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Longitudinal Associations Between Early-Mid Adolescent Risk and Protective Factors and Young Adult Homelessness in Australia and The United States

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Abstract

Homelessness is associated with a range of negative health and behavioral outcomes, yet life-course pathways to homelessness from adolescence to early adulthood are not well-documented. This study asks to what extent do early-mid adolescent risk and protective factors predict young adult homelessness, and whether the predictive nature of these factors is similar in Victoria, Australia, and Washington State in the USA. As part of the International Youth Development Study, adolescents were recruited as state-representative secondary school samples at Grade 7 (age 13, 2002) and longitudinally compared at average age 25. Higher rates of past year homelessness were reported by Washington State (5.24%), compared to Victorian young adults (3.25%). Although some cross-state differences in levels of adolescent demographic, individual, family, peer group, school and community predictors were found, cross-state comparisons showed these factors were equally predictive of young adult homelessness in both states. In univariate analyses most adolescent risk and protective factors were significant predictors. Unique multivariate adolescent predictors associated with young adult homelessness included school suspension

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All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent. Informed consent was obtained from all individual participants included in the study.

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(Adjusted Odds Ratio [AOR] = 2.76) and academic failure (AOR = 1.94). No significant unique protective effects were found. Prevention and intervention efforts that support adolescents' academic engagement may help in addressing young adult homelessness. The similar cross-state profile of adolescent predictors suggests that programs seeking to support academic engagement may influence risk for homelessness into young adulthood in both states. The similarity in life-course pathways to homelessness suggests that the USA and Australia can profitably translate prevention and intervention efforts to reduce homelessness while continuing to identify modifiable predictors.

Keywords

homelessness; adolescents; young adults; cross-state study; risk factors; protective factors

Introduction

Homelessness is a multifaceted and significant social problem in Australia and internationally. Homeless persons include those with no suitable or permanent occupancy at a residence and who may be unsheltered (e.g. living directly on the streets or in spaces not intended for habitation), in emergency shelters or temporary accommodation (Busch-Geertsema et al. 2016). It is estimated that 15% of Australian adolescents and young adults 12–24 years experienced homeless in 2017 (Fildes et al. 2018). In the United States (USA) approximately 15.6% of unaccompanied (without the care of a parent or guardian) adolescents and young adults 18–25 years experienced homelessness in 2017 (Morton et al. 2018). Adolescents and young adults experiencing homelessness face substantial marginalization and are at-risk for entering pathways to long-term homelessness and poverty (e.g. Caton et al. 2005). Experiencing homelessness can compound other health and social problems known to have their peak incidence in adolescence such as substance use (Milburn et al. 2006) and violence (Heerde et al. 2014). Experiencing homelessness during this development period has serious implications for the completion of education, transition to further education or employment, and the attainment of adult roles within health, social, behavioral, educational and economic domains (Bachman et al. 2002).

Cross-national Studies of Homelessness

Prospective cross-national studies can make valuable contributions not only to knowledge of homelessness prevalence, but also predictors of homelessness. Several studies have described cross-national differences in the health and behaviors of homeless adolescents and young adults (e.g. Milburn et al. 2006), yet little is known about cross-national differences in longitudinal predictors of homelessness. Prior cross-national studies have been limited by variation in homelessness definitions (Heerde et al. 2014) and study methodologies (Toro 2007). These studies have commonly analyzed data collected from purposefully recruited samples of homeless adolescents and young adults without a comparison group of non-homeless participants, and where data on factors influencing homelessness has been retrospectively reported (van den Bree et al. 2009).

Australia and the USA adopt similar definitions of homelessness (Australian Bureau of Statistics 2016; National Alliance to End Homelessness 2016), and policies seeking to reduce adolescent and young adult homelessness. The Housing First model, adopted in both countries, seeks to provide safe and stable housing for people experiencing homelessness. Although the model has shown some success in the USA, it has been limited in the Australian context (Australian Housing and Urban Research Institute 2018). In line with the data analyzed in this study, both Washington State in the USA and state of Victoria in Australia, invest in prevention, emergency, and housing strategies for reducing homelessness (Victorian Government 2018; Johnson 2019). More broadly, policies seeking to reduce young people's engagement in harmful behaviors (e.g. substance use, school-based behavior) across the two countries show differences (Beyers et al. 2004). Where Australian policy adopts a harm minimization standpoint, policies in the USA are zero tolerance and abstinence oriented. Country-level differences in rates of substance use and school suspension reflect these policy differences (Hemphill et al. 2014; Beyers et al. 2004). For example, Washington State, relative to Victorian adolescents, show significantly higher rates of cannabis use and school suspension, and lower rates of alcohol and tobacco use (Hemphill et al. 2011; Hemphill et al. 2014). Whether cross-national differences in factors that predict homelessness exist in the context of these policy approaches is unclear.

The Need for Longitudinal Studies of Homelessness

One approach to addressing the incidence of homelessness and its adverse consequences among adolescents and young adults is to understand the influence of risk factors (that increase the probability of experiencing homelessness) and protective factors (that decrease the probability of homelessness or mediate or moderate the effect of risk factors; Catalano and Hawkins 1996; Pollard et al. 1999) in their association with homelessness. Longitudinal studies of homelessness that examine these factors within ecological models (e.g. Social Development Model [SDM], Catalano and Hawkins 1996) and across important contexts of influence (e.g. individual, family, peers, school and community) are needed to inform research on the predictors of homelessness and the development of prevention and intervention strategies.

The SDM recognizes development and behavior occur in the context of multiple, interacting socializing contexts (family, peer-group, school, community), suggesting that adolescents and young adults are socialized through perceived opportunities for involvement in activities and interactions with others across socializing contexts, actual involvement and interaction, skills to participate and rewards or costs perceived from these social interactions (Catalano and Hawkins 1996). Embedding the current study in the SDM permits the analysis of malleable developmental (adolescent) predictors of young adult homelessness across multiple socializing contexts.

Contemporary longitudinal studies examining the influence of adolescent risk and protective factors on homelessness among young adults are few (e.g. van den Bree et al. 2009; Caton et al. 2005; Brakenhoff et al. 2015; Tyler et al. 2011; Shelton et al. 2009). The majority of knowledge concerning risk factors for homelessness has emerged from retrospective cross-sectional studies analyzing data from adolescents and young adults currently experiencing

homelessness (Brakenhoff et al. 2015; Tyler et al. 2011; van den Bree et al. 2009; Shelton et al. 2009). Little is known about the influence of protective factors (Heerde and Hemphill 2019a). Longitudinal studies that analyze data from a general population sample can help estimate rates of homelessness and examine risk and protective factors measured prior to the transition to homelessness (van den Bree et al. 2009).

Domains of Risk and Protection for Homelessness

Literature on childhood and early adolescent experiences of homeless youth commonly suggests a broad range of cross-sectional correlates of homelessness (e.g. Bearsley-Smith et al. 2008; Haber and Toro 2004). Findings of such studies provide an important basis from which to explore prospective predictors of homelessness. Studies investigating individual-level factors (characteristics of adolescents) have shown that prior homelessness experiences, substance use, poor physical and mental health, perpetration of violence and experiencing physical and sexual victimization are associated with adolescent and young adult homelessness (Brakenhoff et al. 2015; Heerde and Hemphill 2019b; Shelton et al. 2009; Tyler et al. 2011). With regard to family-level factors, homeless adolescents and young adults have commonly been exposed to family violence and childhood abuse (Shelton et al. 2009; Tyler et al. 2011; van den Bree et al. 2009). Having been in out-of-home care, low family socioeconomic status and substance use among family members (e.g. Haber and Toro 2004; Koegel et al. 1995) are also frequently cited family factors.

Homeless adolescents and young adults frequently report peer relationship problems, poor social networks, victimization and interactions with antisocial peers (Heerde and Hemphill 2019a; Shelton et al. 2009). Lower educational attainment, school suspension or expulsion, lower school commitment and fewer opportunities and recognition for involvement in school activities are school-level factors (Caton et al. 2005; Shelton et al. 2009; Tyler and Bersani 2008). Higher levels of poverty (e.g., lower than average income level) and lower attachment to ones' neighborhood are commonly cited community factors (Shelton et al. 2009; van den Bree et al. 2009).

The role of adolescent protective factors in decreasing, mediating or moderating the effect of risk factors for young adult homelessness, requires detailed study (Heerde and Hemphill 2019b; van den Bree et al. 2009). Prior studies have generally investigated a small number of protective factors (e.g. van den Bree et al. 2009) or behaviors among homeless adolescents and young adults (Thompson 2005). It remains unclear which adolescent risk and/or protective factors in different contexts are longitudinal precursors to young adult homelessness. Further understanding of these potential longitudinal associations' can be achieved within large population studies recruiting state representative adolescent samples.

The Present Study

This study examines developmental pathways and adolescent predictors of young adult homelessness, using data from a large international cross-state general population sample; the International Youth Development Study (IYDS). The design and longitudinal nature of the IYDS ensures that any observed differences in predictors of homelessness are likely to reflect real cross-state differences rather than methodological artifacts. Two research

questions were examined: (1) To what extent do adolescent factors predict young adult homelessness? and (2) Is the predictive nature of these factors similar in Victoria, Australia, and Washington State in the USA?

Methods

Participants

Data analyzed in this study were drawn from the International Youth Development Study (IYDS). The IYDS is an ongoing longitudinal study exploring the development of healthy and problem behaviors among adolescents and young adults from Victoria, Australia and Washington State, USA. The IYDS design and methods underwent multiple processes prior to study commencement (McMorris et al. 2007) to ensure cross-national validity and minimize method differences commonly seen in international comparisons (Segall et al. 1998), including the matching of sample design and recruitment and survey consent and administration procedures across both states. At the outset of the study, both states were similar in population size, urbanization, educational participation, and prosperity (e.g. low proportions of residents living in poverty; McMorris et al. 2007).

Three single grade cohorts of participants were recruited using a two-stage clustering approach: public and private schools with Grades 5, 7 and 9 were randomly selected for recruitment into the study using a probability proportionate to grade-level size sampling procedure (Kish 1965); and (2) one class at the appropriate grade level was randomly selected within each school (McMorris et al. 2007). The recruitment strategies resulted in 3,856 eligible students in Washington State and 3,926 eligible students in Victoria, across Grades 5, 7 and 9, being approached to participate in the study. Of these, 2,885 (74.8%) students in Washington State and 2,884 (73.5%) students in Victoria consented to and participated in the first survey in 2002. Retention rates across the study have remained high, with 98% retention in 2003 and 2004, 85% retention in 2008, 84% in 2010–11, 83% in 2012–13 and 87% in 2014–15 (Heerde et al. 2018). A detailed account of the IYDS sampling and recruitment methods has been published previously (McMorris et al. 2007). A flow diagram illustrating the tracking of participants at each wave of data collection is provided in Figure 1 (see online supplementary material, Figure 1).

The current study analyzes longitudinal data from the Grade 7 cohort extracted from early-mid adolescence (Grade 7 [2002], Grade 8 [2003] and Grade 9 [2004]) and young adulthood (2014), as this was the cohort chosen for long-term follow-up in the USA, and therefore has the most complete data in both states at these time points. The analyzed sample consisted of 1,945 participants (n = 984 [50.6%] in Victoria). In 2002, 989 (51%) participants identified as female. The sample age ranged between 12 and 16 years (mean (*M*)= 14.01 years, standard deviation (*SD*) = .43). The majority of the Victorian sample identified as Australian (91%) and the Washington State sample had a majority identifying as white (65%). In 2014, the sample ranged in age between 23 and 27 years (*M*[*SD*] = 25.14[.84]) and female participants formed 53% (n = 966) of the sample.

Procedure

Ethics approval.—The University of Melbourne Human Ethics in Research Committee and the Royal Children's Hospital Ethics in Human Research Committee provided approval for this study in Australia. In the USA, the University of Washington Human Subjects Review Committee provided approval for the study.

Survey administration.—Trained survey staff in both states used a single survey administration protocol. Written parental consent and participant assent was obtained for all participants at the study outset. During formal schooling, surveys were administered to class groupings within schools. Following the completion of formal schooling, participants provided informed consent and the survey was completed online. Participants who had prior parental consent (during formal schooling) and provided assent to be contacted beyond formal schooling, were contacted to complete the survey online. The self-report survey took 50–60 minutes to complete. During adolescence, Victorian participants received a small gift (e.g. stress ball) and Washington State participants received $10USD, at the completion of each survey. Most recently, young adult participants in both states received a $40USD/AUD gift voucher as reimbursement for their time.

Instruments

The IYDS survey was adapted from the Communities That Care youth survey (Arthur et al. 2002; Glaser et al. 2005; Pollard et al. 1999). Congruent with recommendations for cross-national instrument development (Segall et al. 1998), the IYDS survey underwent cognitive pretesting and pilot testing, including language review and cross-national item adaptation (McMorris et al. 2007). Full details on cognitive pretesting have been published previously (McMorris et al. 2007). The predictor measures used in the survey have demonstrated cross-sectional and longitudinal validity and reliability when administered in Victoria (Hemphill et al. 2011) and the USA (Arthur et al. 2002; Glaser et al. 2005). Descriptive statistics for all measures analyzed in the present article are provided in the online supplementary material (Table 1).

Homelessness at age 25 years was assessed using the item, "In the past year, have you been homeless (not had a regular place to live)?". Response options were dichotomous; no (0)/yes (1).

Predictors examined in early-mid adolescence were specified a priori due to their known influence on the development of homelessness and related behaviors (e.g. van den Bree et al. 2009; Brakenhoff et al. 2015; Shelton et al. 2009), their being specified in the SDM, and their being available in the IYDS survey.

Demographic factors included five measures. Participants reported their *age*, *gender*, and the *state* in which they lived (Victoria or Washington State). *Accommodation transitions* were measured using the item "Have you changed homes in the past year?" Response options ranged from 'yes' (1) through to 'no' (4) and recoded to reflect 'have not changed homes" (reference group) versus 'changed homes on one or more occasion' (1). *Family socio-economic status* was based on parent (mother and father) reported highest level of education

(e.g., less than secondary school, completed secondary school, completed post-secondary school) and level of family income (ranging from less than $10,000 to $200,000+) in 2002.

Individual-level predictors were measured using eight scales. *Antisocial behavior* was assessed using six items, such as “How many times in the past year have you carried a weapon?”. *Violent behavior* was measured using three items (e.g. “How many times in the past year have you threatened someone with a weapon?”). The item, “How many times in the past year have you been arrested?” was used to measure *arrests*. For each of these predictors, response options ranged from ‘never’ (1) through to ‘40+ times’ (8). Three items, including “It’s important to think before you act” were used to measure *impulsivity*. Items were rated on a 4-point scale ranging from ‘definitely yes’ (1) through to ‘definitely no’ (4). *Depressive symptoms* were measured using the Short Mood and Feelings Questionnaire (Angold et al. 1995). “I felt miserable or unhappy” is an example item. Items were answered on a 3-point scale of ‘not true’ (0), ‘sometimes true’ (1) or ‘true’ (2) and scores across all items were summed to form a total depressive symptoms score (0–26). Higher scores indicated higher depressive symptoms. *Belief in the moral order* was examined using four items (e.g. “It is all right to beat up people if they start the fight.”) The scale measuring *emotional control* included four items such as “I know how to relax when I feel tense.” Response options for these two scales ranged from: ‘definitely yes’ (1) through to ‘definitely no’ (4). *Alcohol use* was assessed using the item “In the past 30 days on how many occasions (if any) have you had more than just a few sips of an alcoholic beverage (e.g. beer)?”. The item was rated on an 8-point scale ranging from ‘never’ (1) through to ‘40+ times’ (8) and recoded to reflect ‘not at all” (reference group) versus ‘one or more occasion’ (1).

Family-level predictors were measured using five scales. *Family conflict* included three items (e.g. “People in my family have serious arguments.”) Nine items, including “The rules in my family are clear” assessed *poor family management*. The item “Do you feel very close to your father?” was one of four items measuring *attachment to parent(s)*. Three items, including “My parents give me lots of chances to do fun things with them” assessed *opportunities for prosocial behavior*. For each scale, response options ranged from ‘definitely no’ (1) to ‘definitely yes’ (4). *Parental attitudes favorable toward drug use* included four items (e.g. “How wrong do your parents feel it would be for you to smoke cigarettes?”). Response options ranged from ‘very wrong’ (1) to ‘not wrong at all’ (4).

Peer group predictors were examined using three scales. Participants reported their *interactions with antisocial peers* using eight items (e.g. “In the past year, how many of your best friends have carried a weapon?”). Four items, such as ‘In the past year, how many of your best friends have smoked cigarettes?’ examined *friends’ use of drugs. Interaction with prosocial peers* was assessed using two items, such as “In the past year, how many of your best friends have tried to do well in school?”. Response options for each scale ranged from ‘none of my friends’ (0) to ‘4 of my friends’ (4).

School-level predictors were assessed using four scales. *Academic failure* was assessed using two items, including “Putting them all together, what were your grades/marks like last year?” Response options ranged from ‘very poor’ (4) to ‘very good’ (1). The item, “How

many times in the past year have you been suspended from school?" measured *suspension*. Response options ranged from 'never' (1) to '40+ times' (8). *Low commitment to school* was measured using seven items (e.g. "How often do you feel that the schoolwork you are assigned is meaningful and important?") Response options ranged from 'never' (5) through to 'almost always' (1). *Opportunities for prosocial involvement* were examined using five items, such as "I have lots of chances to be part of class discussions or activities." Response options ranged from 'definitely no' (1) through to 'definitely yes' (4).

Community-level predictors were assessed using three scales. *Low neighborhood attachment* consisted of three items, including "I'd like to get out of my neighborhood." The item "I feel safe in my neighborhood" was one of five items measuring *community disorganization*. Response options for both scales ranged from 'definitely yes' (1) to 'definitely no' (4). *Rewards for prosocial involvement* were examined using three items (e.g. "There are people in my neighborhood who encourage me to do my best"). Response options ranged from 'definitely no' (1) to 'definitely yes' (4).

Survey Response Accuracy

The accuracy of participants responses was measured in early-mid adolescence. Responses were coded as questionable if participants reported (1) "I was not honest all of the time" when asked how honest they were when completing the survey; (2) use of a fictitious drug (included in the survey for accuracy checking) in the past month; and (3) drug use on >120 occasions in the past month.

Statistical Analysis

All analyses were conducted using Stata IC software for Windows (StataCorp LLC 2017), version 15.1. Fifteen participants in 2002, 35 in 2003, and 27 in 2004 met the criteria for questionable responses and were excluded from the analyses. Missing data were dealt with using list-wise deletion. The percentage of missing data across the analyzed variables ranged from 0 – 12.5% (M = 0.72%). Differences in means and frequencies of predictors between the two states, were examined using t-tests and chi-square analyses. Pooled standard deviations (Cohen 1977) were used to calculate effect sizes. Correlation analyses were performed to show highly correlated pairs or sets of variables that might result in collinearity in the multivariate analyses.

Prospective associations between adolescent predictors and young adult homelessness were examined using logistic regression analyses. Participant responses for each predictor were averaged to obtain a single scale score across the three waves (Grades 7–9). All predictors were then mean centered by subtracting the scale mean from its values. State-predictor interaction terms were calculated by multiplying the state variable (coded 0 and 1) by each centered predictor. Univariate analyses were conducted separately to examine associations between adolescent predictors and young adult homelessness. The first set of multivariate analyses examined associations between domain-specific predictors and homelessness. Next, predictors were grouped by domain and entered into the analysis by group. To conduct the most conservative test possible of adolescent predictors of young adult homelessness, predictors were grouped from most to least proximal according to their influence on the

individual (i.e. individual, family, peer group, school, and community). Each set of multivariate analyses controlled for demographic factors. The last step in the multivariate analyses examined the moderating role of state, using state-predictor interaction terms. To present the most parsimonious model with least assumptions, the final hierarchical multivariate model included the addition of statistically significant state-predictor interaction terms.

Results

State Comparisons of Predictors

Washington State participants reported higher rates of past year homelessness compared to those in Victoria (see online supplementary material, Table 1). Statistically significant state level differences were clear for 11 of the 16 predictors analyzed. Higher levels of violent behavior, impulsivity, past month alcohol use, parental attitudes to drug use, poor family management and low commitment to school were found for Victorian compared to Washington State adolescents. Higher levels of arrest, interactions with antisocial peers, school suspension, low neighborhood attachment and community disorganization were found for adolescents in Washington State. Regarding protective factors, Washington State compared to Victorian adolescents showed higher levels of emotional control, interaction with prosocial peers and school opportunities for prosocial involvement.

Early-Mid Adolescent Predictors of Young Adult Homelessness

Intercorrelations between young adult homelessness and all adolescent predictors were low (.01) to moderate (<.43) and in the expected direction. Homelessness was most strongly correlated with adolescent arrest (r = .34) and school suspension (r = .43). Intercorrelations between the analyzed predictors did not show severe multicollinearity, with no correlations >.80 (refer online supplementary material, Table 2).

At the univariate level (Model 1, Table 1), adolescent antisocial behavior (Odds Ratio [OR] = 2.87), having been arrested (OR = 4.11), poor family management (OR = 2.79), interaction with antisocial peers (OR = 2.60), suspension (OR = 4.96) and academic failure (OR = 3.25) showed the largest associations with young adult homelessness. Higher levels of attachment to parent(s) (OR = .52) in adolescence, opportunities for prosocial involvement in the family (OR = .53), interaction with prosocial peers (OR = .63) and community rewards for prosocial involvement (OR = .58) showed the greatest protective association with young adult homelessness.

Domain-specific multivariate models showed several adolescent predictors were uniquely and significantly associated with young adult homelessness. State was significantly associated with young adult homelessness such that living in Victoria was protective. For individual-level predictors, adolescent antisocial behavior uniquely increased risk for young adult homelessness (Adjusted Odds Ratio [AOR] = 2.25; Model 2). Belief in the moral order uniquely reduced risk for young adult homelessness. For family-level predictors, young adult homelessness was increased uniquely by poor family management practices in adolescence (AOR = 2.31; Model 3). Interactions with prosocial peers during adolescence

uniquely reduced the odds of young adult homelessness (AOR = .72; Model 4). Regarding school-level predictors, suspension (AOR = 3.18) and academic failure (AOR = 1.97; Model 5) uniquely predicted young adult homelessness. Community-level predictors showed no unique associations with later homelessness (Model 6).

For the hierarchical multivariate logistic regression model (Table 2; Full Model 7), school suspension (AOR = 2.76) and academic failure (AOR = 1.94) in adolescence increased risk for young adult homelessness when accounting for all other predictors in the model.

State-Predictor Moderators of Homelessness

Results showed no state-predictor interactions were uniquely statistically significant in either the domain-specific or final multivariate models.

Discussion

Longitudinal predictors that influence life-course pathways to young adult homelessness are not well-documented and there are few international cross-state studies investigating these pathways. We found the rate of young adult homelessness in Washington State was slightly higher than in Victoria. Rates of young adult homelessness were below the national average in both states. While estimates such as those available through national collections (Fildes et al. 2018; Morton et al. 2018) provide valuable information on the extent of homelessness across age groups, estimates of adolescent and young adult homelessness are subject to underestimation (Australian Bureau of Statistics 2016; National Law Center on Homelessness & Poverty 2017). Although participants were provided with assurances of confidentiality and anonymity when completing the survey, it is possible sensitivity to perceived stigma associated with experiencing homelessness may be intensified in a longitudinal survey where participants know they will be surveyed again.

At the univariate level, most adolescent predictors were associated with young adult homelessness; however, only academic failure and school suspension showed unique statistically significant multivariate associations. Our findings showed a similar profile of predictors across both states. Academic failure and suspension in adolescence maintained unique statistically significant associations with young adult homelessness in the multivariate model. Because all analyzed predictors showed univariate relationships with homelessness, we do not interpret this to mean that academic failure and school suspension are the only important" risk or protective factors. It may be that other included predictors affect academic success and suspension and thus are indirectly related to later homelessness. There were no cross-state differences in academic failure or its relationship to young adult homelessness. Levels of school suspension were higher in Washington State, however there was no cross-state difference in its association with homelessness.

The addition of school suspension and other predictors to the multivariate analysis reduced the effect of Victorian state location to non-significance. This finding is important in the context of school-behavior management policies, in both the USA and Australia. The use of suspension and school exclusion as a means of behavior management are used in both countries, however are used more commonly in the USA in association with dominant zero

tolerance approaches to misbehavior (e.g. expulsion) (Hemphill et al. 2014). Our findings suggest that the higher level of suspension in Washington State contributes to the higher rate of homelessness in that state. Although we found no cross-state difference in associations between school predictors and later homelessness, the country-level difference we found in rates of school suspension reflects these policy differences.

Our findings are consistent with prior research on educational risk for homeless children and adolescents (Masten et al. 1997; Obradović et al. 2009; Robinson 2018; Shelton et al. 2009; Rafferty et al. 2004). Prior studies have documented lower academic achievement, disrupted school attendance, suspension and expulsion among adolescents experiencing homelessness (e.g. Robinson 2018; Masten et al. 1997; Rafferty et al. 2004; Shelton et al. 2009). Educational underachievement and exclusion, including academic failure and suspension, have important long-term implications for young adult poverty and social and economic vulnerability (Obradović et al. 2009). School-based strategies which aid adolescents who are at-risk or vulnerable to school disengagement to continue their education, re-engage with school (Robinson 2018), and promote school connectedness (e.g. academic support) may influence later homelessness.

Childhood abuse and adverse family experiences are known risk factors for adult homelessness (Brakenhoff et al. 2015; Shelton et al. 2009; Tyler et al. 2011). These experiences disrupt normative adolescent development and negatively influence an individual's self-worth, emotional regulation and interpersonal relationships (Heerde and Hemphill 2019a; Tyler and Bersani 2008). Measures of childhood abuse were not available in the current study; hence, we were unable to test prospective associations between family-based harm and later homelessness. However, we have examined the influence of multiple predictors related to family adversity (e.g. family conflict, attachment to parent(s)). These adversities, while associated at the univariate level, were not uniquely associated with homelessness in the multivariate analysis. It is possible that the effects of childhood adversity subsequently influence other predictors associated with young adult homelessness, including academic failure and school suspension. An important direction for future longitudinal studies of homelessness will be to include detailed information on childhood or adolescent abuse to provide a stronger basis on which to examine potential mechanisms (such as academic failure) that may explain the relationship between abuse and later homelessness.

The examination of protective factors in studies of homelessness is sporadic; little is known about how these factors may reduce, mediate or moderate risk for homelessness (Heerde and Hemphill 2019a; van den Bree et al. 2009). Although most protective factors examined in this study showed significant univariate effects, no unique associations remained in the multivariate model. Within the domain specific models, only belief in the moral order and interactions with prosocial peers remained significant. There is little similar empirical work with which to situate these findings; the potentially important role of personal morals (e.g. beliefs concerning the need for honesty) and engagement with prosocial peers are notable within the context of the main findings of this study. Indeed, peers as important sources of emotional and social support among adolescents experiencing homelessness has been documented (e.g. McCarthy et al. 2002).

Study Strengths and Limitations

Study strengths.—This study has several strengths. This is one of few longitudinal studies examining adolescent predictors of young adult homelessness and has used data collected from a general population sample, where data on these predictors was collected prior to homelessness. At the time of study commencement in 2002 the analyzed sample was state-representative. The study is unique in analyzing two cross-state samples, recruited, surveyed, and longitudinally followed using identical methods with high response rates (McMorris et al. 2007). This study has detailed data on a wide range of predictors from early in adolescence and into young adulthood. Therefore, the study presents a unique opportunity to examine adolescent predictors of homelessness prospectively over multiple periods of development relative to prior studies. Thus, a noteworthy strength of this study is its ability to maximize the available data to investigate the research questions of the current study, address some of the limitations of prior homelessness research, and contribute vital knowledge to the development of prevention and intervention approaches.

Study limitations.—Several limitations to the present study are acknowledged. Measures of young adult homelessness and adolescent predictors were based on self-report data. The use of self-report data in studies of adolescents and for the predictors examined here is considered reliable (e.g. Jolliffe et al. 2003). The IYDS survey underwent cognitive pretesting (McMorris et al. 2007) and has shown adequate reliability and longitudinal validity (Hemphill et al. 2011; Glaser et al. 2005). The factor structure of these predictors has also been validated (Glaser et al. 2005). The analyzed predictors were correlated, however not at a level which implied multicollinearity.

Although participants were originally sampled to be state-representative, differences emerging over time at the state-level have implications for potential differences in predictors of homelessness. Owing to the low prevalence of homelessness (72 cases across our sample), the analyses may have been underpowered to detect small significant effects. We used a single item to measure young adult homelessness; measures such as this are common in homelessness research (Heerde et al. 2015). This study did not examine the forms of homelessness experienced by young adults (e.g. rough sleeping, couch surfing). Adolescent surveys did not ask about participants' experience of homelessness; however, the logistic regression analyses controlled for accommodation transitions experienced in adolescence. It is also possible that participants experiencing homelessness are a high-risk group for attrition and may not have online access. However, the increasing use of mobile technologies for communication and research with homeless population groups has been reported (e.g. Humphry 2014). Participants were not asked about their sexual identity or orientation, nor their gender identity beyond the binary question of male or female during adolescence. Demographic predictors, including participants' race and ethnicity, should be examined in future studies. Last, our findings are generalizable only to the samples analyzed.

Conclusions

Adolescent academic failure and school suspension were uniquely associated with young adult homelessness. Higher rates of suspension appear to contribute to higher rates of young

adult homelessness in Washington State versus Victoria. Adolescent prevention and intervention efforts that increase academic engagement may help in preventing young adult homelessness. Most of the adolescent predictors studied were associated with young adult homelessness at the univariate level. Caution is added since most predictors showed univariate relationships with homelessness; these predictors may affect academic success and suspension and be indirectly related to homelessness. Our findings showed a similar set of cross-state predictors suggesting programs seeking to support academic engagement may influence risk for homelessness into young adulthood in both Victoria and Washington State. The continued analysis of longitudinal data is needed to model a broad range of adolescent risk and protective factors in their prediction of later homelessness. The viability to cross-nationally translate prevention and intervention approaches will be supported by the continued examination of country-level differences in risk and protective factors.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Univariate and multivariate logistic regression models investigating early adolescent predictors of young adult homelessness.

	Univariate Model		**Domain specific multivariate models**										**Fully adjusted multivariate model**	
	Young adult homelessness (Model 1; n=1,701)		**Individual factors (Model 2; n=1,618)**		**Family factors (Model 3; n=1,599)**		**Peer factors (Model 4; n=1,618)**		**School factors (Model 5; n=1,618)**		**Community factors (Model 6; n=1,618)**		**Yong adult homelessness (Model 7; 1,599)**	
Predictors	**OR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***
Demographic factors														
Female	.87 [.54, 1.40]	.571	1.20 [.68, 2.10]	.532	.90 [.53, 1.52]	.688	.97 [.58, 1.63]	.917	1.29 [.77, 2.18]	.337	.91 [.55, 1.51]	.716	1.26 [.68, 2.32]	.457
Victoria	.61 * [.37, .98]	.043	.65 [.37, 1.13]	.127	.58 * [.34, .99]	.045	.64 [.38, 1.08]	.092	.64 [.37, 1.09]	.097	.73 [.44, 1.24]	.246	.68 [.51, 1.25]	.217
Age (years)	1.08 [.61, 1.91]	.800	1.09 [.58, 2.03]	.788	1.08 [.58, 2.02]	.800	1.03 [.56, 1.89]	.918	.96 [.53, 1.74]	.884	1.09 [.59, 2.01]	.795	.96 [.51, 1.80]	.897
Family SES	1.45 [.89, 2.39]	.139	1.34 [.81, 2.20]	.257	1.37 [.83, 2.26]	.223	1.42 [.87, 2.34]	.165	1.53 [.93, 2.54]	.096	1.43 [.86, 2.36]	.164	1.44 [.86, 2.42]	.163
Accommodation transitions	1.35 [.85, 2.18]	.205	1.13 [.68, 1.90]	.633	1.20 [.73, 1.98]	.478	1.09 [.65, 1.81]	.750	1.00 [.60, 1.68]	.995	1.16 [.70, 1.92]	.554	.97 [.56, 1.65]	.897
Individual factors														
Antisocial behavior	2.87 *** [1.93, 4.25]	<.0001	2.25 ** [1.03, 4.89]	.041	-	-	-	-	-	-	-	-	2.14 [.91, 5.05]	.082
Violent behavior	2.11 ** [1.36, 3.26]	.001	.50 [.21, 1.20]	.123	-	-	-	-	-	-	-	-	.58 [.23, 1.43]	.236
Arrest	4.11 *** [2.25, 7.52]	<.0001	2.09 [.98, 4.50]	.058	-	-	-	-	-	-	-	-	1.40 [.63, 3.09]	.404
Impulsivity	2.17 ** [1.31, 3.61]	.003	1.23 [.63, 2.38]	.542	-	-	-	-	-	-	-	-	1.09 [.55, 2.17]	.806
Depressive symptoms	1.06 * [1.01, 1.10]	.010	1.02 [.96, 1.07]	.510	-	-	-	-	-	-	-	-	.99 [.94, 1.05]	.842
Belief in the moral order (P)	.40 *** [.26, .61]	<.0001	.54 * [.30, .99]	.045	-	-	-	-	-	-	-	-	.70 [.34, 1.41]	.317

	Univariate Model		Domain specific multivariate models										Fully adjusted multivariate model	
	Young adult homelessness (Model 1; n=1,701)		Individual factors (Model 2; n=1,618)		Family factors (Model 3; n=1,599)		Peer factors (Model 4; n=1,618)		School factors (Model 5; n=1,618)		Community factors (Model 6; n=1,618)		Yong adult homelessness (Model 7; 1,599)	
Predictors	**OR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***
Emotional control (P)	.72 [.46, 1.12]	.145	-	-	-	-	-	-	-	-	-	-	-	-
Past month alcohol use	1.90 * [1,02, 3.54]	.044	1.15 [.50, 2.61]	.747	-	-	-	-	-	-	-	-	1.07 [.43, 2.69]	.885
Family factors														
Family conflict	1.58 ** [1.12, 2.23]	.009	-	-	1.21 [.78, 1.88]	.398	-	-	-	-	-	-	1.14 [.70, 1.84]	.600
Parental attitudes favorable toward drug use	1.33 [.81, 2.17]	.264	-	-	-	-	-	-	-	-	-	-	-	-
Poor family management	2.79 *** [1.73, 4.52]	<.0001	-	-	2.31 * [1.20, 4.42]	.012	-	-	-	-	-	-	1.13 [.51, 2.52]	.761
Attachment to parents (P)	.52 *** [.36, .75]	<.0001	-	-	.65 [.36, 1.19]	.162	-	-	-	-	-	-	.80 [.42, 1.52]	.499
Opportunities for prosocial involvement (P)	.53 ** [.37, .77]	.001	-	-	1.14 [.58, 2.23]	.709	-	-	-	-	-	-	1.33 [.64, 2.75]	.450
Peer factors														
Antisocial peers	2.60 *** [1.78, 3.79]	<.0001	-	-	-	-	1.42 [.72, 2.78]	.309	-	-	-	-	.70 [.27, 1.81]	.464
Friends' drug use	1.78 *** [1.39, 2.28]	<.0001	-	-	-	-	1.41 [.94, 2.11]	.099	-	-	-	-	1.09 [.67, 1.78]	.720
Prosocial peers (P)	.63 ** [.47, .84]	.001	-	-	-	-	.72 * [.53, .97]	.032	-	-	-	-	.97 [.67, 1.41]	.879
School factors														
Suspension	4.96 *** [3.07, 8.02]	<.0001	-	-	-	-	-	-	3.18 *** [1.79, 5.66]	<.0001	-	-	2.76 ** [1.48, 5.16]	.001
Academic failure	3.25 *** [2.17, 4.87]	<.0001	-	-	-	-	-	-	1.97 ** [1.18, 3.29]	.009	-	-	1.94 * [1.14, 3.31]	.015

	Univariate Model		Domain specific multivariate models										Fully adjusted multivariate model	
	Young adult homelessness (Model 1; n=1,701)		Individual factors (Model 2; n=1,618)		Family factors (Model 3; n=1,599)		Peer factors (Model 4; n=1,618)		School factors (Model 5; n=1,618)		Community factors (Model 6; n=1,618)		Yong adult homelessness (Model 7; 1,599)	
Predictors	**OR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***	**AOR [95% CI]**	***p***
Low commitment to school	2.31*** [1.54, 3.46]	<.0001	-	-	-	-	-	-	.95 [.54, 1.68]	.852	-	-	.61 [.31, 1.19]	.147
Opportunities for prosocial involvement (P)	.32** [.16, .62]	.001	-	-			-	-	.44 [.18, 1.04]	.063	-	-	.49 [.20, 1.21]	.122
Community factors														
Low neighborhood attachment	1.85*** [1.34, 2.56]	<.0001	-	-	-	-	-	-	-	-	1.50 [.97, 2.33]	.069	1.47 [.93, 2.33]	.100
Disorganization	1.60* [1.04, 2.47]	.034	-	-	-	-	-	-	-	-	1.07 [.62, 1.85]	.810	.67 [.36, 1.26]	.219
Rewards for prosocial involvement (P)	.58** [.42, .81]	.001	-	-	-	-	-	-	-	-	.70 [.48, 1.03]	.067	.89 [.59, 1.35]	.589
Pseudo R^2	-	-	.071		.050		.055		.104		.038		.128	
Adjusted R^2	-	-	.024		.014		.022		.068		.005		.030	

Note. The fully adjusted analyses (Model 7) control for gender, age, state, and all risk and protective factors. The final hierarchical multivariate logistic regression model is presented here (contact lead author for further details about other modeling stages). SES = socio-economic status; (P) = Protective factor. OR = odds ratio; AOR = adjusted odds ratio; CI = confidence interval. Female gender (coded 0 = male, 1 = female); Victoria (coded 0 = Washington State, 1 = Victoria); Past month alcohol use (coded 0 = no use, 1 = recent use). Pseudo R^2 = McFadden's R^2; Adjusted R^2 = McFadden's Adjusted R^2.

* $p < .05$,

** $p < .01$,

*** $p < .001$.