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ORIGINAL PAPER

Homelessness, Mental Illness, and Criminal Activity: Examining Patterns Over Time

Sean N. Fischer · Marybeth Shinn · Patrick Shrout · Sam Tsemberis

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Abstract This study examined whether street homelessness, sheltered homelessness, and the severity of psychological symptoms predicted non-violent and violent crime among 207 mentally ill participants who were homeless at baseline. Participants were interviewed at 9 time points over 4 years. Hierarchical linear modeling (HLM) was used to examine whether changes in homelessness status and symptom severity predicted changes in criminal activity over time. Results indicated that homelessness both on the streets and in shelters and psychological symptom severity predicted increases in non-violent crime. Sheltered homelessness and symptom severity predicted increases in violent crime, although street homelessness did not. A separate mediational analysis with 181 participants showed that the relationship between diagnosis of a psychotic disorder and both non-violent and violent criminal activity was partially mediated through the severity of psychotic symptoms. Implications for research and intervention are discussed.

S. N. Fischer (✉)
Psychology Department, New York University, 715 Broadway, 2nd Floor, New York, NY 10003, USA
e-mail: sean.fischer@nyu.edu

M. Shinn
Department of Human and Organizational Development, Vanderbilt University, Peabody College #90, 230 Appleton Place, Nashville, TN 37203-5721, USA

P. Shrout
Psychology Department, New York University, 6 Washington Place, New York, NY 10003, USA

S. Tsemberis
Pathways to Housing, Inc., New York, USA

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Introduction

The current study examines the relationship between homelessness, mental illness, and two types of criminal offenses: non-violent and violent crimes. This study builds on the literature by examining how the likelihood of committing a crime changes as individuals cycle between episodes of homelessness and housing and as mental illness symptoms become more and less severe. By estimating effects of housing context and symptom severity on changes in criminal activity within persons across time, it holds constant other personal characteristics which may confound relationships between homelessness, mental illness, and crime in between-person studies.

Non-Violent Criminal Activity

Previous studies have found that homeless individuals are at risk for engaging in non-violent criminal activity (Martell et al. 1995); DeLisi (2000) found that homeless jail inmates were more likely to have been arrested for nuisance offenses (e.g., camping without a permit, indecent exposure) than domiciled inmates. Other researchers showed that homeless individuals are often arrested for crimes resulting from subsistence-related strategies, such as being charged with trespassing or sleeping on a park bench (Fischer 1988; Snow et al. 1989). Snow and Mulcahy (2001) showed that homeless individuals may adopt new subsistence strategies, including illegal strategies such as theft, when previous strategies are blocked (e.g., a new city ordinance restricting panhandling).

Interestingly, no research to the author's knowledge has focused on whether the association between homelessness and non-violent criminal activity is different when individuals are connected to institutional supports such as shelters and drop-in centers. The current study tests whether homeless individuals are less prone to non-violent criminal activity when spending their nights at these types of institutions (referred to as *sheltered homelessness*) than when they are spending their nights in public locations such as the streets or abandoned buildings (referred to as *street homelessness*). Homeless individuals may be less likely to engage in subsistence-driven, non-violent crime if their survival needs are fulfilled by institutional supports.

Surprisingly, little is known about the relationship between mental illness and non-violent crimes. Belcher has suggested that homeless individuals with chronic mental illnesses may be prone to criminal activity because they have difficulty functioning within "'normative' reality" (Belcher 1989, p. 181), or because they lack a structured environment that hinders their use of services or prescribed medication (Belcher 1988). The situation of homelessness, therefore, may aggravate non-violent criminal activity among mentally ill individuals in ways that are different than if they were housed. Specifically, non-violent criminal activity may be similar between domiciled individuals with low and high severity of mental illness symptoms (referred to in this paper as *psychological symptom severity*). However, homeless individuals with high psychological symptom severity may be more likely to engage in non-violent crime than homeless individuals with low symptom severity. The literature provides little evidence for or against this type of interaction.

Violent Criminal Activity

Homeless individuals who have serious mental illnesses may be at risk for arrest for violent crimes (e.g., Richman et al. 1992). In fact, research suggests that people with mental illnesses have a modestly higher rate of committing violent crimes than the general population (for a review, see Mulvey 1994). For example, using data from three large surveys of adult households, Swanson and colleagues found that, controlling for substance abuse, the prevalence of violence among individuals diagnosed with major mental disorders, including schizophrenia and affective disorders, was higher than among individuals without disorders (Swanson et al. 1990). Mulvey (1994) stated that mental illness symptoms may be a better predictor of violence than diagnosis, suggesting that the tendency toward violence may change within individuals as their symptoms become more or less severe. The current study builds on the literature by examining whether the likelihood of committing a violent crime among individuals with serious mental illnesses changes over time as psychological symptom severity changes.

Some researchers have found that the presence of psychotic symptoms in particular may predict violent behavior (for a review, see Bjorkly 2002a, b). For example, Link et al. (1992) found that mentally ill patients were more likely to engage in violent behavior than community controls and that psychotic symptoms accounted for nearly all differences in violent behavior between the two groups. Interestingly, no research to the authors' knowledge has examined the relative importance between the diagnosis of a psychotic disorder and active psychotic symptoms when predicting violent criminal activity. This study tests whether a relationship between diagnosis of a psychotic disorder and criminal activity exists, and if this relationship is fully mediated through the severity of psychotic symptoms. It seems likely that the propensity to commit a violent crime among individuals with a psychotic disorder will change over time as the severity of their symptoms also changes.

Previous research has not provided a clear understanding of the relationship between homelessness and violent criminal activity. Several studies using mentally ill samples suggest that homelessness is significantly associated with violent crime (Martell 1991; Martell et al. 1995). Richman et al. (1992) found that among mentally ill offenders, those individuals who had been homeless at the time of their arrest were more likely to have committed previous violent crimes. Swanson et al. (2002) found that after controlling for self-rated mental health status and history of psychiatric hospitalization, homelessness was independently associated with violent criminal activity. However, other researchers have not been able to replicate this relationship. Snow et al. (1989) found that homeless men were generally no different than the overall male population in committing violent crimes. Arrests were either not statistically different or lower for homeless participants for murder, rape, and aggravated assault, though homeless participants had slightly higher arrest rates for robbery. McNiel et al. (2005) found that homeless inmates were significantly less likely to have been arrested for a violent crime than housed individuals.

Research also has not examined whether interactions between homelessness and mental illness predict increases in violent crime. Belcher (1988) has suggested that some mentally ill individuals may be more prone to criminal behavior in unstructured environments such as homelessness. Although little research directly examines the consequences of an unstructured environment, Katz and Kirkland (1990) found that structure within psychiatric wards may help explain differences in patients' violent behavior. Specifically, patients in wards characterized by unpredictable events and staff–patient encounters exhibited more violent behavior than patients in wards characterized

by clear structure and predictable events. The current study tests whether violent criminal activity is higher among homeless adults than housed adults when symptom severity is high, but similar when symptom severity is low.

Between- Versus Within-Persons Research

Research that suggests positive relationships exist between homelessness, mental illness, and criminal activity has generally used cross-sectional, between-person methods that examine differences between homeless versus housed participants or individuals with static representations of mental illness. Such studies limit causal inference by leaving open the possibility that individuals who are prone to homelessness or severe mental illness symptoms are also prone to criminal activity, but that one does not necessarily encourage the other. Without a longitudinal, within-person design, it remains unclear if the propensity toward criminal activity changes when housing status changes (i.e., individuals move from homelessness into housing or vice versa) or the severity of mental illness symptoms changes.

One example of a study that examined within-person change in a sample of homeless adolescents used retrospective, self-reported criminal activity before and after participants became homeless (McCarthy and Hagan 1991). Findings indicated that participants who were homeless for a year or more were more likely to report engaging in all forms of criminal activity measured in the study than before they became homeless. Although not directly related to criminal activity, other researchers found that among HIV-positive adults, risky behaviors associated with HIV transmission (e.g., needle use, unprotected sex) increased among participants whose housing status worsened between observation periods (e.g., moving from housing to homelessness) and decreased among participants whose housing status improved (Aidala et al. 2005). Unfortunately, comparable research on criminal activity among homeless adults and studies that use prospective designs with multiple time points is scant. In addition, no known study has examined changes in criminal activity as psychological symptom severity fluctuates.

The current study addresses these gaps in the literature. First, its longitudinal design tracks changes within individuals across observation periods to examine how patterns of deviant behavior change as participants experience changes in housing status and severity of psychological symptoms. Second, it examines the relationship between psychiatric diagnosis, psychotic symptoms, and criminal activity. Specifically, this study tests the following within-person hypotheses: (1) Individuals will be more likely to commit a non-violent crime when they are homeless, particularly for offenses that may be related to subsistence strategies (e.g., strategies aimed at meeting basic needs). In addition, street homelessness will have a stronger association with this type of non-violent crime than sheltered homelessness; (2) Individuals will be more likely to commit violent offenses when they experience greater psychological symptom severity. In addition, this study will examine (3) the relationship between symptom severity and non-violent criminal activity, (4) the relationship between street and sheltered homelessness and violent criminal activity, and (5) interactions between symptom severity and both types of homelessness when predicting non-violent and violent criminal activity.

Cross-Level Hypotheses

Cross-level analysis tests relationships between variables at different levels of analysis (see Shinn and Rapkin 2000, for a review). The current study will test the cross-level hypothesis that (6) individuals with a diagnosis of a psychotic disorder will be more likely to commit violent offenses than those with other diagnoses, and this relationship will be mediated by psychotic symptom severity. Diagnosis of a psychotic disorder is represented as a stable, person-level characteristic, whereas psychotic symptom severity is represented as a characteristic that can change within individuals across observation periods. A similar relationship between diagnosis, psychotic symptoms, and non-violent crime (7) will be explored.

Method

Participants

A total of 225 adults participated in the study from which these data are drawn. However, seven participants were not included in any of the analyses in this paper due to incomplete data on the variables of interest. Of the remaining 218 participants, most of the sample ($n = 152$) was literally homeless at the time of recruitment. To be eligible, these participants were required to (1) have spent 15 of the 30 days prior to recruitment on the street or in other public places, (2) have shown a period of housing instability of at least 6 months, and (3) have an Axis I diagnosis of severe mental illness (American Psychiatric Association 2000), such as a psychotic disorder (e.g., schizophrenia) or mood disorder (e.g., major depressive disorder). Other Axis I disorders, such as substance-related disorders or sleep disorders, did not meet this criterion. These participants were recruited mostly through referrals from homeless outreach programs. The remaining participants ($n = 66$) were recruited from two state psychiatric hospitals and were required to meet the same three requirements immediately prior to hospitalization. Baseline

demographic information indicated that the participants were mostly male (78%), non-White (72%), unemployed (89%), and unmarried (88%). The age of participants ranged from 18 to 70 ($M = 41.5$, $SD = 11.9$). The average age for the first time homeless was 29.7 ($SD = 12.9$), the average lifetime homelessness was 6.5 years ($SD = 7.2$), and the average longest period homeless was 3.6 years ($SD = 5.0$), all of which highlight the chronic nature of the sample's homelessness.

Participants were recruited in New York City for a larger study comparing two models of housing services offered to homeless individuals. Specifically, participants were either assigned at the beginning of the study to an experimental "housing first" group in which they received immediate placement into permanent housing with a variety of mostly optional services, or a control group ("treatment as usual" housing) which included housing programs that required psychiatric and substance abuse treatment and sobriety before offering permanent housing (for more information, see: Gulcur et al. 2003; Padgett et al. 2006; Tsemberis et al. 2003, 2004). Group assignment is not relevant to the current study's goals, but it is included in the analyses to control for possible effects.

Procedure

Trained research assistants interviewed participants at the time of recruitment and every 6 months thereafter for 48 months. At each assessment period, data were collected on homelessness, mental illness symptoms, and criminal activity. In addition, because the psychiatric diagnoses required for study entry were assigned by a variety of health care professionals and not with a structured diagnostic instrument, participants were given the Structured Clinical Interview for DSM-IV Axis I Disorders (described later) after the 36-month interview to obtain diagnoses. Interviews generally lasted between 1 and 2 hours and were usually conducted at the research site, although some participants were interviewed at other locations that were more convenient for them. Interviewers read the informed consent statement aloud to participants before asking whether they would like to participate. Participants were paid between $25 and $40 per interview.

Materials

Demographics

Participants' demographic information assessed at baseline included gender, age, marital status, employment status, education, and lifetime history of homelessness. Information on race was also collected during baseline, but missing and unclear responses were replaced with data gathered during the 30-month assessment.

Residential Follow-Back Calendar

This measure assessed the residential history of participants between time points (New Hampshire Dartmouth Psychiatric Research Center 1995). Interviewers began by asking participants where they stayed the night before, how long they had stayed there, where and how long they stayed immediately before that, and so on until they reached the point of the previous interview. Places named by the participants were classified into 34 categories (e.g., street, drop-in center, hospital, own apartment). Of these categories, seven were considered to be literally homeless. These locations were further divided into street homelessness or sheltered homelessness. Locations that were considered street homelessness were: (1) All night theater, subway station, or other indoor public place; (2) subway or bus; (3) abandoned building; (4) car or other private vehicle; (5) on the street or in another outdoor place. Locations that were considered sheltered homelessness were: (1) emergency shelter; (2) drop-in center. Figure 1 shows the sample's mean proportions of time spent homeless at each interview.[1] The residential follow-back calendar has been shown to be a reliable and valid instrument (Tsemberis et al. 2007). Other studies document the method's reliability and validity in other research areas, particularly with substance use (Brown et al. 1998; Ehrman and Robbins 1994; Sobell and Sobell 1992).

Colorado Symptom Index

A modified version of the Colorado Symptom Index (CSI; Ciarolo et al. 1981; Conrad et al. 2001) was used to assess psychological symptom severity at each assessment. The purpose of the CSI is to provide researchers with a short self-report measure of psychological symptoms appropriate for a mentally ill sample, and it includes 15 items that range in severity and type of symptom (e.g., "In the past month, how often have you felt depressed?", "In the past month, how often did you hear voices, or hear or see things that other people didn't think were there?"). Responses range on a five-point scale ranging from zero ("Not at all") to four ("At least every day"). Missing data were replaced with individual participants' average item score within a given observation period. Scores across the 15 items were summed to create a total score. Mean scores ranged from

[1] Certain variables only appear in analyses where a subset of participants was included. For these variables, we report figures and descriptive statistics that include only the relevant subset of participants.

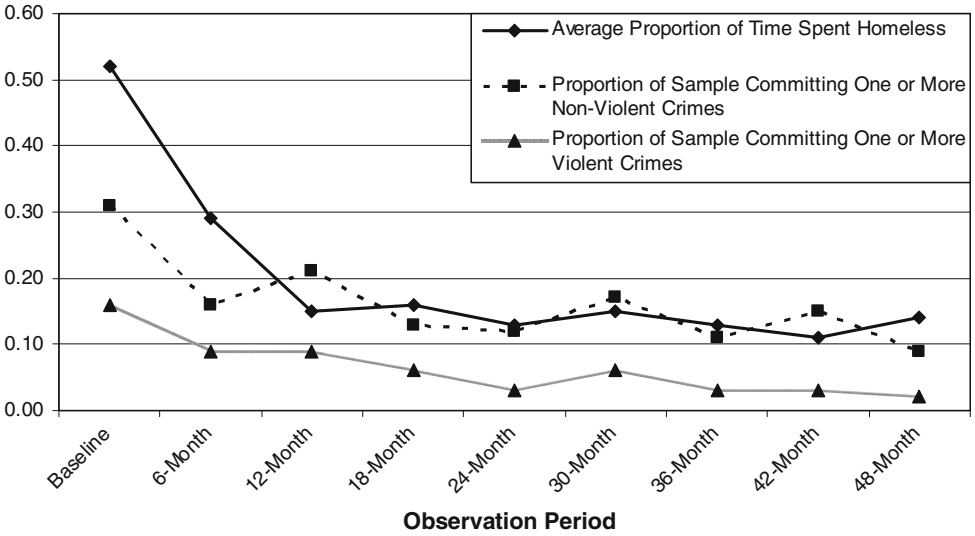

Fig. 1 Average proportion of time spent homeless and the proportions of the sample committing at least one non-violent crime and one violent crime at each time point

14.8 ($SD = 11.2$) to 21.1 ($SD = 14.8$) across the observation periods. Internal consistency reliability was strong, with alphas ranging between .81 and .92. The CSI has also demonstrated acceptable validity in a national sample of homeless individuals of which the current sample is a subset (Conrad et al. 2001). Conrad and colleagues also found strong test-retest reliability within a short 15-day interval, although long-term stability was not tested and may not be as strong. The current study took this possibility into account and modeled the variability across observations.

Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Non-Patient Edition (SCID-I/NP)

This instrument assessed the presence of Axis I disorders using the criteria outlined in the American Psychiatric Association's (1994) Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (First et al. 1998). The SCID-I/NP is divided into diagnostic modules that allow the researcher to stop inquiring about a disorder that is clearly not present. The measure consists mostly of closed-ended questions, although open-ended follow-up questions are provided, and interviewers are encouraged to insert their own questions to help make more accurate diagnoses. In addition to assessing all Axis I disorders, the SCID-I/NP also allows the interviewer to assign a principle diagnosis. The instrument has demonstrated good psychometric properties for assessing severe mental illness (Basco et al. 2000; Fennig et al. 1994; Williams et al. 1992).

Criminal Activity Questionnaire

The dependent variables for the analyses were constructed from this measure. Participants were asked 15 questions about their criminal activity in the previous 6 months. The items inquired about a variety of illegal activities (e.g., "During the last six months, have you robbed someone?", "During the last six months, have you hit someone so hard you hurt them?"). After each item, participants were asked to respond, in a yes/no format, whether they had committed the crime(s) mentioned, and then asked whether they were charged for the crime(s). This study focuses only on crimes committed, regardless of whether an arrest was made.

We created two categories of items. The first category consisted of non-violent offenses that we believed could be related to subsistence strategies (i.e., strategies employed by a person to meet basic needs). As noted earlier, homeless individuals employ a variety of subsistence strategies to meet their basic needs, and some of these strategies may be illegal. Non-violent offenses which we did not expect to be related to subsistence strategies, regardless of housing status (e.g., driving a car recklessly or without a license) or which were difficult to classify because of the wording of a particular item ("have you bought, sold, or used illegal drugs?") were excluded from this category. The criminal activities that composed this category included the following, with percentages reflecting the proportion of instances reported for a specific activity out of all criminal instances analyzed in this paper: public disturbances (29.7%; e.g., urinating in a public place, public intoxication), trading sex for money, drugs, goods, or services (12.1%), shoplifting/vandalism (8.6%), burglary/breaking and entering a home or store (5.1%), and writing someone else's name on a check to buy something (1.8%). Various other offenses (15.6%) included in this category were offered by participants in response to the last question, which inquired whether participants committed additional offenses not listed in the previous items. For this question, participants listed offenses such as trespassing, aggressive

panhandling, and turnstile jumping to access the city subway system (the subway system is sometimes used as an alternative form of shelter by homeless individuals in addition to typical transportation needs). Readers should note that shoplifting and vandalism were included in the same item, such that a "Yes" on this particular item could refer to either type of crime. Vandalism would most likely not be related to subsistence strategies, but the item's wording did not allow us to separate participants' responses between these two types of crime. We decided to include this item despite its limitations because we believe that shoplifting could potentially be an important subsistence strategy, as suggested by prior research (e.g., Snow et al. 1989).

The second category consisted of violent crimes and included the following actions: hitting someone so hard that it hurt them (18.3%), robbery (4.6%), rape (0.4%, two instances), and murder, on purpose or accidental (0.4%; two instances). Additional offenses (3.3%) named in the last question included other forms of assault.

For each category, we created a binary variable (non-violent and violent crime, respectively) such that participants received a score of zero if they did not commit a non-violent/violent crime and a score of one if they committed at least one non-violent/violent crime in the previous 6 months. Figure 1 shows the proportions of the sample that committed at least one crime in each category at each time point.

Data Analytic Strategy

Between-person approaches can provide evidence of a relationship between time spent homeless and the probability of committing a crime, but they cannot distinguish the variance that is present between individuals (variance that is accounted for by stable characteristics such as gender) and the variance that is present within individuals (accounted for by time-varying phenomena such as time spent homeless within each observation period). In other words, the relationship between homelessness and criminal activity could be primarily due to a type of person who is simply prone to both (a between-person phenomenon), though the two variables could be causally independent of one another. In this case, the probability of committing a crime would remain unchanged if a particular person moved from homelessness to housing. However, homelessness and criminal activity may share a causal link, such that the probability of committing a crime would change if a particular person moved from homelessness to housing (a within-person phenomenon). Between-persons studies are unable to distinguish between these possibilities. Similar limitations exist when trying to understand the relationship between criminal activity and the severity of psychological symptoms.

To overcome the limitations of a traditional between-person approach, this study employs hierarchical linear modeling (HLM), also known as multilevel modeling (see Raudenbush and Bryk 2002). HLM is specifically geared toward handling nested data and can partition the variance between and within individual participants. We used HLM software, version 6.03 (Raudenbush et al. 2004) for our analyses.

In HLM, a regression equation (known as the level-1 equation) is generated for each participant. For the current study, the level-1 equation estimates the probability that a particular individual committed a crime during a particular 6-month observation period from street homelessness, sheltered homelessness, and CSI score specific to both the person and the observation period. These predictors, which vary from one observation period to the next, are called *time-varying*. The coefficients of the level-1 model (an intercept and slope associated with each level-1 predictor) are in turn predicted in respective level-2 (between-persons) equations using personal characteristics such as gender and age at baseline that are *time-invariant* (i.e., constant across time). In addition to these time-invariant predictors, the level-2 equations also include a person-level random effect component. When the random effect is significantly different across participants, there is strong variation between participants' uniquely generated level-1 intercept or slope coefficients. A nonsignificant result would indicate that the level-1 coefficients are not strongly varying, but there may be subtle variation that could still be explained by including level-2 predictors.

Results

This section examines the extent to which street and sheltered homelessness, psychological symptom severity, and relevant controls predict criminal activity, first for non-violent and then for violent crime. We then test whether psychotic symptoms mediate the relationship between the diagnosis of a psychotic disorder and non-violent and violent criminal activity.

Homelessness, Mental Illness, and Non-Violent Crime

Preliminary Analyses

Due to inadequate data for some participants, 207 participants were included in these analyses. We controlled for several level-2 (person-level) variables. In addition to gender and baseline age, we included lifetime homelessness (defined as years homeless prior to baseline) to account for the possibility that chronically homeless participants may have developed more illegal subsistence-

oriented strategies. We also controlled for recruitment site (psychiatric hospital versus agencies that referred currently homeless individuals) and experimental group assignment.

Due to high positive skew and nonlinear associations with the outcome variables, we dichotomized *street homelessness* and *sheltered homelessness* (1 = street homeless/in shelters at least once during the observation period, 0 = no time street homeless/in shelters). Other dummy coded control variables were *female* (1 = female, 0 = male), *psychiatric hospital* (1 = recruited from a psychiatric hospital upon discharge, 0 = literally homeless at recruitment), and *experimental group* (1 = housing first intervention, 0 = treatment as usual housing). We centered CSI scores, lifetime homelessness, and baseline age at their grand means so that the intercepts represent a person with the average level on these variables. All continuous variables remained unstandardized and retained their original units of variance.

Primary Analyses

To examine the relationship of non-violent crime to homelessness and symptom severity, we began by specifying a within-person (level-1) model without level-2 covariates in which non-violent crime at each time point was predicted from time-varying levels of homelessness and symptom severity (Eq. 1a).

$$\begin{aligned}\text{Non-violent crime} = {} & B_0 + B_1\,(\text{Street homelessness}) \\ & + B_2\,(\text{Sheltered homelessness}) \\ & + B_3\,(\text{CSI}) + r\end{aligned} \tag{1a}$$

To determine whether there was significant variation in the coefficients for the intercept, we added a random effect term (U_0) in the level-2 equation for the intercept (Eq. 1b), but did not add random effects at this step to the equations for the slopes.

$$B_0 = G_{00} + U_0 \tag{1b}$$

$$B_1 = G_{10} \tag{1c}$$

$$B_2 = G_{20} \tag{1d}$$

$$B_3 = G_{30} \tag{1e}$$

Results summarized in Table 1 showed significant positive associations between non-violent crime and street homelessness, sheltered homelessness, and CSI scores. In addition, we tested U_0 and found significant variation in the level-1 intercepts ($\chi^2(206, n = 207) = 396.66$, $p < .001$), indicating that participants' intercept coefficients differed significantly from one another.

Next, we added random effect terms to the original level-2 equations for the slope coefficients (Eqs. 1c, 1d, and 1e). None of the slopes were found to be significantly varying, so these terms were not included in subsequent analyses, leaving only the random effect term predicting the intercept coefficient. Next, we tested level-1 multiplicative interactions between CSI score and street homelessness and sheltered homelessness. Neither the CSI by street homelessness interaction ($B_4 = -0.01$, $OR = 0.99$, SE = 0.01, $p = .47$) nor the CSI by sheltered homelessness interaction ($B_5 = -0.01$, $OR = 0.99$, SE = 0.01, $p = .49$) were significant, so we excluded both from subsequent analyses.

Although these findings indicate main effect relationships for street and sheltered homelessness and symptom severity, subsequent analyses tested whether these relationships held after including relevant controls. We entered between-person control variables into the level-2 equations predicting the level-1 intercept (Eq. 2, building on Eq. 1b) and slopes (not shown, but building on Eqs. 1c, 1d, and 1e in a similar manner).

$$\begin{aligned}B_0 = {} & G_{00} + G_{01}\,(\text{Age}) + G_{02}\,(\text{Female}) \\ & + G_{03}\,(\text{Psychiatric hospital}) \\ & + G_{04}\,(\text{Lifetime homelessness}) \\ & + G_{05}\,(\text{Experimental group}) + U_0\end{aligned} \tag{2}$$

Note that level-2 predictors of the level-1 intercepts act as main effects, and level-2 predictors of the level-1 slopes are essentially level-1 by level-2 interaction terms. These interaction terms test whether the relationship between level-1 variables and non-violent crime depends on personal characteristics such as gender or lifetime homelessness.

We removed predictors of the level-1 slopes (e.g., interaction terms) with significance values above .10 to obtain a final model predicting non-violent crime. After accounting for relevant level-2 variables, the positive main effects for street homelessness, sheltered homelessness, and CSI score were still significant (Table 2). However, the full model differed from the previous one in that the relationship between sheltered homelessness and non-violent crime was stronger for individuals with higher levels of lifetime homelessness. In addition, we found a significant level-2 negative effect for baseline age and a significant level-2 positive effect for psychiatric hospitalization. This model had significant variation in the level-1 intercept ($\chi^2(201, n = 207) = 372.56$, $p < .001$), suggesting that a substantial amount of person-level variance for non-violent criminal activity remained unexplained. Figure 2 depicts the probabilities of committing a non-violent crime within a 6-month period by different levels of symptom severity and whether participants experienced only street homelessness, only sheltered homelessness, both types of homelessness, or no homelessness.

Table 1 Hierarchical linear model with level-1 variables predicting non-violent crime ($n = 207$ participants assessed across nine observations periods)

Level-1 main effects (time-varying level)	*b* (SE)	Odds Ratio (95% CI)
Intercept (average log odds; B_0)	−2.39 (0.13)****	0.09 (0.07–0.12)
Street homelessness (B_1)	1.38 (0.19)****	3.96 (2.73–5.73)
Sheltered homelessness (B_2)	0.53 (0.19)**	1.71 (1.18–2.47)
CSI (B_3)	0.02 (0.01)***	1.02 (1.01–1.04)

** $p < .01$, *** $p < .005$, **** $p < .001$

Colorado Symptom Index (CSI) score is grand-mean centered. Street and sheltered homelessness are binary (1 = at least one night spent in street/sheltered homelessness in a 6-month observation period, 0 = No days spent street/sheltered homeless). All coefficients are unstandardized

Table 2 Hierarchical linear model predicting non-violent crime with level-2 by level-1 interactions ($n = 207$ participants assessed across nine observations periods)

	b (SE)	Odds Ratio (95% CI)
Level-1 main effects (time-varying level)		
Intercept (average log odds; B_0)	−2.69 (0.19)****	0.07 (0.05–0.10)
Street homelessness (B_1)	1.46 (0.20)****	4.30 (2.92–6.33)
Sheltered homelessness (B_2)	0.54 (0.19)**	1.72 (1.19–2.50)
CSI (B_3)	0.02 (0.01)***	1.02 (1.01–1.04)
Level-2 main effects (person level)		
Baseline age (G_{01})	−0.02 (0.01)*	0.98 (0.96–1.00)
Female (G_{02})	0.30 (0.29)	1.34 (0.76–2.39)
Psychiatric hospitalization (G_{03})	0.54 (0.25)*	1.71 (1.05–2.78)
Lifetime homelessness (G_{04})	−0.03 (0.02)	0.97 (0.94–1.01)
Experimental group assignment (G_{05})	0.06 (0.22)	1.06 (0.69–1.65)
Level-2 × Level-1 interaction		
Sheltered homelessness × Lifetime homelessness (G_{21})	0.07 (0.03)**	1.07 (1.02–1.13)

* $p < .05$, ** $p < .01$, *** $p < .005$, **** $p < .001$

Baseline age, lifetime homelessness, and Colorado Symptom Index (CSI) score are grand-mean centered. Binary variables include street and sheltered homelessness (1 = at least one night spent in street/sheltered homelessness in a 6-month observation period, 0 = No days spent street/sheltered homeless), female (1 = female, 0 = male) psychiatric hospitalization (1 = recruited from psychiatric hospital, 0 = recruited from street), experimental group assignment (1 = housing first group, 0 = treatment as usual group). All coefficients are unstandardized

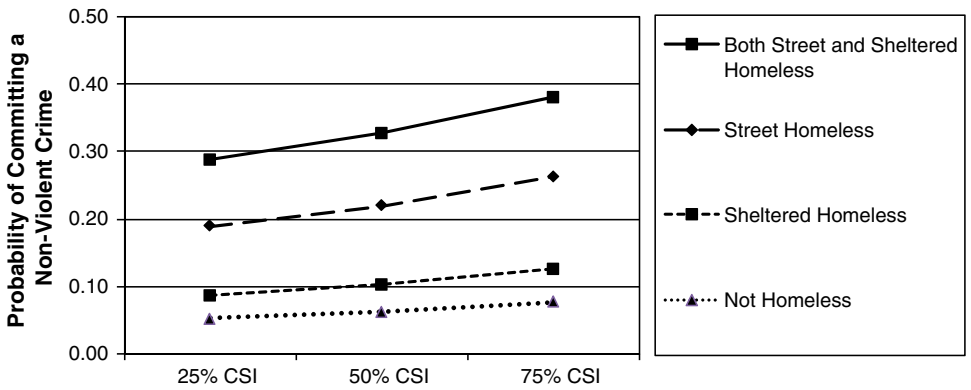

Fig. 2 Probability of committing a non-violent crime within a 6-month period by participants' CSI percentile scores and whether they experienced street homelessness, sheltered homelessness, both types of homelessness, or no homelessness. Corresponding CSI scores are 7.0 (25%), 15.0 (50%), and 25.0 (75%). Values of other variables represent the average participant in the analyses

Violent Crime

Preliminary Analyses

The same participants who were included in the non-violent crime analyses were also present in the violent crime analyses ($n = 207$). These analyses closely parallel the non-violent crime analyses already described. However, because of a nonlinear relationship between CSI scores and violent crime, we divided CSI scores into three distinct categories: "low symptom severity" (CSI scores 0–10), "moderate symptom severity" (over 10–40), and "high symptom severity" (over 40–60). Of all the individual observations, 36.3% were low severity, 58.6% were moderate severity, and 5.1% were high severity. However, of all participants, 69.6% reported low symptom severity, 90.8% reported moderate symptom severity, and 23.2% reported high symptom severity during at least one observation period. Thus, we represented psychological symptom severity in subsequent analyses predicting violent crime as "moderate symptom severity" and "high symptom severity" dummy codes, with "low symptom severity" serving as the reference variable.

Primary Analyses

The initial level-1 model predicting violent crime without level-2 covariates can be seen in Eq. 3.

$$\begin{aligned}\text{Violent crime} = {} & B_0 + B_1\,(\text{Street homelessness}) \\ & + B_2\,(\text{Sheltered homelessness}) \\ & + B_3\,(\text{Moderate symptom severity}) \\ & + B_4\,(\text{High symptom severity}) + r \end{aligned} \quad (3)$$

We added a random effect to test for variation in the intercept coefficients, making the level-2 equations identical to Eqs. 1b–1d, plus two additional equations for moderate symptom severity (B_3) and high symptom severity (B_4) that replaced Eq. 1e. As shown in Table 3, we found a significant, positive effect for high symptom severity and a marginally significant, positive effect for moderate symptom severity on violent crime when compared to low symptom severity. For homelessness, we found significant, positive effects for both street and sheltered homelessness. We also found significant variation in the level-1 intercepts ($\chi^2(206,\ n = 207) = 280.60,\ p < .005$).

Next, random effects were added for the slope coefficients. We did not find significant variation in the slopes, so the effects were removed leaving only the random effect for the intercept coefficient. Next, we tested multiplicative interactions between moderate and high CSI scores and street and sheltered homelessness, creating four interaction terms: moderate symptom severity by street homelessness ($B_5 = -0.11$, $OR = 0.90$, SE $= 0.53$, $p = .84$), high symptom severity by street homelessness ($B_6 = 0.30$, $OR = 1.35$, SE $= 0.70$, $p = .67$), moderate symptom severity by sheltered homelessness ($B_7 = 0.21$, $OR = 1.24$, SE $= 0.61$, $p = .73$), and high symptom severity by sheltered homelessness ($B_8 = -0.26$, $OR = 0.77$, SE $= 0.82$, $p = .75$). As the findings indicate, all four interaction terms were nonsignificant and were removed from the equation prior to subsequent analyses.

Next, we tested whether the positive relationships between violent crime and street homelessness, sheltered homelessness, and symptom severity held after including relevant controls. Predictors were entered into equations predicting the level-2 intercept and slopes. Predictors of the slopes with significance values above .10 were then removed from the analyses to create a final model predicting violent crime (see Table 4). After accounting for relevant level-2 variables, the full model had positive, significant effects for both sheltered homelessness and high symptom severity. However, this model differed from the previous one in that street homelessness no longer significantly predicted violent crime after accounting for the marginally significant moderation of experimental group assignment, such that participants in the experimental group who nonetheless experienced street homelessness

Table 3 Hierarchical linear model with level-1 variables predicting violent crime ($n = 207$ participants assessed across nine observations periods)

Level-1 main effects (time-varying level)	*b* (SE)	Odds Ratio (95% CI)
Intercept (average log odds; B_0)	−3.65 (0.26)****	0.03 (0.02–0.04)
Street homelessness (B_1)	0.48 (0.25)*	1.62 (1.00–2.62)
Sheltered homelessness (B_2)	0.66 (0.25)**	1.93 (1.19–3.12)
Moderate CSI (B_3)	0.52 (0.27)$^+$	1.68 (0.99–2.84)
High CSI (B_4)	2.06 (0.40)****	7.84 (3.57–17.24)

$^+$ $p < .10$, * $p < .05$, ** $p < .01$, **** $p < .001$

All variables are binary: Street and sheltered homelessness (1 = at least one night spent in street/sheltered homelessness in a 6-month observation period, 0 = No days spent street/sheltered homeless); dummy-coded Colorado Symptom Index (CSI) categories: Moderate (score = 10+ to 40) and High (score = 40+ to 60), reference variable is Low CSI (score = 0–10)

Table 4 Hierarchical linear model predicting violent crime with level-2 by level-1 interactions ($n = 207$ participants assessed across nine observations periods)

	b (SE)	Odds Ratio (95% CI)
Level-1 main effects (time-varying level)		
Intercept (average log odds; B_0)	−3.90 (0.31)****	0.02 (0.01–0.04)
Street homelessness (B_1)	0.23 (0.34)	1.27 (0.67–2.40)
Sheltered homelessness (B_2)	0.73 (0.27)**	2.09 (1.23–3.55)
Moderate CSI (B_3)	0.55 (0.25)*	1.74 (1.06–2.85)
High CSI (B_4)	1.68 (0.55)***	4.92 (1.66–14.58)
Level-2 main effects (person level)		
Baseline age (G_{01})	−0.04 (0.01)*	0.97 (0.94–0.99)
Female (G_{02})	−0.48 (0.36)	0.62 (0.31–1.25)
Psychiatric hospitalization (G_{03})	0.79 (0.28)**	2.19 (1.28–3.78)
Lifetime homelessness (G_{04})	−0.03 (0.03)	0.97 (0.92–1.02)
Experimental group assignment (G_{05})	−0.06 (0.30)	0.95 (0.53–1.69)
Level-2 × Level-1 interactions		
Street homelessness × Experimental group assignment (G_{11})	0.82 (0.50)$^+$	2.28 (0.86–6.06)
High CSI × Baseline age (G_{41})	−0.11 (0.04)***	0.90 (0.83–0.97)
High CSI × Psychiatric hospitalization (G_{42})	−1.51 (0.71)*	0.22 (0.06–0.88)

$^+$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .005$, **** $p < .001$

Baseline age and lifetime homelessness are grand-mean centered. Binary variables include street and sheltered homelessness (1 = at least one night spent in street/sheltered homelessness in a 6-month observation period, 0 = No days spent street/sheltered homeless), female (1 = female, 0 = male), psychiatric hospitalization (1 = recruited from psychiatric hospital, 0 = recruited from street), experimental group assignment (1 = housing first group, 0 = treatment as usual group), and dummy-coded Colorado Symptom Index (CSI) categories: Moderate (score = 10+ to 40) and High (score = 40+ to 60), reference variable is Low CSI (score = 0–10). All coefficients are unstandardized

were more likely to commit a violent crime. In addition, the effect for moderate symptom severity increased slightly and reached significance. Baseline age and psychiatric hospitalization moderated the relationship between high symptom severity and violent crime. Specifically, participants with high symptom severity were more likely to commit a violent crime if they were younger or were literally homeless at the time of recruitment. We also found a significant level-2 negative main effect for baseline age and a significant level-2 positive main effect for psychiatric hospitalization. The intercepts no longer showed significant variation in this model ($\chi^2(201, n = 207) = 224.58$, $p = .12$). Figure 3 depicts the probabilities of committing a violent crime within a 6-month period by the three levels of symptom severity and whether or not participants experienced sheltered homelessness.

Mediational Analysis: Psychiatric Diagnosis, Psychotic Symptoms, and Criminal Activity

Preliminary Analyses

We wanted to determine whether a diagnosis of a psychotic disorder predicted violent crime, and if so, whether psychotic symptoms mediated this relationship. To obtain an index of psychotic symptoms, we created a variable ranging from 0 (no psychotic symptoms) to 16 (severe psychotic symptoms) by summing four items from the CSI that explicitly measured psychotic symptoms. These items were: "In the past month, how often: (1) have others told you that you acted 'paranoid' or 'suspicious'?" (2) did you hear voices, or hear or see things that other people didn't think were there?" (3) did your [voices]/[things you see/hear] interfere with your doing things?" (4) did you feel suspicious or paranoid?" Although the CSI is generally not treated as multidimensional, Conrad et al. (2001) conducted a psychometric analysis of the instrument using data from a large sample (of which the participants in this study comprised a subset) and found evidence for a secondary factor in addition to a central factor. Our index of psychotic symptoms included the three highest item loadings on this factor and an additional item (#3 above) that was not examined by Conrad et al. because of inconsistent use across sites, but which loaded similarly on the secondary factor in our data.

Except for the 30-month assessment, the index measuring psychotic symptoms had adequate internal consistency, with alphas ranging from .69 to .82. The 30-month assessment was lower, with an alpha of .55. One possible reason for this score was that a significant portion of the sample (38%) completed their 30-month assessment shortly after September 11, 2001 (as noted in Greenwood

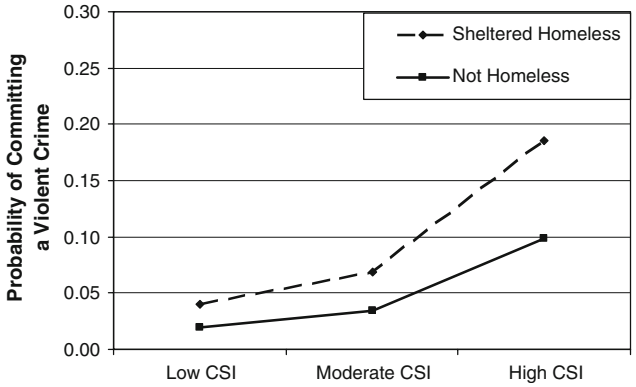

Fig. 3 Probability of committing a violent crime within a 6-month period by participants' CSI score categories and whether they experienced sheltered homelessness or no homelessness. Corresponding scores are 0–10 (Low CSI), above 10–40 (Moderate CSI), and above 40–60 (High CSI). Values of other variables represent the average participant in the analyses except for street homelessness, which is assumed to be zero

et al. 2005). Participants may have had feelings of paranoia or suspiciousness that were not necessarily linked with psychotic symptoms.

Because the SCID was not administered to all participants, 181 participants were included in this analysis. Analyses comparing excluded and non-excluded participants on the level-2 variables indicated the excluded participants were significantly older ($M = 46.2$) than non-excluded participants ($M = 40.5$), $t(216) = 2.66$, $p < .01$. Using HLM to test differences among the level-1 variables, findings indicated that excluded participants were less likely to report non-violent criminal activity (7% vs. 18%; $G_{01} = 1.10$, $t = 2.70$, SE $= 0.41$, $p < .01$).

Primary Analyses

To conduct a mediational analysis within an HLM framework, researchers can follow, with slight adjustment, the three-step plan Baron and Kenny (1986) describe for use with multiple regression. We allowed intercepts to randomly vary in all three steps. In the first step, diagnosis of a psychotic disorder, a level-2, time-invariant variable, marginally predicted violent crime ($G_{01} = 0.63$, $t = 1.77$, SE $= 0.36$, $p < .10$). In the second step, diagnosis significantly predicted psychotic symptoms, a time-varying variable ($G_{01} = 0.77$, $t = 2.14$, SE $= 0.36$, $p < .05$). For the third step, as shown in level-1 equation 4a and level-2 equations 4b and 4c,

$$\text{Violent crime} = B_0 + B_1\,(\text{Psychotic symptoms}) + r \quad (4a)$$

$$B_0 = G_{00} + G_{01}\,(\text{Diagnosis of a psychotic disorder}) + U_0 \quad (4b)$$

$$B_1 = G_{10} \quad (4c)$$

psychotic symptoms significantly predicted violent crime ($B_1 = 0.12$, $t = 3.98$, SE $= 0.03$, $p < .001$), but diagnosis was no longer related to the outcome ($G_{01} = 0.57$, $t = 1.61$, SE $= 0.35$, $p = .11$). We estimated the indirect effect by multiplying the coefficient for diagnosis in the second step by the coefficient for psychotic symptoms in the third step. We estimated the standard error for the indirect effect using the formula from Goodman (1960) as recommended by Krull and Mackinnon (1999) for multilevel mediation with at least 100 level-2 groups. The indirect effect was marginally significant ($B = 0.09$, $z = 1.93$, SE $= 0.05$, $p < .10$). The results suggest that psychotic symptoms partially mediated the relationship between the diagnosis of a psychotic disorder and violent crime.

We conducted a similar analysis to see whether the diagnosis of a psychotic disorder predicted non-violent crime, and if psychotic symptoms mediated this relationship. In the first step, diagnosis of a psychotic disorder significantly predicted non-violent crime ($G_{01} = 0.48$, $t = 1.99$, SE $= 0.24$, $p < .05$). For the second step, diagnosis significantly predicted psychotic symptoms ($G_{01} = 0.75$, $t = 2.08$, SE $= 0.36$, $p < .05$).[2] For the third step, psychotic symptoms significantly predicted non-violent crime ($B_1 = 0.12$, $t = 5.16$, SE $= 0.02$, $p < .001$), but diagnosis no longer significantly predicted non-violent crime ($G_{01} = 0.40$, $t = 1.62$, SE $= 0.25$, $p = .11$). The indirect effect was significant ($B = 0.09$, $z = 1.96$, SE $= 0.04$, $p < .05$). The results suggest that psychotic symptoms partially mediated the relationship between the diagnosis of a psychotic disorder and non-violent crime.

Discussion

The current study examined the relationships between homelessness, psychological symptoms, and criminal activity in a sample of homeless individuals with severe mental illnesses using a within-person design. Findings suggest that the likelihood of an individual committing a crime increased as homelessness and severity of mental illness symptoms increased across observation periods. Certain stable factors such as baseline age and recruitment site also mattered. Separate analyses indicated that psychotic symptoms partially mediated a positive relationship between the diagnosis of a psychotic disorder and non-violent and violent criminal activity.

[2] Although the same participants were included in the meditational analyses for both non-violent and violent crime, the analyses for non-violent crime included slightly fewer observation points (i.e., data specific to a particular person and time point) due to missing data. Therefore, we conducted the second step separately for both outcomes.

Findings supported our hypothesis that both street homelessness and sheltered homelessness would be associated with higher likelihoods of committing non-violent crimes that may be related to subsistence strategies, but that this relationship would be weaker for sheltered homelessness since institutional supports may lower the need for subsistence-driven crimes (e.g., breaking into buildings to find shelter). Since results indicated that the likelihood of committing a non-violent crime increases as homelessness increases, a strong argument can be made that homelessness encourages non-violent crime. Rather than thinking of homeless individuals as criminals, it may be more accurate to think of them as people struggling to get by whose engagement in non-violent illegal activities is driven by survival needs. In addition, we found an interaction between sheltered homelessness and lifetime homelessness such that during periods when participants experienced sheltered homelessness, their likelihood of committing a non-violent crime increased with each year of cumulative lifetime homelessness. A possible explanation for this finding is that individuals with little experience of homelessness use shelters in lieu of illegal subsistence strategies, whereas individuals with longer lifetime experiences of homelessness employ a much broader range of survival strategies that are both legal, such as shelter use, as well as illegal.

We found a different relationship between homelessness and violent crime. There was no main effect of street homelessness, although there was a marginally significant moderation by experimental group assignment. Specifically, the low number of participants who continued to experience homelessness despite being assigned to the housing first program were more likely to commit a violent crime than homeless participants assigned to the treatment as usual group. To understand this finding, it is important to note that the housing first participants were far less likely than the treatment as usual participants to experience homelessness since the former group received immediate access to housing whereas participants in the latter group were required to demonstrate that they were "housing ready" first (Gulcur et al. 2003; Tsemberis et al. 2003, 2004). Those few individuals in the experimental group who nevertheless experienced homelessness may have been characterized by higher levels of social and behavioral instability, which may have been accompanied by a greater propensity toward violent behavior. The most important point, though, is that after taking group assignment into account, street homelessness was not independently related to violent criminal activity.

In contrast, however, we found that sheltered homelessness significantly predicted increases in violent crime. One explanation for this finding could be that temporary shelters increase contact among individuals who already experience high levels of stress and increased violent tendencies from being homeless. Another possibility is that the atmospheres of these settings may unintentionally create stressful and confrontational living conditions that lead to violence, independent of the stress that accompanies homelessness. Again, it is worth noting that the likelihood of committing a violent crime increased within participants as they intermittently experienced sheltered homelessness. In other words, these findings suggest that homeless individuals are not inherently violent, but that some may become violent when exposed to temporary living situations such as shelters. Given these findings, perhaps the best way to prevent violence among homeless individuals is to move them quickly into housing rather than rely on temporary shelters.

We found that psychological symptom severity predicted increases in non-violent and violent criminal activity. For non-violent crime, one explanation is that the most frequently cited type of non-violent criminal offense was public disturbances. Although individuals who admitted to this type of offense could have engaged in a variety of public disturbances (e.g., drinking or urinating in public), participants who experienced higher levels of psychological symptom severity may have reported committing a public disturbance if they expressed these symptoms in a very noticeable way (e.g., talking loudly or experiencing a hallucination in public).

Consistent with prior research, findings suggest that greater symptom severity was associated with an increased likelihood of committing a violent crime. However, the strength of the relationship between high symptom severity and violent crime depended on the participants' age and recruitment location. Specifically, findings suggest that age becomes an even stronger predictor of violent crime among participants with severe psychological symptoms. In addition, participants recruited from the streets were more likely to report violent crime when they experienced high symptom severity. One possible explanation for this finding is the fact that participants recruited from psychiatric hospitals were more likely to stay in psychiatric hospitals during the study, possibly limiting their ability to commit violent crimes.

Interestingly, gender did not significantly predict the likelihood of violent criminal activity. Some researchers who have examined violent behavior between men and women with psychiatric problems have also found non-significant differences or smaller differences than in the general population (e.g., Stueve and Link 1998; Swanson et al. 1999, 2002), whereas other researchers have found that males are more likely to engage in violent behavior or commit a violent crime (Swanson et al. 1990). Hiday and colleagues found no differences between mentally ill men and women in person-directed violence after controlling

for substance abuse (Hiday et al. 1998). In contrast, Fazel and Grann (2006) found that mental illness was a stronger predictor of violence in women than men. Clearly, more research on the role of gender in predicting violent crime in mentally ill populations needs to be done.

We detected no significant interactions between symptom severity and type of homelessness for either outcome. Prior research has found that homeless mentally ill individuals are more likely to commit violent crimes than non-homeless mentally ill individuals. This study suggests that homelessness and mental illness have additive, as opposed to multiplicative, effects.

Certain stable characteristics also by themselves predicted criminal activity. Recruitment from psychiatric hospitals was positively associated with both non-violent and violent crime. Since this finding occurred even after accounting for psychological symptom severity, one possibility is that some participants who were recruited from psychiatric hospitals were initially sent there as a result of breaking the law. Following release from the hospitals, these individuals may have continued their patterns of criminal activity due to factors independent of psychological symptom severity. In addition, consistent with prior research, younger adults were more likely to admit to committing non-violent and violent crimes (e.g., Hirschi and Gottfredson 1983; Steffensmeier et al. 1989).

We found that the diagnosis of a psychotic disorder predicted an increase in the likelihood of non-violent crime and marginally predicted violent crime. We also found evidence that psychotic symptom severity partially mediates both of these relationships. Additional research needs to illuminate what other factors also mediate this relationship. In addition, it is worth noting that the mediational model assumes a causal relationship between diagnosis and symptoms, though symptoms simply could be a better representation of the disorder than diagnosis. However, the results, which separate the associations of within- and between-persons factors, show that even among individuals with a diagnosis of a psychotic disorder, the likelihood of committing a crime fluctuates from observation period to observation period depending on the severity of psychotic symptoms such as hallucinations and feelings of paranoia.

Several limitations to the study exist. One problem is the reliance on self-report data, especially for criminal activity. Underreporting seems likely. Also, although street homelessness was associated with non-violent crime, one cannot say definitively that these crimes were subsistence-driven without knowing their exact nature or the reasons people engaged in them. Based on findings from other research (e.g., Snow et al. 1989), it is likely that at least some of the non-violent crimes were subsistence-driven. However, non-violent criminal activity may also include public disturbances relating to psychological symptoms in this mentally ill sample. Future research should focus on teasing apart these explanations.

In addition, although Conrad et al. (2001) and our own examination of the data found evidence for a secondary "psychotic" scale in the CSI, the four items used to measure psychotic symptoms do not comprise a completely psychometrically distinct subscale. Therefore, it would have been useful to have had a psychometrically strong measure that distinguished psychotic symptoms from other types of symptoms. While the cross-level, mediational analyses suggest that most criminal activity related to the diagnosis of a psychotic disorder is driven more by currently active psychotic symptoms rather than more stable factors associated with the diagnosis, future research must confirm this finding.

Two additional points concerning causal inference warrant consideration. First, although the analytic methods employed in this study lend greater support for a causal relationship than traditional approaches, they have not proven causality. To strengthen causal arguments, future research could gather data on the reasons behind certain types of criminal activity and examine whether they are linked to individuals' environmental context. Researchers could also examine lagged rather than simultaneous relationships between variables in a growth curve framework. However, unless measurement periods correspond reasonably well to the lags in the underlying causal relationships, lagged analyses may not capture causal linkages very well. In the present study, we expect that both cause and effect are likely to occur within a single, 6-month measurement period, so the lags between homelessness and criminal activity should be measured in days or weeks. In addition, future research should examine the role of alcohol and substance abuse, which commonly occurs among individuals in this population (e.g., Fischer and Breakey 1991; North et al. 2004). Given its relationship to homelessness and mental illness, it is possible that substance and alcohol abuse is a "third variable" that might partially account for the relationships found in this study. For example, an individual might engage in criminal activity to obtain and use illegal substances, which also might contribute to an onset of greater symptom severity. It is also possible that substance and alcohol abuse is the first link in a chain that leads to homelessness, which in turn leads to criminal activity. This possibility is plausible among those participants who participated in restrictive housing programs, which often evict clients who do not stay sober.

Future research should build on the strengths of the study. One of the most important strengths, and one that has been largely absent in previous research, is the longitudinal, within-persons design. Understanding how patterns change allows researchers to more directly examine both individual and contextual influences. The study showed a clear association between time-varying, contextual factors

and changes in criminal activity. Therefore, interventions that address criminal activity among homeless individuals should target the context by moving people into permanent housing. In addition, if future research documents that stressful conditions within shelters and other temporary, congregate housing encourage violent criminal activity, then interventions should target these conditions. The relationship between the severity of mental illness symptoms and criminal activity should be addressed by facilitating easier access to adequate health care. This study adds reduction in crime to the many reasons for providing people who are homeless and mentally ill with permanent housing and mental health services.

References

Aidala, A., Cross, J. E., Stall, R., Harre, D., & Sumartojo, E. (2005). Housing status and HIV risk behaviors: Implications for prevention and policy. *AIDS and Behavior, 9*, 251–265.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

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*, 1173–1182.

Basco, M. R., Bostic, J. Q., Davies, D., Rush, A. J., Witte, B., Hendrickse, W., et al. (2000). Methods to improve diagnostic accuracy in a community mental health setting. *American Journal of Psychiatry, 157*, 1599–1605.

Belcher, J. R. (1988). Are jails replacing the mental health system for the homeless mentally ill? *Community Mental Health Journal, 24*, 185–194.

Belcher, J. R. (1989). On becoming homeless: A study of chronically mentally ill persons. *Journal of Community Psychology, 17*, 173–185.

Bjorkly, S. (2002a). Psychotic symptoms and violence toward others—a literature review of some preliminary findings. Part 1. Delusions. *Aggression and Violent Behavior, 7*, 617–631.

Bjorkly, S. (2002b). Psychotic symptoms and violence toward others—a literature review of some preliminary findings. Part 2. Hallucinations. *Aggression and Violent Behavior, 7*, 605–615.

Brown, R. A., Burgess, E. S., Sales, S. D., Whiteley, J. A., Evans, D. M., & Miller, I. W. (1998). Reliability and validity of a smoking timeline follow-back calendar interview. *Psychology of Addictive Behavior, 12*, 101–112.

Ciarolo, J. A., Edwards, D. W., Kiresuk, T. J., Newman, F. L., & Brown, T. R. (1981). *Colorado Symptom Index*. Washington, DC: National Institute of Mental Health.

Conrad, K. J., Yagelka, J. R., Matters, M. D., Rich, A. R., Williams, V., & Buchanan, M. (2001). Reliability and validity of a modified Colorado Symptom Index in a national homeless sample. *Mental Health Services Research, 3*, 141–153.

DeLisi, M. (2000). Who is more dangerous? Comparing the criminality of adult homeless and domiciled jailed inmates: A research note. *International Journal of Offender Therapy and Comparative Criminology, 44*, 59–69.

Ehrman, R. N., & Robbins, S. J. (1994). Reliability and validity of 6-month timeline reports of cocaine and heroin use in a methadone population. *Journal of Consulting and Clinical Psychology, 62*, 843–850.

Fazel, S., & Grann, M. (2006). The population impact of severe mental illness on violent crime. *American Journal of Psychiatry, 163*, 1397–1403.

Fennig, S., Craig, T., Lavelle, J., Kovasznay, B., & Bromet, E. J. (1994). Best-estimate versus structured interview-based diagnosis in first-admission psychosis. *Comprehensive Psychiatry, 35*, 341–348.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1998). *Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Non-Patient edition (SCID-I/NP)*. New York: Biometrics Research Department, New York State Psychiatric Institute.

Fischer, P. J. (1988). Criminal activity among the homeless: A study of arrests in Baltimore. *Hospital and Community Psychiatry, 39*, 47–51.

Fischer, P. J., & Breakey, W. R. (1991). The epidemiology of alcohol, drug, and mental disorders among homeless persons. *American Psychologist, 46*, 1115–1128.

Goodman, L. A. (1960). On the exact variance of products. *Journal of the American Statistical Association, 55*, 708–713.

Greenwood, R. M., Schaefer-McDaniel, N. J., Winkel, G., & Tsemberis, S. J. (2005). Decreasing psychiatric symptoms by increasing choice in services for adults with histories of homelessness. *American Journal of Community Psychology, 36*, 223–238.

Gulcur, L., Stefancic, A., Shinn, M., Tsemberis, S., & Fischer, S. N. (2003). Housing, hospitalization, and cost outcomes for homeless individuals with psychiatric disabilities participating in Continuum of Care and Housing First programmes. *Journal of Community and Applied Social Psychology, 13*, 171–186.

Hiday, V. A., Swartz, M. S., Swanson, J. W., Borum, R., & Wagner, H. R. (1998). Male-female differences in the setting and construction of violence among people with severe mental illness. *Social Psychiatry and Psychiatric Epidemiology, 33*, S68–S74.

Hirschi, T., & Gottfredson, M. (1983). Age and the explanation of crime. *American Journal of Sociology, 89*, 552–584.

Katz, P., & Kirkland, F. R. (1990). Violence and social structure on mental hospital wards. *Psychiatry, 53*, 262–277.

Krull, J. L., & Mackinnon, D. P. (1999). Multilevel mediation modeling in group-based intervention studies. *Evaluation Review, 23*, 418–444.

Link, B. G., Andrews, H., & Cullen, F. T. (1992). The violent and illegal behavior of mental patients reconsidered. *American Sociological Review, 57*, 275–292.

Martell, D. A. (1991). Homeless mentally ill offenders and violent crimes. *Law and Human Behavior, 15*, 333–347.

Martell, D. A., Rosner, R., & Harmon, R. B. (1995). Base-rate estimates of criminal behavior by homeless mentally ill persons in New York City. *Psychiatric Services, 46*, 596–601.

McCarthy, B., & Hagan, J. (1991). Homelessness: A criminogenic situation? *British Journal of Criminology, 31*, 393–410.

McNiel, D. E., Binder, R. L., & Robinson, J. C. (2005). Incarceration associated with homelessness, mental disorder, and co-occurring substance abuse. *Psychiatric Services, 56*, 840–846.

Mulvey, E. P. (1994). Assessing the evidence of a link between mental illness and violence. *Hospital and Community Psychiatry, 45*, 663–668.

New Hampshire Dartmouth Psychiatric Research Center. (1995). *Residential Follow-Back Calendar* [Ver. June 1995]. Lebanon, NH: Dartmouth Medical School.

North, C. S., Eyrich, K. M., Pollio, D. E., & Spitznagel, E. L. (2004). Are rates of psychiatric disorders in the homeless population changing? *American Journal of Public Health, 94*, 103–108.

Padgett, D. K., Gulcur, L., & Tsemberis, S. (2006). Housing first services for people who are homeless with co-occurring serious mental illness and substance abuse. *Research on Social Work Practice, 16*, 74–83.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. T. (2004). *HLM 6: Hierarchical linear and nonlinear modeling*. Lincolnwood, IL: Scientific Software International, Inc.

Richman, B. J., Convit, A., & Martell, D. (1992). Homelessness and the mentally ill offender. *Journal of Forensic Sciences, 37*, 932–937.

Shinn, M., & Rapkin, B. D. (2000). Cross-level research without cross-ups in community psychology. In J. Rappaport & E. Seidman (Eds.), *Handbook of community psychology* (pp. 669–695). New York, NY: Kluwer Academic/Plenum Publishers.

Snow, D. A., Baker, S. G., & Anderson, L. (1989). Criminality and homeless men: An empirical assessment. *Social Problems, 36*, 532–549.

Snow, D. A., & Mulcahy, M. (2001). Space, politics, and the survival strategies of the homeless. *American Behavioral Scientist, 45*, 149–169.

Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back: A technique for assessing self-reported alcohol consumption. In R. Z. Litten & J. P. Allen (Eds.), *Measuring alcohol consumption: Psychosocial and biochemical methods* (pp. 41–72). Totowa, NJ: Humana Press.

Steffensmeier, D. J., Allan, E. A., Harer, M. D., & Streifel, C. (1989). Age and the distribution of crime. *American Journal of Sociology, 94*, 803–831.

Stueve, A., & Link, B. G. (1998). Gender differences in the relationship between mental illness and violence: Evidence from a community-based epidemiological study in Israel. *Social Psychiatry and Psychiatric Epidemiology, 33*, S61–S67.

Swanson, J., Borum, R., Swartz, M., & Hiday, V. (1999). Violent behavior preceding hospitalization among persons with severe mental illness. *Law and Human Behavior, 23*, 185–204.

Swanson, J. W., Holzer, C. E., III, Ganju, V. K., & Jono, R. T. (1990). Violence and psychiatric disorder in the community: Evidence from the Epidemiologic Catchment Area surveys. *Hospital and Community Psychiatry, 41*, 761–770.

Swanson, J. W., Swartz, M. S., Essock, S. M., Osher, F. C., Wagner, R., Goodman, L. A., et al. (2002). The social-environmental context of violent behavior in persons treated for severe mental illness. *American Journal of Public Health, 92*, 1523–1531.

Tsemberis, S., Gulcur, L., & Nakae, M. (2004). Housing first, consumer choice, and harm reduction for homeless individuals with a dual diagnosis. *American Journal of Public Health, 94*, 651–656.

Tsemberis, S., McHugo, G., Williams, V., Hanrahan, P., & Stefancic, A. (2007). Measuring homelessness and residential stability: The residential time-line follow-back inventory. *Journal of Community Psychology, 35*, 29–42.

Tsemberis, S. J., Moran, L., Shinn, M., Asmussen, S. M., & Shern, D. L. (2003). Consumer preference programs for individuals who are homeless and have psychiatric disabilities: A drop-in center and a supported housing program. *American Journal of Community Psychology, 32*, 305–317.

Williams, J. B. W., Gibbon, M., First, M. B., Spitzer, R. L., Davies, M., Borus, J., et al. (1992). The Structured Clinical Interview for DSM-III-R (SCID): Multisite test-retest reliability. *Archives of General Psychiatry, 49*, 630–636.