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ORIGINAL ARTICLE

An Ecological Analysis of Risk Factors for Runaway Behavior among Individuals Exposed to Commercial Sexual Exploitation

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Abstract
Running away from home is a known risk factor for commercial sexual exploitation among youth; however, research has not fully investigated the process by which multiple factors at individual, familial, and extra-familial levels increase youths' risk for runaway behavior. This study applies an ecological risk factor framework to assess risk for runaway behavior among individuals exposed to commercial sexual exploitation and examines mediating relationships between salient risk factors (i.e. substance abuse, insufficient basic needs, having a much older boyfriend/girlfriend) and runaway behavior. A cross-sectional, retrospective survey was administered to individuals involved in the commercial sex industry using Respondent Driven Sampling methods ($N = 273$). Bivariate results suggested associations between runaway behavior and childhood emotional and physical abuse, having friends who sold sex, having a much older boyfriend/girlfriend, dropping out of school, being worried about where to eat/sleep, homelessness, and frequent alcohol and drug use prior to entering the commercial sex industry. Hierarchical logistic regression revealed that individuals with runaway behavior histories were more likely to have frequently used alcohol and/or drugs and to have insufficient basic needs compared to those did not run away; however, these factors were no longer significant after accounting for having a much older boyfriend/girlfriend. Having an older boyfriend/girlfriend fully mediated the relationship between frequent alcohol and/or drug use and runaway behavior. Findings support the need for community and school-based prevention programs that target these risk factors with a specific focus on healthy dating relationships, which may reduce risk for runaway behavior and subsequent commercial sexual exploitation.

Keywords Runaway youth · High risk youth · Domestic minor sex trafficking · Commercial sexual exploitation · Risk factors

Introduction

Between 1.6 and 2 million youth run away from home each year in the United States (Hammer et al. 2002; National Survey on Drug Use and Health 2004). Research on risk factors for runaway behavior include family instability (e.g., conflict, abuse), youth problem behaviors (e.g., substance abuse), and other demographic factors linked to economic (e.g., poverty) and social stressors (e.g., gender identity, sexual orientation) (Greene et al. 1995; Molnar et al. 1998; Tyler et al. 2011; Westat 1997). Youth engaging in runaway behaviors are at greater risk for further exposure to a variety of harms while on the street or away from home, including homelessness, substance abuse, violence, and exploitation (Tyler et al. 2004; Whitbeck et al. 2007).).

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Commercial Sexual Exploitation and Runaway Behavior

Commercial sexual exploitation (CSE) of youth is defined as a range of activities that involve sexual abuse or exploitation for the financial gain of any person or in exchange for something of value (including monetary and non-monetary benefits) (Office Juvenile Justice and Delinquency Prevention n.d.). Commercial sexual exploitation can include sex trafficking, which is defined as the recruitment, transportation, transfer,

harboring, or receipt of persons through force, fraud, coercion, or abuse for the purposes of commercial sexual exploitation (Trafficking Victims Protection Act [TVPA] of 2000 2010). Federal law recognizes all persons under the age of 18 who are engaged in commercial sex acts as victims of sex trafficking, regardless of whether force, fraud, or coercion is present. Commercial sexual exploitation of youth can include commercial sex acts in circumstances of force, fraud, and/or coercion by a third party (e.g., pimp-controlled prostitution) and when force, fraud, and coercion are not present, where youth may be engaging in "survival sex," defined as selling or exchanging sex for food, clothing, shelter, money, drugs, or other items of value in order to survive (Ennett et al. 1999).

Disproportionately high rates of CSE have been documented among runaway youth, and runaway behavior has been identified as a precursor to CSE (Edwards et al. 2006; Fedina et al. 2016; Greene et al. 1995). Prior research suggests that individuals who entered the commercial sex industry under the age of 18 were over five times more likely to have run away prior to entering the commercial sex industry compared to individuals who entered the commercial sex industry as adults, even after adjusting for demographics and other known risk factors for CSE (Fedina et al. 2016). Although youth may enter the commercial sex industry through varying pathways, runaway behavior remains a clear risk factor for CSE (both for engaging in survival sex and forced or coerced commercial sex acts), which has been linked to multiple poor physical and mental health outcomes among youth including HIV and other sexually transmitted infections, unintended pregnancy, depression, and suicidal behaviors (Haley et al. 2004; Klain 1999).

Application of an Ecological Risk Factor Framework

A considerable amount of research on adolescents and youth has integrated a risk factor approach to Bronfenbrenner's ecological framework (Bronfenbrenner 1979; 1989) to identify multiple risk factors that increase youths' vulnerability and susceptibly for negative developmental outcomes such as alcohol and substance abuse, early sexual activity, and other health risk behaviors (Browning et al. 2015; Nargiso et al. 2015; Newcomb et al. 1986; Small and Luster 1994). Although the presence of one or more risk factors do not ensure a negative outcome, it does increase the probability of the outcome to occur, especially if multiple risk factors are present (Small and Luster 1994). The benefit to utilizing an integrated ecological risk factor framework is indeed the multi-level approach, which provides greater understanding into how risk factors operate and interact with one another at various levels and subsequently shape a youth's social ecology. An integrated ecological framework of risk factors for runaway behavior and subsequent CSE would suggest that multiple risk factors are related to runaway behavior, and that these factors are "nested" and operate at multiple levels, including individual (e.g., sociodemographic factors, child abuse, substance abuse), familial (e.g., family instability), and extra-familial levels (e.g., school factors, peer networks) (Aratani and Cooper 2015; DuPont et al. 2013; Reid and Piquero 2014; Roe-Sepowitz 2012; Weber et al. 2004). Identifying the constellation of precursory risk factors to runaway behavior among commercially sexually exploited individuals can be used to inform targeted intervention and prevention strategies aimed at serving this high-risk population.

Risk Factors Associated with Runaway Behavior and CSE

Existing research on runaway behavior and CSE suggests an at-risk profile comprised of multiple factors at individual, familial, and extra-familial levels that appear to increase youths' risk for CSE. Prior research has largely focused on individual-level factors linked to runaway behavior. Research on individual-level factors associated with runaway behavior has found that exposure to childhood abuse, economic stressors, homelessness, and alcohol and drug abuse act as precursory factors to running away from home in samples of youth engaged in the commercial sex industry (Greene et al. 1995; Rice et al. 2013; Tyler et al. 2007). Additionally, sociodemographic factors related to youths' identity (i.e. race/ethnicity, gender identity, and sexual orientation) have been linked to runaway behavior, including among samples of youth exposed to CSE. Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) youth have disproportionately higher rates of runaway behavior (Ray 2006) and are also less likely to stay in a shelter and more likely to stay with a stranger than heterosexual and cisgender male and female youth, which increases their risk for exposure to violence and exploitation while away from home (Rice et al. 2013). Few studies have examined familial-level factors that are linked to runaway behavior in samples of individuals with CSE histories. Family conflict has been identified as a primary predictor of runaway behavior among youth in the general population. Specifically, 47% of youth who run away cite conflict with one or both parents as the most salient reason they left home (Westat 1997) and 50% of runaway youth report their parents knew they were leaving home or asked them to leave (Greene et al. 1995).

Although family conflict may prompt youth to run away and subsequently experience CSE, some research suggests other familial-level factors, such as parental or family involvement in the commercial sex industry, may lead to CSE among youth (Raphael et al. 2010; Williamson and Prior 2009). However, prior studies have not yet fully explored how familial involvement in the commercial sex industry is linked to runaway behavior, which is important to understand the potential pathways between familial risk factors, runaway behavior, and subsequent CSE.

Research on extra-familial factors related to youths' risk for runaway behavior have primarily examined the role of peer factors among runaway youth. Peer influences have been broadly linked to delinquency behaviors (Warr 2005) and some research suggests that having peers engaged in the commercial sex industry (e.g., trading sex for various things of value, engaging in survival sex to meet basic needs), can influence youths' behaviors to engage in similar commercial sex acts (Ennett et al. 1999; Tyler et al. 2004). Peer deviance in particular has been identified as a strong predictor of runaway behavior in national samples, independent of a youth's own deviant behavior and other individual-level characteristics as well as familial factors (Chen et al. 2012). Although peer deviance may influence runaway behavior, prior research has largely focused only on peer friendships, rather than other types of peer relationships (i.e. romantic and sexual) which may influence runaway behavior and subsequent CSE among youth.

Current Study

Prior research has not collectively assessed multiple risk factors for runaway behavior at individual, familial, and extra-familial levels among individuals exposed to CSE, which is needed to improve knowledge on the ways in which risk factors operate and interact with one another at multiple levels. The following study aims to address this gap through applying an ecological framework of risk factors to understand risk associated with runaway behavior among commercially sexually exploited youth. This retrospective study 1) uses multivariate statistics to examine individual, familial, and extra-familial risk factors for runaway behavior among individuals engaged in commercial sexual exploitation and 2) tests mediating risk factors to better understand the process by which multiple risk factors influence runaway behavior among those who have been involved in commercial sexual exploitation.

Methodology

Study Design and Procedures

University Institutional Review Board (IRB) approval was obtained for this study. In order to protect study participants and to maintain their anonymity, a waiver of documentation of consent was granted by the IRB. A cross-sectional, retrospective survey was administered in five urban areas within one Midwestern state. A 76-item survey instrument was developed and piloted during the formative research stage, which included individual and focus group interviews among community-based organizations, local and state officials, researchers, and individuals engaged in the commercial sex industry.

Data collectors were trained in survey administration and were accompanied by a trained advocate at each collection site to assist study participants who requested referrals for social services, immediate help, or who were under the age of 16 and needed to be reported to child welfare for assessment and/or protection. Surveys were administered in local public libraries in private study rooms. Data collectors presented participants with the option to complete the survey online (via Survey Gizmo) or on paper. English-speaking participants over the age of 16 and who engaged in commercial sex acts in the past 6 months were eligible for participation in the study. Data were collected over a 6-months period (January 2011 to June 2011).

Survey participants were recruited using Respondent Driven Sampling (RDS) (Heckathorn 1997, 2002). RDS has been used in prior studies to recruit youth and adults engaged in the commercial sex industry (Curtis et al. 2008). RDS is particularly useful when researchers need to capture a community that is hidden, is violating the law, or is otherwise difficult to access. In the current study, data collectors first identified the "seeds" or individuals known to be involved in the commercial sex industry. These "seeds" were surveyed by data collectors, compensated $10, and then provided five coupons to give to others they knew involved in the commercial sex industry. Each person who took the survey received $10 and those who referred them received another $10. In order to track coupons and identify various social networks, coupons were numbered (to prevent duplication) with the initial seed's name on them. Each coupon could be redeemed for $10 at a nearby location within the designated city on specific days and at specific times identified on the coupon. Coupons were also color coded to track the city in which they were obtained and redeemed. Sample recruitment ended once the sample reached stable composition and possessed the characteristics of the intended population of study (Heckathorn 1997).

Sample Description

A total of 328 participants currently engaged in the commercial sex industry were recruited to the study to examine runaway histories and associated individual, familial, and extra-familial risk factors for runaway behavior. Among these, 42 participants were identified as adult sex trafficking victims (defined as currently being 18 years of age and older and having reported currently being forced or manipulated to participate in commercial sex acts) and were excluded from the sample for the purposes of the current study. A total of 13 participants had missing data on runaway history variables, resulting in a final sample size of 273.

The majority of participants in the sample were female (72.5%) and Black or African American (59.7%), with a mean current age of 36.74 (SD = 11.47). A total of 36.6% of participants identified as a sexual minority (lesbian/gay/bisexual).

Nearly 29% of participants reported runaway behavior prior to entering the commercial sex industry. The largest group (37%) of participants engaged in their first commercial sex act between the ages of 14 and 17, followed by 28.9% between the ages of 18 and 20, 28.9% age 21 and older, and 5.1% under the age of 12. The majority of participants with runaway behavior histories entered the commercial sex industry under the age of 18 (62.8%) (see Tables 1, 2, and 3).

Measures

Dependent Variable

Runaway behavior was assessed through two single dichotomous indicators (yes/no) asking respondents to indicate whether the following statements were true before they entered the commercial sex trade: *I ran away from home less than 1 year before* and/or *I ran away from home more than 1 year before*, which were combined to indicate any runaway behavior before entering the commercial sex industry (no = 0; 1 yes = 1).

Independent Variables

All risk factors were measured using single dichotomous indicators (yes/no) asking respondents to indicate whether they experienced the following less than 1 year before entering the commercial sex industry and/or more than 1 year before entering the sex trade, all of which were collapsed to indicate the presence of each (at any time point) prior to entering the commercial sex industry. Some variables were further combined and conceptually grouped for the purposes of the multivariate analysis, as detailed below.

Individual-level factors included the demographics of self-identified gender (male, female, or transgender), race/ethnicity (Black or African American, White, Hispanic, or Other) and sexual orientation (heterosexual, lesbian, gay, or bisexual) and were included as covariates in the analysis based on prior research on youth involvement in the commercial sex industry (Clarke et al. 2012; Fedina et al. 2016; Kramer and Berg 2003; Tyler et al. 2004). Gender was recoded to indicate male (0) or female (1) (reference group = male), as two participants identified as transgender, but were not included in the multivariate analysis due to the small sample size of this group.

Table 1 Sample demographics and bivariate statistics for runaways and non-runaways

Variable	Total ($N = 273$) % (N)	Runaway ($n = 78$) % (n)	Non-Runaways ($n = 190$) % (n)	χ^2 (df)
Median current age (SD)	36 (11.47)	35 (10.75)	37.8 (11.67)	
Age of first commercial sex act				
Younger than 12	3.7 (10)	2.6 (2)	4.2 (8)	
12–17	31.9 (87)	56.4 (44)	21.1 (40)	
18–20	20.5 (56)	19.2 (15)	21 (40)	
21 and older	19 (52)	9.1 (7)	23.2 (46)	
Gender				$3.56_{(1)}$
Male	26 (71)	18.2 (14)	29.4 (55)	
Female	72.5 (198)	81.8 (63)	70.6 (132)	
Transgender	0.7 (2)	0 (0)	1.2 (2)	
Race				$4.86_{(1)}$*
White	32.6 (89)	42.3 (33)	28.4 (54)	
Non-White	184 (67.4)	57.7 (45)	71.6 (136)	
Sexual orientation				$.08_{(1)}$
Heterosexual	61.5 (168)	63.6 (49)	61.8 (115)	
LGB	36.6 (100)	36.4 (28)	38.2 (71)	
Frequent AoD use	48.7 (133)	67.6 (50)	44.6 (83)	$11.15_{(1)}$***
Homeless	36.3 (99)	46.7 (35)	33.2 (63)	$4.21_{(1)}$*
Worried about eating/sleeping	40.3 (110)	51.4 (38)	37.2 (70)	$4.37_{(1)}$*
Raped	38.5 (105)	47.4 (36)	35.1 (66)	$3.43_{(1)}$
CPS involvement	20.9 (57)	21.8 (17)	20.5 (39)	$.05_{(1)}$
Childhood physical abuse	28.6 (78)	39 (30)	24.3 (46)	$5.73_{(1)}$*
Childhood sexual abuse	34.1 (93)	37.7 (29)	33.7 (63)	$.38_{(1)}$
Childhood emotional abuse	32.6 (89)	45.5 (35)	28 (52)	$7.53_{(1)}$**
Family members involved in sex work	27.8 (76)	30.7 (23)	27.9 (53)	$.20_{(1)}$
Dropped out of school	38.1 (104)	59 (46)	30.7 (58)	$18.68_{(1)}$***
Friends who bought sex	31.1 (85)	40.5 (30)	28.4 (54)	$3.61_{(1)}$
Friends who sold sex	40.7 (111)	52.1 (38)	38.5 (72)	$3.95_{(1)}$*
Older boyfriend/girlfriend	43.6 (119)	66.2 (49)	37.5 (69)	$17.54_{(1)}$***

LGB lesbian, gay, or bisexual, *AoD* alcohol and/or drug, *CPS* child protection services

Some totals do not add up to 100% due to missing data

*$p < .05$, ** $p < .01$, *** $p < .001$

Table 2 Hierarchical logistic regression predicting odds of runaway behavior ($N = 240$)

	Step 1		Step 2		Step 3		Step 4	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Step 1: Covariates								
Gender (female)	1.64	.83, 3.22	1.64	.81, 3.32	1.63	.80, 3.29	1.54	.75, 3.19
Race (non-white)	1.77	.97, 3.23	1.68	.90, 3.12	1.64	.88, 3.06	1.63	.85, 3.12
Sexual orientation	.97	.53, 1.75	.99	.53, 1.82	.99	.53, 1.83	1.06	.57, 2.03
Step 2: Individual Factors								
Insufficient basic needs			1.80	.94, 3.47	2.00*	1.12, 3.94	1.54	.73, 3.25
Interpersonal trauma			1.21	.62, 2.37	1.17	.59, 2.29	1.42	.69, 2.91
Frequent AoD use			2.07*	1.08, 3.98	2.23*	1.15, 4.33	1.50	.72, 3.12
Step 3: Familial Factors								
Family involved in sex work					1.53	.76, 3.05	2.01	.93, 4.29
Step 4: Extra-familial Factors								
Peers involved in sex work							1.34	.62, 2.89
Dropping out of school							1.85	.88, 3.93
Having older boyfriend/girlfriend							2.81*	1.19, 6.54
Model Evaluation	χ^2		χ^2		χ^2		χ^2	
Likelihood Ratio Test	280.19		268.89		267.42		255.49	
Pseudo-R^2(Nagelkerke)	.04		.10		.11		.17	

AoD alcohol and/or drug

*$p < .05$

Race/ethnicity was recoded to indicate White (0) non-White (1) (reference group = White), as most the sample identified as Black or African American (59.7%) and White (32.6%). Sexual orientation was recoded into a dichotomous variable (heterosexual = 0; lesbian, gay, or bisexual [LGB] = 1) (reference group = heterosexual).

Additional individual-level factors included frequent alcohol and/or drug use, having insufficient basic needs, and interpersonal trauma. Frequent alcohol and/or drug use was measured using five items indicating whether the following substances were used frequently prior to entry: alcohol, marijuana, prescription drugs, crack cocaine, or other illegal drugs. Items were collapsed to indicate any frequent alcohol and/or drug use (0 = no frequent yes; 1 = frequent use) (Cronbach's alpha = .88). Insufficient basic needs were assessed with two indicators measuring homelessness (*I was homeless)* and/or being worried about where to eat or sleep (*I worried about how I would eat or where I would sleep)*, which were collapsed into one dichotomous variable (0 = endorsement of neither item; 1 = endorsement of either or both items) for the multivariate analysis although examined as separate indicators in the bivariate analysis (Cronbach's alpha = .66),.

Table 3 Results of mediation effect of older boyfriend/girlfriend (model 1) and insufficient basic needs (model 2) between frequent AoD use and running away

	Path	Predictor	Dependent variable	OR	95% CI
Model 1					
Step 1	*c*	Frequent AoD use	Running away	2.59**	1.47, 4.55
Step 2	a	Frequent AoD use	Older boyfriend/girlfriend	10.04***	5.63, 17.88
Step 3	b	Older boyfriend/girlfriend	Running away	3.27***	1.85, 5.76
Step 4	c'	Frequent AoD use	Running away	1.6	.82, 3.10
Model 2					
Step 1	*c*	Frequent AoD use	Running away	2.59**	1.47, 4.55
Step 2	a	Frequent AoD use	Insufficient basic needs	3.82***	2.28, 6.40
Step 3	b	Insufficient basic needs	Running away	2.02*	1.16, 3.51
Step 4	c'	Frequent AoD use	Running away	1.99*	1.09, 3.63

AoD = alcohol and/or drug. N ranges from 255 to 267 in each model due to missing data on outcome variables.
*$p < .05$, **$p < .01$, ***$p < .001$

Interpersonal trauma consisted of five items with positive endorsements to rape (*I was raped)*, childhood physical, sexual, and emotional abuse (*I was a victim of childhood physical abuse; I was a victim of childhood sexual abuse, I was a victim of childhood emotional abuse*), and/or involvement in Child Protection Services (*I was involved with Child Protection Services as an abused/neglected child)*, which were combined into a single dichotomous variable (0 = not maltreated; 1 = maltreated) (Cronbach's alpha = .83),

Familial-level factors included a single item assessing whether the participant had family members involved in the commercial sex industry: *I had close family members involved in sex work* (0 = no; 1 = yes).

Extra-familial factors included dropping out of school, peer involvement in the commercial sex industry, and having a much older boyfriend/girlfriend. Dropping out of school was measured with one item asking participants whether the following were true prior to entry: *I dropped out of school* (no = 0; 1 = yes). Two items (i.e. *I had friends who bought sex* and/or *I had friends who sold sex)* were combined to assess peer involvement in the commercial sex industry (no = 0; 1 = yes) (Cronbach's alpha = .72). Finally, having a much older boyfriend/girlfriend was measured with one item: *I had an older boyfriend or girlfriend* (0 = no; 1 = yes).

Data Analyses

Statistical analyses were conducted in three steps. First, chi-square tests were used to examine bivariate relationships between individual risk factors and runaway behavior. Second, hierarchical logistic regression was conducted to examine the relationship between conceptually grouped risk factors and runaway behavior, using the ecological risk factor framework. Third, two variables were tested as potential mediators between significant independent variables and runaway behavior in the hierarchical logistic regression model. The multivariate analyses were conducted with a sample of 240 out of 273 cases (87.9%), due to missing data. Listwise deletion (Saunders et al. 2006) was employed. All analyses were assessed at an alpha criterion of .05 and analyzed in SPSS Version 24.

Two separate mediation models were tested, with both having an older boyfriend/girlfriend and having insufficient basic needs examined as potential mediators of the relationship between frequent alcohol and/or drug use and runaway behavior (see Fig. 1). Baron and Kenny's (1986) four steps to testing mediation were used for the initial assessment: 1) regression with X (frequent alcohol and/or drug use) predicting Y (runaway behavior); 2) regression with X (frequent alcohol and/or drug use) predicting M (older boyfriend/girlfriend or insufficient basic needs); 3) regression with M (older boyfriend/girlfriend or insufficient basic needs) predicting Y (runaway behavior); and 4) regression with X (frequent alcohol and/or drug use) and M (older boyfriend/girlfriend or insufficient basic needs) predicting Y (runaway behavior). The Sobel test (1987) was then used as the final criterion to determine the significance of the mediation effect of a) older boyfriend/girlfriend and b) insufficient basic needs between frequent alcohol and/or drug use and runaway behavior.

Results

Results from chi-square tests yielded statistically significant associations between running away prior to entering the commercial sex industry and childhood emotional abuse ($\chi^2 = 7.53$; $p < .01$); childhood physical abuse ($\chi^2 = 5.73$; $p < .05$); having friends who sold sex ($\chi^2 = 3.95$; $p < .05$); having an older boyfriend/girlfriend ($\chi^2 = 17.54$; $p < .001$); dropping out of school ($\chi^2 = 18.58$; $p < .001$); being worried about where to eat/sleep ($\chi^2 = 4.37$; $p < .05$); homelessness ($\chi^2 = 4.21$; $p < .05$); and frequent alcohol and/or drug use ($\chi^2 = 11.15$; $p < .01$) prior to entering the commercial sex industry. Race/ethnicity was significantly associated with runaway behavior ($\chi^2 = 4.86$; $p < .05$); however, gender and sexual orientation were not. Childhood sexual abuse, having friends who bought sex, involvement with CPS, and having family members involved in the commercial sex industry were not significantly associated with runaway behavior at the bivariate level (see Table 1).

Assumptions for logistic regression were assessed and met (e.g., independent observations, multicollinearity, independent variables are linearly related to the log odds). Individual, familial, and extra-familial risk factors were then entered in a hierarchical logistic regression model across four steps. Demographic covariates of race, gender, and sexual orientation were entered in Step 1. No demographic variables were significant in the model in Step 1. Additional individual-level factors were entered in Step 2, including insufficient basic needs, interpersonal trauma, and frequent alcohol and/or drug use. Frequent alcohol and/or drug use was significant in the model in Step 2, after controlling for all other variables. Those who frequently used alcohol and/or drugs prior to commercial sex industry entry had significantly higher odds (OR = 2.07, 95% CI = 1.08, 3.98, $p = .03$) of runaway behavior than those who did not frequently use alcohol and/or drugs prior to entry. The familial-level factor of family involvement in commercial sex work was added in Step 3. Frequent drug and/or alcohol use remained significant (OR = 2.23, 95% CI = 1.14, 4.33, $p = .01$) and insufficient basic needs became significant (OR = 2.00, 95% CI = 1.02, 3.94, $p < .04$), after controlling for familial and other individual factors, but family involvement was not significant in step 3. Extra-familial factors were entered in Step 4 (dropped out of school, peer involvement in commercial sex work, older boyfriend/girlfriend). Frequent alcohol and/or drug use and insufficient

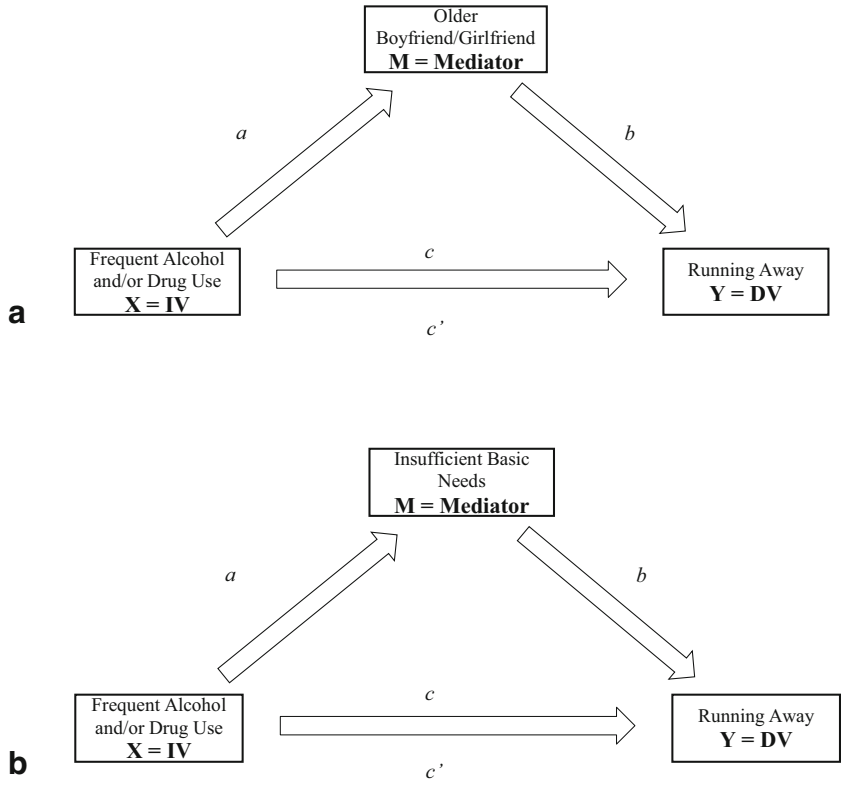

Fig. 1 Model of effect of frequent alcohol and/or drug use on runaway behavior as mediated by having an older boyfriend/girlfriend (**a**) and insufficient basic needs (**b**). a = IV to M, b = direct effect of M on DV while controlling for X, c = total effect of IV on DV, c' = direct effect of IV on DV, when controlling for M

basic needs were no longer significant in Step 4; however, having an older boyfriend/girlfriend was associated with a nearly three-fold increase in the odds of runaway behavior (OR = 2.81, 95% CI = 1.19, 6.64, $p = .02$) (see Table 2).

Figure 1a depicts the relationships necessary for mediation to occur (Baron and Kenny 1986). In the first mediation model (Fig. 1a), a significant relationship between the predictor and the outcome was established in Step 1 (path c). Specifically, frequent alcohol and/or drug use was a significant predictor of runaway behavior (OR = 2.56, $p = .001$). In step 2, a significant relationship between the predictor and the mediator was found (path a). Frequent alcohol and/or drug use was a significant predictor of having an older boyfriend/girlfriend (OR = 10.04, $p < .001$). In step 3, a significant relationship between the mediator and the outcome variable was established (path b). Having an older boyfriend/girlfriend was a significant predictor of runaway behavior (OR = 3.27, $p < .001$). Finally, in step 4, the strength of the relationship between the predictor and the outcome was reduced when the mediator was added to the model (path c'). Frequent alcohol and/or drug use was no longer significantly predictive of runaway behavior, after accounting for having an older boyfriend/girlfriend (OR = 2.64, $p = .004$), supporting full mediation. The Sobel test confirmed the significant mediation effect (Z = 2.71 $p = .006$).

In the second mediation model (Fig. 1b), a significant relationship between the predictor and the outcome was established in Step 1 (path c). Frequent alcohol and/or drug use was a significant predictor of runaway behavior (OR = 2.56, $p = .001$). In step 2, a significant relationship between the predictor and the mediator was found (path a). Frequent alcohol and/or drug use was a significant predictor of having insufficient basic needs (OR = 3.82, $p < .001$). In step 3, a significant relationship between the mediator and the outcome variable was found (path b); that is, having insufficient basic needs was a significant predictor of runaway behavior (OR = 2.02, $p = .013$). In step 4, the strength of the relationship between the predictor and the outcome was found to be reduced when the mediator was added (path c'); however, frequent alcohol and/or drug use remained significantly predictive of runaway behavior (OR = 1.87, $p = .041$), after accounting for insufficient basic needs (OR = 1.99, $p = .025$), suggesting possible partial mediation. These results were further assessed using the Sobel test, which indicated that insufficient basic needs did not significantly mediate the relationship effect between frequent alcohol and/or drug use and runaway behavior (Z = 1.89, $p = .058$) (see Tables 2 and 3).

Discussion

This study used an ecological framework of risk factors to understand the process by which individual, familial, and extra-familial risk factors are linked to runaway behavior among a sample of individuals engaged in commercial sexual exploitation. Findings from this study suggest that a range of risk factors are linked to runaway behavior among commercial

sexually exploited individuals, however, results suggest several prominent factors that may act as the strongest predictors for runaway behavior among this population. Findings also highlight particularly salient risk factors at each level of the ecological framework and provides a more comprehensive profile of risk for runaway behavior among CSE youth.

Individual-level factors including alcohol and substance abuse, poverty and economic insecurity, and childhood abuse have been consistently linked to runaway behavior among youth in prior research (Fountain et al. 2003; Hagan & McCarthy 1997; McNaughton 2008; Thompson & Pillai 2006; Tyler et al. 2011). This finding is somewhat supported in the current study, as significantly higher rates of frequent alcohol and/or drug use, having insufficient basic needs, and varying forms of child abuse (e.g., physical, emotional) were documented among participants with runaway behavior histories compared to participants without runaway behavior histories at the bivariate level. In the multivariate analyses, significant individual-level factors included frequent alcohol and/or drug use and having insufficient basic needs, which were found to increase odds of runaway behavior in early steps of the analysis; however, these predictors were no longer significant after accounting for extrafamilial factors.

In particular, having an older girlfriend/boyfriend was the strongest predictor of runaway behavior, after controlling for other factors at individual, familial, and extrafamilial levels. Prior research has found that extrafamilial peer friendships (peer delinquency) is strongly correlated with runaway behavior among youth in the general population (Chen et al. 2012; Warr 2005). Although we examined other extra-familial factors related to participants' peer friendships (i.e. peers engaged in buying or selling/trading sex), these factors were not significant in the multivariate model after accounting for other romantic/sexual relationships and individual and familial-level factors. Peer delinquency may be related to runaway behavior in general among youth, however, our findings suggest that older dating partners may be uniquely associated with runaway behavior and subsequent CSE, after accounting for risk factors at multiple levels.

We also examined mediation effects to better understand the mechanisms through which risk factors for runaway behavior and subsequent CSE operate and interact with one another at individual, familial, and extra-familial levels. Our results suggest that extrafamilial factors may supersede risk for runaway behavior and subsequent CSE found at individual-levels. Specifically, we found that having an older boyfriend/girlfriend fully mediated the relationship between frequent alcohol and/or drug use and runaway behavior. This finding lends support for the utility of an ecological framework of risk factors to predict runaway behavior and subsequent CSE and suggests the need for future research to assess risk factors beyond individual and familial levels and to include extrafamilial factors.

Our findings suggest the need for professionals working with youth at risk for CSE to consider the role of dating partners in youth's risk for runaway behavior. Scant research has examined the role of dating partners in predicting runaway behavior among youth generally; however, a growing body of literature suggests that third parties (e.g., pimps, recruiters, or others involved in commercial sex industry networks) often pose as dating or romantic partners to youth to effectively recruit or lure adolescents and young adults into the commercial sexual industry (Fedina et al. 2016; Williamson and Prior 2009). For example, Fedina et al. (2016) found that over 50% of commercially sexually exploited youth had been dating a much older partner prior to entering the commercial sex industry. Qualitative research on CSE among female youth suggests that older male pimps, as well as older adult women engaged in commercial sex industry networks, use physically, psychologically, and sexually abusive and coercive tactics to recruit and maintain youth in the commercial sex industry (Williamson et al., 2009). Practitioners working with at-risk and runaway youth should routinely screen for dating violence and be cognizant of youth who may be dating or sexually active with much older partners, which may increase risk for runaway behavior and subsequent CSE.

In addition to examining mediation effects between levels of risk factors, we also explored mediating relationships within levels of risk. Prior literature documents strong links between individual-level factors of poverty, economic insecurity, and runaway behavior (e.g., Tyler et al. 2011), however, the extent to which these factors interact with substance abuse has not been fully examined. Therefore, we tested whether having insufficient basic needs mediated the relationship between frequent alcohol and/or drug use and runaway behavior; however, no significant mediation effect was found. This suggests that substance abuse, poverty, and economic insecurity remain important individual-level risk factors when assessing youths' runaway behavior and subsequent risk for CSE. Practitioners working with at-risk youth in community and school settings should assess socioeconomic needs (e.g., housing, food and nutrition assistance, clothing) and substance abuse behaviors to link youth and their families to appropriate community resources and services.

Limitations

Findings should be considered within the context of several limitations. All data are cross-sectional so causality between variables cannot be established. Although this study identifies

a range of risk factors that were precursory to entering the commercial sex industry, it is not clear which risk factors were present first and/or which, if any, co-occurred with runaway behavior. Future research is needed using longitudinal data to understand the sequential pathways to runaway behavior and subsequent commercial sexual exploitation. Generalizability may also be limited as data collection occurred in one Midwestern state and thus, findings may not apply to other states and cities in the United States.

There are also several limitations to the study's measures. This study used retrospective, self-report measures, which are susceptible to recall bias. The survey instrument did not include standardized measures of child abuse, runaway behaviors, and alcohol and drug use and were instead developed by the research team and community collaborators during the formative research phase. The researchers created a new instrument given the dearth of retrospective measures that assess a wide set of precursory factors to commercial sexual exploitation and to mitigate the potential for recall bias in the study which included populations exposed to trauma and substance abuse, which could interfere with recall of experiences prior to entering the commercial sex industry. Additionally, measures were largely dichotomous and incident-based, rather than behavior-based, which likely resulted in underestimations among participants who may not have acknowledged or perceived their experiences as child abuse, runaway behavior, or frequent alcohol and drug use and may not fully represent the range of experiences among participants.

Additionally, there may be limitations to the study's modes of data collection, which included both online and paper surveys. Unfortunately, we were not able to control for the mode of data collection in analyses, which may have impacted study outcomes. Additional modes of data collection, such as in-person field interviews, may have served as a more robust method of data collection for the purposes of this study; however, limited funding and resources prevented us from using additional data collection methods. Despite these limitations, this study improves our understanding of salient risk factors for runaway behaviors and subsequent commercial sexual exploitation among youth and highlights the need for targeted intervention strategies addressing healthy peer and romantic relationships among youth (e.g., extra-familial factors).

Conclusions and Implications

Findings highlight the importance of using an ecological framework to identify, intervene, and prevent risk factors at individual, familial, and extra-familial levels that lead to runaway behavior and subsequent commercial sexual exploitation. Professionals working with adolescents and youth should screen for individual-level risk factors including frequent alcohol and drug use and economic insecurity (e.g., housing, food, and other basic needs) and coordinate needed resources and services for children and families, which may prevent runaway behavior and subsequent commercial sexual exploitation. In addition to these individual-level risk factors, findings indicate that extra-familial factors and specifically, having older dating partners is an especially strong predictor and mediator of runaway behavior. Professionals working with youth should assess extra-familial relationships, including relationships where youth are romantically or sexually engaged with older partners as well as older adults who may be addressing youths' varied needs for housing, food, clothing and emotional attachment. Although interventions with youth at risk for runaway behavior and commercial sexual exploitation should include strategies that address healthy romantic and peer relationships, these preventive measures will likely not be successful without policy interventions that identify and hold perpetrators accountable. It is likely that many of the romantic relationships between children and older adults engaged in the commercial sex industry constitute child maltreatment and in certain contexts, the older partner can be considered a caregiver to the youth if they are addressing youths' basic needs, which has implications for investigation and response at public child welfare agencies.

Findings also suggest implications for future research. Future studies are needed to identify which risk factors precede each other, including those that co-occur, prior to runaway behavior and subsequent commercial sexual exploitation to better understand pathways into the commercial sex industry. Additional research is also needed to better understand whether youth begin dating older partners prior to running away, which then prompts youth to run away to their dating partners, or whether youth run away from home and then encounter older dating partners who may recruit them into the commercial sex industry. Finally, research is needed on the dynamics and contexts of relationships between youth and older dating partners engaged in the commercial sex industry in order to more accurately inform clinical and policy interventions that both support youths' disengagement from harmful relationships and hold perpetrators accountable.

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Compliance with Ethical Standards

Conflict of Interest The authors have no conflicts of interest to declare.

References

Aratani, Y., & Cooper, J. L. (2015). The effects of runaway-homeless episodes on high school dropout. *Youth & Society, 47*(2), 173–198.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182.

Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge: Harvard University Press.

Bronfenbrenner, U. (1989). Ecological systems theory. *Annals of Child Development, 6*, 187–249.

Browning, C. R., Soller, B., & Jackson, A. L. (2015). Neighborhoods and adolescent health-risk behavior: An ecological network approach. *Social Science & Medicine, 125*, 163–172.

Chen, X., Thrane, L., & Adams, M. (2012). Precursors of running away during adolescence: do peers matter?. *Journal of Research on Adolescence, 22*(3), 487–497.

Clarke, R. J., Clarke, E. A., Roe-Sepowitz, D., & Fey, R. (2012). Age at entry into prostitution: Relationship to drug use, race, suicide, education level, childhood abuse, and family experiences. *Journal of Human Behavior in the Social Environment, 22*, 270–289.

Curtis, R., Terry, K., Dank, M., Dombrowski, K., & Khan, B. (2008). *The commercial sexual exploitation of children in New York City, volume one: The CSEC population in New York City: Size, characteristics, and needs*. Final report submitted to the National Institute of Justice. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/grants/225083.pdf.

DuPont, R. L., Caldeira, K. M., DuPont, H. S., Vincent, K. B., Shea, C. L., & Arria, A. (2013). *America's dropout crisis: The unrecognized connection to adolescent substance use.* Institute for Behavior and Health, Rockville. Retrieved from www.ibhinc.org, www.PreventTeenDrugUse.org, and www.cls.umd.edu/docs/AmerDropoutCrisis.pdf.

Edwards, J. M., Iritani, B. J., & Hallfors, D. D. (2006). Prevalence and correlates of exchanging sex for drugs or money among adolescents in the United States. *Sexually Transmitted Infections, 82*(5), 354–358.

Ennett, S. T., Bailey, S. L., & Federman, E. B. (1999). Social network characteristics associated with risky behaviors among runaway and homeless youth. *Journal of Health and Social Behavior, 40*, 63–78.

Fedina, L., Williamson, C., & Perdue, T. (2016). Risk factors for domestic child sex trafficking in the United States. *Journal of Interpersonal Violence*. https://doi.org/10.1177/0886260516662306.

Fountain, J., Howes, S., Marsden, J., Taylor, C., & Strang, J. (2003). Drug and alcohol use and the link with homelessness: results from a survey of homeless people in London. *Addiction Research & Theory, 11*(4), 245–256.

Greene, J., Ringwalt, C., Kelly, J., Iachan, R., & Cohen, Z. (1995). *Youth with runaway, throwaway, and homeless experiences: Prevalence, drug use, and other at-risk behaviors* U.S. Department of Health and Human Serivices, Administration on Children, Youth and Families.

Hagan, J., & McCarthy, B. (1997). *Mean streets: Youth crime and homelessness*. New York: Cambridge University Press.

Haley, N., Roy, É., Leclerc, P., Boudreau, J. F., & Boivin, J. F. (2004). HIV risk profile of male street youth involved in survival sex. *Sexually Transmitted Infections, 80*, 526–530.

Hammer, H., Finkelhor, D., & Sedlak, A. (2002). *Runaway/thrownaway children: National estimates and characteristics. National Incidence Studies of Missing, Abducted, Runaway and Thrownaway Children*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention. Retrieved January 26, 2017, From www.ncjrs.org/pdffiles1/ojjdp/196469.pdf.

Heckathorn, D. (1997). Respondent-driven sampling: A new approach to the study of hidden populations. *Social Problems, 44*, 174–199.

Heckathorn, D. (2002). Respondent-driven sampling II: Deriving valid population estimates from chain-referral sample of hidden populations. *Social Problems, 49*, 11–34.

Klain, E. J. (1999). *Prostitution of children and child-sex tourism: An analysis of domestic and international responses*. Washington, DC: National Center for Missing & Exploited Children.

Kramer, L. A., & Berg, E. C. (2003). A survival analysis of timing of entry into prostitution: The differential impact of race, educational level, and childhood/ adolescent risk factors. *Sociological Inquiry, 73*, 511–528.

McNaughton, C. (2008). *Transitions through homelessness: Lives on the edge*. Basingstoke: Palgrave Macmillan.

Molnar, B. E., Shade, S. B., Kral, A. H., Booth, R. E., & Watters, J. K. (1998). Suicidal behavior and sexual/physical abuse among street youth. *Child Abuse & Neglect, 22*(3), 213–222.

Nargiso, J. E., Ballard, E. L., & Skeer, M. R. (2015). A systematic review of risk and protective factors associated with nonmedical use of prescription drugs among youth in the United States: A social ecological perspective. *Journal of Studies on Alcohol and Drugs, 76*(1), 5–20.

National Survey on Drug Use and Health. (2004). Substance use among youths who had run away from home. Substance Abuse and Mental Health Services Administration. Retrieved from http://www.popcenter.org/problems/runaways/PDFs/OAS_2004.pdf

Newcomb, M. D., Maddahian, E., & Bentler, P. M. (1986). Risk factors for drug use among adolescents: Concurrent and longitudinal analyses. *American Journal of Public Health, 76*, 525–530.

Office on Juvenile Justice and Deliquency Prevention. (n.d.). *Commercial sexual exploitation of children.* Retrieved from https://www.ojjdp.gov/programs/csec_program.html

Raphael, J., Reichert, J. A., & Powers, M. (2010). Pimp control and violence: Domestic sex trafficking of Chicago women and girls. *Women & Criminal Justice, 20*, 89–104.

Ray, N. (2006). Lesbian, gay, bisexual, and transgender youth: An epidemic of homelessness. National gay and lesbian task force. Retrieved from http://www.thetaskforce.org/static_html/downloads/reports/reports/HomelessYouth_ExecutiveSummary.pdf

Reid, J. A., & Piquero, A. R. (2014). On the relationships between commercial sexual exploitation/prostitution, substance dependency, and delinquency in youthful offenders. *Child Maltreatment, 19*(3–4), 247–260.

Rice, E., Barman-Adhikari, A., Rhoades, H., Winetrobe, H., Fulginiti, A., Astor, R., et al. (2013). Homelessness experiences, sexual orientation, and sexual risk taking among high school students in Los Angeles. *Journal of Adolescent Health, 52*(6), 773–778.

Roe-Sepowitz, D. E. (2012). Juvenile entry into prostitution the role of emotional abuse. *Violence Against Women, 18*, 562–579.

Saunders, J. A., Morrow-Howell, N., Spitznagel, E., Doré, P., Proctor, E. K., & Pescarino, R. (2006). Imputing missing data: A comparison of methods for social work researchers. *Social Work Research, 30*(1), 19–31. https://doi.org/10.1093/swr/30.1.19.

Small, S. A., & Luster, T. (1994). Adolescent sexual activity: An ecological, risk-factor approach. *Journal of Marriage and the Family, 56*(1), 181–192.

Sobel, M. E. (1987). Direct and indirect effects in linear structural equation models. *Sociological Methods & Research, 16*(11), 155.

Thompson, S. J., & Pillai, V. K. (2006). Determinants of runaway episodes among adolescents using crisis shelter services. *International Journal of Social Welfare, 15*(2), 142–149.

Trafficking Victims Protection Act of 2000, 22 U.S.C. §§ 7101–7112 (2010).

Tyler, K. A., Whitbeck, L. B., Hoyt, D. R., & Cauce, A. M. (2004). Risk factors for sexual victimization among male and female homeless and runaway youth. *Journal of Interpersonal Violence, 19*(5), 503–520.

Tyler, K. A., Whitbeck, L. B., Chen, X., & Johnson, K. (2007). Sexual health of homeless youth: prevalence and correlates of sexually transmissible infections. *Sexual Health, 4*(1), 57–61.

Tyler, K. A., Hagewen, K. J., & Melander, L. A. (2011). Risk factors for running away among a general population sample of males and females. *Youth & Society, 43*(23), 583–608.

Warr, M. (2005). Making delinquent friends: Adult super- vision and children's affiliations. *Criminology, 43*, 77–106.

Weber, M. A. E., Boivin, J. F., Blais, L., Haley, N., & Roy, É. (2004). Predictors of initiation into prostitution among female street youths. *Journal of Urban Health, 81*(4), 584–595.

Westat, I. (1997). *National evaluation of runaway and homeless youth*. Washington, DC: U.S. Department of Health and Human Services, Administration on Children, Youth, and Families.

Whitbeck, L. B., Hoyt, D. R., Johnson, K. D., & Chen, X. (2007). Victimization and posttraumatic stress disorder among runaway and homeless adolescents. *Violence and Victims, 22*(6), 721–734.

Williamson, C., & Prior, M. (2009). Domestic minor sex trafficking: A network of underground players in the Midwest. *Journal of Child & Adolescent Trauma, 2*(1), 46–61.