of conflict was unrelated to the likelihood of a child leaving home, but the experience of lack of support and connection was highly predictive.

Although adolescents' depressive symptoms, delinquency and school enrollment were unrelated to runaway or homeless episodes over the two-year period, substance use was significantly related. Over time, increased substance use was associated with an increased likelihood of runaway and homeless episodes. Even though a significant number of studies identify high rates of substance use among runaway and homeless adolescents, few studies have prospectively examined the relationship between substance use and runaway/homeless episodes. Tucker and colleagues (2011) conducted one of the few longitudinal studies examining runaway behavior among a general population sample. They found that adolescents' substance abuse at grade 9 predicted later runaway behavior, however, runaway

behavior also predicted young adult substance use problems. Similarly among adult homeless populations, some research indicates that substance use increases after the experience of homelessness (Johnson & Fendrich, 2007; Johnson, Freels, Parsons, & VanGeest, 1997; North, Pollio, Smith, & Spitznagel, 1998), with other research indicating that substance use is a key factor in initiating homelessness (Johnson et al., 1997; Van Geest & Johnson, 2002). It is likely that while substance use contributes to the chronicity runaway/homeless episodes among these adolescents, it is also exacerbated by the stress associated with unstable living environments. Even so, this study suggests that reducing substance use among these adolescents through treatment can prevent future runaway and homeless episodes. Given the high rates of substance abuse among adolescents seeking services through runaway shelters, estimated at 70–95% (Chen et al., 2006; Martijn & Sharpe, 2006), and its relationship to continuing runaway and homeless episodes, substance abuse treatment should be an important consideration in programming among runaway shelters.

Finally, treatment condition received by adolescents did not result in differences in runaway/homeless episodes over time. As treatment ended at 6 months, the drop in frequency of runaway/homeless episodes from 6 to 18 months might be associated with lingering treatment effects. However, the rise of runaway/homeless episodes at 24 months to 3 month levels could suggest that long-term intervention might be necessary in preventing homelessness. That is, an acute intervention through the runaway shelter combined with an empirically supported substance abuse treatment delivered over a period of 6 months (as in this study) may be insufficient to maintain long-term effects. Given high levels of family disturbance and that substance abuse is often considered a chronic/relapsing condition with substance use rates increasing during adolescent years (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Leshner, 1997), longer term care such as ‘check-ins’ or booster sessions should be considered in future research.

Limitations

Some limitations of the current study should be considered with interpreting the findings. First, all adolescents in the current sample were recruited from the only runaway shelter in Columbus, Ohio, and therefore might not represent adolescents in other runaway shelters or in other cities. Second, all adolescents were substance abusing, and family relationships and predictors associated with future runaway and homeless episodes might differ among those who do not abuse alcohol and/or drugs. Third, due to the attrition and missing data, the current analysis only utilized data from 156 out of the total 179 adolescent participants. Therefore, statistical power was lowered by the smaller sample size. A larger sample size would provide greater power to detect significant relationships perhaps unobserved in the current analysis.

Conclusion

The findings of this study show that low levels of perceived family cohesion predict runaway and homeless episodes among substance abusing adolescents, while family conflict shows little utility as a long-term predictor. Family and individual therapists often focus on reducing conflict among family members through improving communication and problem-solving skills (Sprenkle, Blow, Dickey, 1999). However, these findings suggest that treatment efforts with runaway adolescents would benefit from increasing the experience of support, connection, and care among family members as the reduction of conflict is not automatically associated with an increase in support and connection. Furthermore, the observed relationship between substance use and future running away/homelessness highlights the importance of treating substance abuse problems, as such treatment is likely to defend against future adolescent runaway and homeless episodes. And finally, acute short-term intervention might need to be combined with a longer-term supportive intervention,

such as booster sessions, throughout the years following a shelter stay in order to enhance the maintenance of positive intervention effects for the long-term.

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Table 1

Numbers and frequencies of adolescents reported experiences of runaway and homelessness during the last 3/6 months by treatment condition.

Runaway and Homelessness Experience during the Last 3/6 Months (Total N = 179)	3-m FU	6-m FU	9-m FU	12-m FU	18-m FU	24-m FU
No (n, %)	90 (50.28%)	89 (49.72%)	95 (53.07%)	100 (55.87%)	93 (51.96%)	79 (44.13%)
EBFT	35 (19.55%)	32 (17.88%)	36 (20.11%)	37 (20.67%)	37 (20.67%)	26 (14.53%)
CRA	28 (15.64%)	31 (17.32%)	33 (18.43%)	31 (17.32%)	27 (15.08%)	21 (11.73%)
MI	27 (15.08%)	26 (14.53%)	26 (14.53%)	32 (17.88%)	29 (16.20%)	32 (17.88%)
Yes (n, %)	50 (27.93%)	32 (17.88%)	22 (12.29%)	27 (15.08%)	35 (19.55%)	52 (29.05%)
EBFT	14 (7.82%)	9 (5.03%)	9 (5.03%)	10 (5.59%)	9 (5.03%)	16 (8.94%)
CRA	18 (10.06%)	10 (5.59%)	4 (2.23%)	8 (4.47%)	13 (7.26%)	20 (11.17%)
MI	18 (10.06%)	13 (7.26%)	9 (5.03%)	9 (5.03%)	13 (7.26%)	16 (8.94%)
Missing (n, %)	39 (21.79%)	58 (32.40%)	62 (34.64%)	52 (29.05%)	51 (28.49%)	48 (25.82%)

Note: EBFT: Ecologically-Based Family Therapy; CRA: Community Reinforcement Approach; MI: Motivation Interviewing

Table 2

Bernoulli HGLM output for the unconditional and the final conditional model.

Fixed Effect	Unconditional Model				Conditional Model			
	Coefficient	SE	Odds Ratio	t-ratio	Coefficient	SE	Odds Ratio	t-ratio
Intercept								
Intercept	-1.04	0.11	0.35	-9.44***	-1.16	0.15	0.31	-7.72***
BDI Slope								
Intercept					0.04	0.02	1.04	1.67
FES Cohesion Slope								
Intercept					-0.18	0.07	0.83	-2.45*
FES Conflict Slope								
Intercept					0.06	0.10	1.06	0.62
Substance use Slope								
Intercept					0.02	0.01	1.02	3.29***
Random Effect	Variance	df	χ^2		Variance	df	χ^2	
Intercept	0.43	155	214.94**		0.57	89	129.74**	
BDI slope					0.0003	89	64.87	
FES Cohesion Slope					0.02	89	67.03	
FES Conflict Slope					0.01	89	76.67	
Substance use Slope					0.00006	89	68.41	
Estimated parameters	2				20			
Deviance statistic	2082.73				2046.88			
χ^2 test					35.85**			

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

Note: Laplace estimation was used for the estimation of fixed effects and deviance statistics. PQL estimation was used for the estimation of random effects