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Abstract

Violence and housing insecurity are horrible events that may be intertwined, with violence possibly forcing victims to abandon their accommodations and housing insecurity depriving people of the safety of a home or placing them in compromised circumstances. This study uses national, prospective, longitudinal data from the *Journeys Home Survey* to examine how violence, housing insecurity, and other characteristics in one period affect disadvantaged Australian men's and women's chances of experiencing violence and housing insecurity in subsequent periods. The study is one of the first to investigate these relationships prospectively and unusual in considering how violence among adult men contributes to their housing insecurity. We estimate dynamic multivariate models that control for observed and time-invariant unobserved characteristics and find that men's chances of being housing secure without experiencing violence are 24-45 percent lower and women's chances are 12-20 percent lower if they experienced housing insecurity, violence or both in the previous period. Heavy drinking, marijuana use, psychological distress, and a history of childhood abuse and neglect also increase the risks of violence and housing insecurity for both genders, while the presence of children reduces these risks. Women who are bisexual or lesbian and women with homeless friends also face elevated risks of housing insecurity, while men's sexual orientation and friend networks seem less relevant.

JEL classification: J1, R2

Keywords: Housing insecurity, homelessness, violence, *Journeys Home Survey*

Being a victim of physical violence and losing one's accommodation are each terrible events. Physical violence is painful and in extreme instances can inflict disabling injuries and emotional trauma. Housing insecurity is also detrimental, with harms that range from anxiety over the uncertainty of housing to the intense hardship of being homeless altogether. Worse, each condition may contribute to the other. Domestic violence could force victims to abandon their accommodations; indeed, domestic violence is cited as a leading cause of women's and children's homelessness (Jasinski et al., 2005; Flinders Institute for Housing, Urban and Regional Research, 2008). Violence may also lead to housing problems by impairing a person's ability to function in social or economic settings (Williams & Mickelson, 2004). Similarly, primary homelessness (being without shelter altogether) deprives people of the physical security associated with shelter, possibly increasing the risk of victimisation (Burt et al., 2001; Wenzel et al., 2001), and other marginal housing situations may put people in crowded or compromised conditions where they are vulnerable. The harms and presumed interlinkages of these problems have prompted national plans to reduce violence (the Australian government's $100 million women's safety package; *Healthy People 2020* in the U.S.) and homelessness (Commonwealth of Australia, 2008; U.S. Interagency Council on Homelessness, 2015).

Despite ample evidence that violence and housing insecurity are related, researchers have not convincingly established that either problem causes the other. A fundamental problem in developing the evidence has been the lack of sizeable, representative samples of people who are at risk of housing problems and who have suffered these problems. Many large surveys—including many focused on disadvantaged populations—only interview householders. Other surveys that consider people who are homeless or housing insecure rely on convenience samples, such as shelter residents, or are geographically or demographically limited. Another problem has been researchers' inability to account for the many other

characteristics that also contribute to violence and housing insecurity and thereby give rise to spurious correlations. Finally, researchers have rarely had access to prospective, longitudinal data that can indicate which events precede others and distinguish antecedents from consequences.

This study overcomes these problems, using national, longitudinal data from the *Journeys Home* (JH) *Survey* to examine how violence, housing insecurity, and other characteristics in one period affect disadvantaged Australians' chances of experiencing violence and housing insecurity in subsequent periods. The JH survey interviewed 1,682 Australians who were initially homeless or at high risk of homelessness, asking about their housing, economic, health, and other circumstances, including their exposure to violence, through six semi-annual survey waves. The survey includes a rich set of covariates that we can include in multivariate analyses to control for observed characteristics that might confound the estimated relationship between violence and housing insecurity. The survey's longitudinal design allows us to map how experiences with violence and housing problems in one interview relate to these same problems in the next interview, helping to establish a temporal ordering of events. Moreover, because there are multiple waves of data, we can employ statistical techniques that account for time-invariant unobserved characteristics that might also be a source of confounding correlation.

The JH survey has other valuable features. First, unlike many surveys meant to address housing insecurity, JH interviewed a relatively diverse, albeit disadvantaged, at-risk population that included people who were and were not suffering from housing problems and followed them as they transitioned between different housing circumstances. Second, the survey's diversity extends to its geographic coverage, which includes people in urban and rural contexts and from each of Australia's states and major territories. Third, the large sample size not only supports the inclusion of numerous controls in our statistical analyses

but also allows us to conduct separate analyses for men and women.

Our consideration of how men's experiences with violence contribute to their housing problems is especially distinctive. A large research literature documents how domestic violence is associated with women's and children's subsequent homelessness (see, e.g., Bassuk et al., 2001; Flinders Institute for Housing, Urban and Regional Research, 2008; Weitzman et al., 1990). Studies also show that homeless men and women suffer higher rates of victimisation than their housed counterparts (Burt et al., 2001; Jasinski et al., 2005; Lam & Rosenheck, 1998; Lee & Schreck, 2005; Wenzel et al., 2001). However, less is known about how violence might trigger men's housing problems. Although men are less frequently the victims of sexual and domestic violence (Breiding et al., 2014), they experience more violence overall than women (see, e.g., Truman & Langdon, 2015). As we show, the disadvantaged Australian men in the JH survey are five percent more likely to experience violence in a six-month interval than the women, and our multivariate analyses indicate that JH men who experience violence are 23 to 45 percent more likely be housing insecure six months later than men who do not experience violence.

In addition, the paper addresses a key conceptual issue in housing security research regarding the centrality of life shocks. O'Flaherty (2004; 2010) has theorised that homelessness is often unpredictable and largely the result of negative, bad-luck shocks hitting people who were otherwise vulnerable. Research has found supporting evidence regarding shocks from income losses (O'Flaherty, 2009), a partner's incarceration (Geller & Franklin, 2014), and the birth of children with severe health problems (Curtis et al., 2013). Physical violence, which occurs infrequently and unpredictably for the vast majority of people, has properties of a shock.

Previous studies

Predicting housing problems. Researchers and policymakers have long debated the relative importance of structural and background circumstances on the one hand and individual behaviours and agency on the other as causes of housing insecurity. With respect to structural circumstances, research points to the deinstitutionalisation of the mentally ill (Jencks, 1994), limited availability of low-cost housing (Burt, 1991; Quigley et al., 2001; Quigley & Raphael, 2001), and low levels of economic activity and opportunities (Burt, 1991; Gould & Williams, 2010) as contributors. Background risk factors include being a victim of violence or abuse as a youth (Baron, 2003; Bassuk et al., 2001; Burt et al., 2001; Caton et al., 2005; Herman et al., 1997), having a parent who was incarcerated (Shelton et al., 2009) or used drugs (Bassuk et al., 1997), growing up in poverty (Koegel et al., 1995), spending time in foster care (Burt et al., 2001; Shelton et al., 2009), and poor mental health in childhood (Shelton et al., 2009).

There is also evidence regarding the role of agency and especially the abuse of drugs and alcohol (Bassuk et al., 1997; Early, 2005; McVicar et al., 2015; Shelton et al., 2009; Shinn et al., 1998). Joblessness (Shelton et al., 2009; Shinn et al., 1998) and low levels of schooling (Lehmann et al., 2007; Shelton et al., 2009) also appear to contribute to housing problems.

Housing insecurity may itself be a vulnerability for subsequent housing problems if it compromises people's physical health (Dennis et al., 1991), mental health (Hodgson et al., 2013) or labour market productivity (Glomm & John, 2001) and lowers their current and future economic prospects. As homeless people come to identify with being homeless, they may take fewer steps to escape their condition or become more accepting of socially inappropriate behaviours that prolong their homelessness (Snow & Anderson, 1987). Empirically, several studies have found evidence of state dependence in housing problems

(Allgood & Warren, 2003; Piliavan et al. 1996; Shinn et al., 1998); however, a recent analysis of the JH survey by Cobb-Clark et al. (2015) detected no evidence of duration dependence within homelessness spells.

While studies have identified many characteristics that increase the general risks of housing problems, they have been less successful in predicting specific transitions to or from housing insecurity (Shinn et al., 2001). Recognising the unpredictability of homelessness episodes, O'Flaherty (2004; 2010) hypothesised that homelessness results mainly from bad-luck shocks striking vulnerable people. In an empirical analysis, O'Flaherty (2009) found evidence that income shocks were a principal source of housing insecurity. Curtis et al. (2013) found that shocks in the form of the birth of a child with a severe health problem increased the risks of homelessness, while Geller and Franklin (2014) found that a partner's incarceration contributed to homelessness.

Violence may be another such shock, and indeed, domestic violence is regularly cited as a cause of women's housing problems. Violence may have a direct effect if victims have to flee their accommodations. In interviews with homeless women in the U.S., Jasinski et al. (2005) reported that one-in-four told them that violence in their last residence was a cause for their homelessness, and in an analysis of administrative data from Australia, the Flinders Institute for Housing, Urban and Regional Research (2008) found that one-in-three women listed domestic violence as a reason for seeking housing services. Exposure to violence could also have indirect effects through increased stress and anxiety, overstimulation of the allostatic systems, and posttraumatic stress disorder (Basile et al., 2004; McEwan, 1998; Williams & Mickelson, 2004).

Homeless women report high rates of previously being exposed to violence (Fischer, 1992; Jasinski et al., 2005; Wenzel et al., 2001). Although this suggests that violence is a cause of homelessness, it does not compare homeless people with similar at-risk, housed

groups, who might also have high rates of earlier victimisation. Studies that have used matched comparison designs have been equivocal. Bassuk et al. (2001) found that intimate partner violence raised the odds that a baseline group of newly homeless mothers would repeat their homelessness episodes; however, Brown and Bassuk (1997) did not find significant differences in the violence experiences between that baseline group and a housed comparison group. Shinn et al. (1998) and Weitzman et al. (1990) found higher earlier exposure to violence among families that entered homeless shelters relative to those that remained housed, but Lehmann et al. (2007) and Shelton et al. (2009) failed to find differences.

Predicting violent victimisation. General rates of violent victimisation are low. In Australia in 2013-14, 2.3 percent of adults reported being physically assaulted in the previous year.[1] In the U.S., 0.9 percent of people 12 and over reported being physically assaulted in 2014 (Truman & Langton, 2015). While everyone faces some risk of victimisation, people of lower socioeconomic status (Hotaling & Sugarman, 1990) and homeless people face much higher risks (Burt et al., 2001; Fischer, 1992; Garland et al., 2010; Geissler et al., 1995; Kipke et al., 1997; Lam & Rosenheck, 1998; Lee & Shreck, 2005; Wenzel et al., 2001).

Conceptual approaches to victimisation attempt to identify sources of marginalisation to explain why people might be in vulnerable situations. Lee and Schreck (2005) proposed how homelessness and other associated characteristics, including divorce, poverty, poor mental health, and a history of childhood abuse, increase marginalisation. The lifestyle-exposure theory of personal crime suggests that homeless people may cope with their structural constraints and role expectations by adopting lifestyles and activities that increase their risks of victimization (Hindelang et al., 1978). People may also experience violence because they initiate physical conflicts (Ruback et al. 2014).

[1] Australian Bureau of Statistics, "4530.0 – Crime Victimisation, Australia, 2013-14," <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4530.0Main+Features12013-14>, released 17 Feb. 2015.

Prior victimisation may also increase the chances of subsequent victimisation. Chu (1992) discussed repetition compulsion, post-traumatic stress syndrome, and the inability to effectively relate to others as explanations for revictimisation. Violence may also undermine perceptions of agency and self-efficacy (Bandura, 1997; Gecas, 1989). There is evidence of associations over time. Sexual abuse as a child is associated with increased risk of sexual assault in college years (Gidycz et al., 1995). Analyses of panel data have shown that women who suffer partner violence at one point in time are more likely to be victimised again (Frias & Angel, 2007; Tauchen & Witte, 1995). Other panel studies show similar results for crime revictimisation among young adults (Lauritsen & Quinet, 1995; Ruback et al., 2014). Ruback et al. (2014) further investigated how substance abuse, depression, and offending behaviour might mediate revictimisation. They found evidence of direct and mediated effects of prior violence on subsequent violence for young men but only evidence of mediated effects for women.

As this discussion indicates, previous research has provided evidence of contemporaneous and dynamic links between violence and housing insecurity. However, some of the evidence comes from analyses that only considered homeless people and that relied on implicit comparisons. Other studies that have directly examined comparison groups have used small and select samples. The comparison studies have also typically used cross-section data that include retrospective reports and that sometimes fail to indicate the timing of violent incidents and housing problems. Most studies also lack controls for unobserved characteristics that could lead to spurious associations. Results from some previous studies have been equivocal.

Analysis data from the Journeys Home Survey

Our empirical analyses use data from the six waves of the *Journeys Home Survey*. JH

is a large, national, interviewer-administered survey that has followed a sample of Australian public assistance (Centrelink) clients who were initially either housing insecure or at risk of housing insecurity. Because the JH sample includes both types of people, it is exceptionally valuable for examining the causes and consequences of housing insecurity. Interviews began in 2011 and continued in six-month intervals with each wave asking people about their housing, economic, health, and other circumstances, including their experiences with violence (see Wooden et al., 2012). In the initial survey wave, 1,682 people participated, which represented a response rate of 62 percent of the in-scope sample. Retention in subsequent waves was high, with 91, 88, 87, 85, and 84 percent of the initial respondents being re-interviewed in waves two through six, respectively (Bevitt et al., 2014).

Violence and housing insecurity. In each wave, the JH survey asked, "has anyone used physical violence or force against you in the last six months?" We code a binary indicator that equals one if the respondent answered "yes" and use this as our principal measure of violence.[2] The JH survey also asked about the characteristics of violence, including whether the respondent experienced multiple episodes, the respondent's relationship to the assailant, whether the respondent was physically harmed, and whether the respondent experienced anxiety or fear because of the incident. We conduct descriptive analyses using these measures to provide a clearer picture of the violence suffered by the respondents.

In addition to questions about physical violence, the JH survey also asked about experiences in the last six months with sexual assault and with being "the victim of an assault or robbery which resulted in police contact or investigation." In sensitivity analyses, we examine alternative measures of victimisation that combine experiences of (a) either physical violence or sexual assault and (b) either physical violence or a reported assault or robbery.

[2] These questions are preceded by a statement, "we know these questions may be sensitive, so we can move to a quieter place or skip them if they make you feel uncomfortable," and by a request for consent to continue.

To indicate housing insecurity, we use a binary measure that is supplied with the JH data that takes on a value of one if a person

a) experienced primary or literal homelessness (e.g., was sleeping rough, slept in a car, or squatted in an abandoned building)
b) was living in a caravan/camper, hotel, boarding house, or crisis accommodation, or
c) was living with friends, family, or other relatives

at any time during either the six months before the wave 1 interview or during the time between subsequent interviews. Our six-month measure is similar to the Melbourne Institute's broad point-in-time measure of homelessness (Bevitt et al., 2014)—that is, experiencing either primary homelessness, secondary homelessness (living temporarily rent-free with friends or family or temporarily in an accommodation that fails to meet the community standards for housing), or tertiary homelessness (living long-term in an accommodation that fails to meet community standards). However, our measure also includes situations where people lived long-term with friends or relatives or were paying them rent.

Our empirical analyses focus on a four-category measure that interacts the different possible combinations of housing insecurity and violence (securely housed and no violence = 0, insecurely housed and no violence = 1, securely housed and violence = 2, and insecurely housed and violence = 3). We adopt this interacted, multinomial specification, rather than separate binary specifications of each outcome, because the rates of violence and housing insecurity are each substantially higher in the presence of the other condition and because the characteristics of violence are much different in the presence of housing insecurity than housing security.

Explanatory variables. Our empirical analyses incorporate many explanatory variables that are available in the JH survey. Most importantly, we include a lag of our multinomial outcome variable so that we can examine how housing insecurity and violence in one wave

affect these same conditions in the next wave. The use of a lagged dependent variable allows us to investigate whether the specific combinations of housing insecurity and violence are subject to state dependence. It also allows us to examine whether there are cross-effects—that is, whether previous violence predicts subsequent homelessness and vice versa.

Gender is another key conditioning variable. Preliminary analyses indicated that the rates and characteristics of violence and housing insecurity differed substantially between men and women. Accordingly, we disaggregate all our empirical analyses by gender.

Our other time-invariant background controls include measures for whether the respondent identified as Aboriginal or a Torres Strait Islander; migrated from a non-English-speaking country; was lesbian, gay, or bisexual; did not live with both biological parents at age 14; was homeless as a child; lived in foster, residential, or kin care as a child; and was ever incarcerated prior to the JH survey. We also created a 0-4 index of childhood abuse and neglect that was the sum of indicators for whether the person's childhood experiences included being left without food or shelter, suffering physical force or violence from someone s/he lived with, suffering physical force or violence from someone else, and being sexually assaulted.[3] In addition, we included an indicator for whether the person consented to answer questions regarding sexual violence.

We also included several contemporaneous time-varying measures that are arguably exogenous, including a quadratic for the respondent's age; three dummy variables for education (completing years 10-11, completing year 12, or completing a university degree—the omitted category is completing less than 10 years of school); and dummies for each JH wave.

Because our other time-varying explanatory variables are potentially impacted by housing insecurity or violence, we incorporated lagged, rather than contemporaneous,

[3] Preliminary analyses revealed that allowing for separate effects of the separate abuse and neglect experiences did not improve the explanatory power of the models by much.

measures of them. These include indicators for living either in a small city or in a rural or boundary area (the omitted category is living in a large or capital city); an indicator for being in a formal or de facto marriage; the number of children under 18; the logarithm of the person's gross income; an indicator for being employed; a 1-5 rating of poor health, an indicator for having a long-term health or disability condition; the Kessler scale (0-24) of psychological distress; an indicator for ever being diagnosed with a psychological disorder; the number of days in the previous month the person had five or more alcoholic drinks; an indicator for marijuana use; an indicator for being incarcerated during the survey wave; an indicator for being in contact with family; and indicators for having employed friends, homeless friends, and friends who used drugs, were in prison, or were arrested. We also created indicators for whether information for the person's income, disability status, psychological diagnosis, or drinking behaviour were missing.

To control for housing costs and job market conditions, we use a lagged measure of the person's SA4 area of residence to link each observation to the log of the area apartment/flat rental price and the area unemployment rate for the observation reference period. That is, we use lagged information to identify areas but current information to characterise the conditions.[4]

Besides these measures, we also experimented with including measures for the person's childhood home environment, work experience, availability of social supports, use of street drugs, and full-time employment. However, these measures were never significant for either men or women, and their inclusion did not alter our other findings.

Analysis sample. We initially selected wave-specific observations for people who participated in the interviews (dropped attriters), were at least 18 years old and less than 70 years old, and completed the interviews without the assistance of others, eliminating 2,114 of

[4] SA4 areas are sub-state geographies defined by the Australian Bureau of Statistics to represent labour sub-markets and typically have 300,000-500,000 people in metropolitan areas and 100,000-300,000 people in other areas.

the potential 10,092 (= 1,682 x 6) person-wave observations. We then dropped 400 observations with missing information on people's housing insecurity or violence status. We next dropped 1,853 observations that either were missing information for the explanatory variables (except those noted as having missing flags) or followed a break in the longitudinal sequence (e.g., if a wave 4 observation was deleted, we also dropped the wave 5 and 6 observations). Our final analysis sample has 5,725 person-wave observations: 1,261 observations from wave 1 that we use in our "initial conditions" models and 4,464 observations (2,487 for men and 1,977 for women) from waves 2-6 that we use in our lagged dependent variable models. Means of the explanatory measures for our longitudinal analysis sample calculated separately by gender are reported in Appendix A.

The incidence and characteristics of violence and housing insecurity

We begin our empirical analysis by tabulating how the incidence and characteristics of violence and housing insecurity vary with each other. The top panel of Table 1 lists the percentages of men and women who experienced different violence outcomes. Rates of physical violence among JH respondents were much higher than for Australians generally, with 19.1 percent of men and 14.7 percent of women reporting incidents in the six months preceding their interviews. Although these rates are high in a relative sense, they are low in absolute terms and imply that violence is an unusual occurrence and arguably a shock. For both men and women, the incidence of violence was approximately 9 percent higher if they were housing insecure than if they were housing secure.

Among the respondents who reported violence, women were more likely than men to report being harmed, experiencing fear or anxiety, and being a current or former romantic partner of the assailant, while men were more likely to report multiple violent events and being assaulted by strangers. The results confirm the salience of intimate partner violence for

women, with partners accounting for 56.5 percent of women's violent episodes. Men and women who were housing insecure were twice as likely to report experiencing multiple violent episodes as those who were housing secure. The relationships with assailants also differed for men and women conditional on their housing security status. In addition, housing insecure women more frequently reported being harmed by their violence episodes than housing secure women.

Gender differences also appeared in respondents' housing experiences, with men being more likely to be housing insecure. Men's housing insecurity included more time without shelter, more time in socially unacceptable housing (caravans, boarding houses, crisis accommodations), and less time in own housing. Among the men and women who experienced housing insecurity, there were relatively few differences in housing characteristics conditional on violence.

In Table 2 and Figure 1, we consider the longitudinal relationships among our housing insecurity and violence categories. The top panels in Table 2 and Figure 1 show the probabilities of men being housing secure without violence, housing insecure without violence, housing secure with violence, and housing insecure with violence at one interview conditional on their experiences with these outcomes in the prior interview. The third panel of Table 2 and bottom panel of Figure 1 display the same conditional probabilities for women. The first thing that stands out is that the probability that someone is housing secure without violence in one period is much lower (34-55 percent for men and 25-50 percent for women) if the person experienced housing insecurity, violent, or both in the previous period.

Second, there are patterns that are consistent with state dependence. The highest probability of being in a given multinomial housing and violence category in one wave occurs among people who were in the same category in the previous wave. Associations between previous and current outcomes also appear if we consider simple, rather than

compound outcomes. The second and fourth panels from Table 2, which show the conditional percentages for the simple outcomes, indicate that the probability of being housing insecure in one wave is higher if the person was housing insecure in the previous wave, and the probability of experiencing violence was higher if the person previously experienced violence.

Third, there is evidence of cross-effects among the simple outcomes. The rate of violence was 22 percent for men who were housing insecure in the previous period but only 16 percent for men who were housing secure. The rate of housing insecurity was 60 percent for men who experienced violence in the previous wave but only 43 percent for men who did not. Similar patterns appear for women.

Multivariate empirical analyses

Econometric specification. To investigate the determinants of housing insecurity and violence and move beyond simple associations, we estimate longitudinal multinomial, Markov models.[5] Let HV_t denote our four-outcome categorical measure of a person's housing insecurity and violence at wave t. We model the probability of being in a particular status in the current wave as depending upon the person's housing insecurity and violence status from the previous wave, observed exogenous time-varying characteristics in the current wave, X_t, observed endogenous time-varying characteristics from the previous wave, S_{t-1}, observed time-invariant characteristics, Z, and an unobserved time-invariant factor η (random effect) such that

$$\Pr(HV_t = j) = \frac{\exp\left(\alpha_j{}'HV_{t-1} + \beta_j{}'X_t + \delta_j{}'S_{t-1} + \gamma_j{}'Z + \lambda_j\eta\right)}{1 + \sum_{k=1}^{3}\exp(\alpha_k{}'HV_{t-1} + \beta_k{}'X_t + \delta_k{}'S_{t-1} + \gamma_k{}'Z + \lambda_k\eta)} \qquad (1)$$

for $j = 1, 3$ and $t = 2, 6$ and where α_j, β_j, δ_j, and γ_j represent vectors of coefficients to be

[5] Although the Markov assumption is restrictive, Cobb-Clark et al. (2015) have reported that there is little evidence of duration dependence in homelessness and housing insecurity spells in the JH survey.

estimated and λ_j represents a scalar coefficient (factor loading) to be estimated. As with other types of dynamic, random-effects models, the presence of the time-invariant factor, η, leads to serial correlation in the unobserved determinants of a person's housing insecurity and violence status; accounting for this factor mitigates a source of bias.

To account for initial conditions in people's housing insecurity and violence status, we estimate equation (1) jointly with a multinomial specification for their status in wave 1

$$\Pr(HV_1 = j) = \frac{\exp\left(\beta_{0j}'X_1 + \gamma_{0j}'Z + \lambda_{0j}\eta\right)}{1 + \sum_{k=1}^{3}\exp(\beta_{0k}'X_1 + \gamma_{0k}'Z + \lambda_{0k}\eta)} \quad (2)$$

for j = 1, 3. We specify the common random time-invariant factor to follow a discrete distribution with three points of support, and estimate the system of equations using the aML software (www.applied-ml.com).[6]

Estimation results. Table 3 reports estimation results from our principal specifications. The first three columns of Table 3 list estimated coefficients, Huber-White standard errors, and marginal effects for the MNL coefficients for model (1) for the housing insecurity and no violence, housing security and violence, and housing insecurity and violence outcomes for men—being housing secure without violence is the reference category. The next three columns list the same set of estimates for women. For brevity, Table 3 omits results for the intercepts; wave dummies; indicators for missing childhood abuse, income disability, psychological condition, and alcohol consumption information; error distribution parameters; and the initial conditions model (full results are available upon request).

The first three rows of Table 3 list estimation results for the lagged housing security and violence measures. For men, all the coefficients on these variables are positive and statistically different from zero, indicating that being housing insecure, experiencing violence, or both in one period increases the risks of these outcomes relative to being housing

[6] We also estimated specifications of our model with η terms that followed (a) normal distributions and (b) discrete distributions with two points of support. There were no substantive differences in the estimation results.

secure without violence in the next period. For women, all the coefficients for the lagged outcome measures are also positive, but two coefficients cannot be distinguished from zero.

The quantitative interpretation of these coefficients is complicated because the MNL model is nonlinear and the coefficients refer to relative, rather than absolute risks. To assist with interpretations, we calculated marginal effects, which are shown in italics. The marginal effects were estimated by predicting the change in probabilities for each outcome associated with a change in the relevant explanatory variable for each person and then averaging these changes across all persons (i.e., they are averages of the individual marginal effects). In addition, we calculated average predicted probabilities of the housing and violence outcomes conditional on the possible values of the lagged outcomes and have displayed these in Figure 2. Figure 2, which is directly comparable to Figure 1, helps illustrate how the model-adjusted relationships between the current and lagged outcomes differ from the unadjusted relationships.

The estimated marginal effects indicate that many sizeable associations remain between the lagged and current housing insecurity and violence measures. Most notably, the MNL results imply that experiencing housing insecurity, violence, or both in one period reduces JH men's chances of being housing secure without violence in the next period by 24 to 45 percent and reduces JH women's chances of the same outcome by 12 to 20 percent. These are large differences but nevertheless are muted relative to the unadjusted differences from Figure 1.

There is other evidence of state dependence from the MNL specifications, though this too is weaker than the evidence from the simple conditional statistics. Results that change across analyses include men being at highest risk of being housing insecure without violence (status 1) if they previously experienced housing insecurity with violence (status 3) and women being at highest risk of being housing secure with violence (status 2) if they had

previously been housing insecure with violence (status 3). Also, for a few housing and violence outcomes, there is little apparent model-adjusted association with a person's lagged status. For example, lagged status in the MNL models does not predict whether men are housing secure but experiencing violence (status 2).

We can also consider marginal effects for the simple housing insecurity and violence outcomes. For men, the predicted probabilities of housing insecurity are 28 percent if they were previously housing secure without violence, 60 percent if they were previously housing insecure without violence, 51 percent if they were previously housing secure with violence, and 73 percent if they were previously housing insecure with violence. Thus, men's probabilities of being housing insecure are higher if they were previously housing insecure, experienced violence, or both. Women's predicted probabilities of housing insecurity are 26, 42, 30, and 36 percent conditional on statuses 0-3, respectively. Thus, women's housing insecurity is strongly positively associated with their previous housing insecurity but only conditionally associated with previous violence status. In particular, experiencing violence while housing secure increases the probability of women's subsequent housing insecurity—a result that is consistent with domestic violence being a trigger for women's entry into homelessness. However, experiencing violence while housing insecure reduces the probability of subsequent housing insecurity.

When we consider violence as an outcome, men's previous experiences with violence and housing insecurity predict higher subsequent rates of violence. Women's previous experiences with violence also predict higher subsequent rates of violence; however, women's experiences with housing insecurity only predict higher subsequent violence if those experiences involved violence (i.e., previously being in status 3 predicts a higher level of violence relative to being in status 2 but previously being in status 1 does not relative to status 0).

The distributions of predictions from the models also indicate that violence has properties of a shock. We used the coefficients from the models and the values of the explanatory variables to predict probabilities of violence for all the observations in the analysis sample. The median predicted probability of violence for men is 15 percent, and the median predicted probability of violence for women is 9 percent. Only 4 percent of men and 3 percent of women in the JH survey are predicted to have more than a 50-50 chance of experiencing violence.

As mentioned, the estimated associations between earlier violence and housing insecurity outcomes and later outcomes from the multivariate models are generally weaker than the estimated associations from the descriptive analysis. The controls for other observed characteristics in the models account for a small part of this change, while the controls for time-invariant unobserved heterogeneity account for a much larger share. Appendix B shows results from dynamic MNL models with no controls for observed or unobserved heterogeneity (top panel), only controls for observed characteristics (middle panel), and controls for both types of characteristics (bottom panel). The estimates from Appendix B indicate that the controls for unobserved heterogeneity lead to the biggest changes in results. Estimates from the bottom of Table 3 further reveal that there are significant loading terms (λ parameters) on the time-invariant errors for both men and women.

Among the other characteristics in our models, lesbian and bisexual women face higher risks of housing insecurity (with and without violence) than heterosexual women. In contrast, gay and bisexual men appear to face lower risks of housing insecurity, though the estimates are not statistically significant. Women and men who were abused or neglected as children face higher risks of violence; however, women who were abused or neglected face lower risks of being housing insecure without violence. For women, the chances of being housing insecure decrease with age; for men, the risks of being housing secure but

experiencing violence fall with age. For women, schooling has little association with housing insecurity and violence; however, for men, there is a counter-intuitive positive association between schooling and housing insecurity without violence.

Family relationships appear to be important and mostly protective. Being married or in a de facto marriage significantly reduces women's risks of being housing insecure without violence. The presence of children is associated with lower rates of housing insecurity (with and without violence) for women and men, though one of the coefficients for men falls short of statistical significance. Maintaining other contacts with family members is estimated to reduce housing insecurity and violence for men and to reduce the housing insecurity without violence outcome for women.

Consistent with McVicar et al. (2015), we find deleterious effects from substance abuse. More occasions of consuming five or more alcoholic drinks increases women's risks of all three multinomial housing insecurity and violence outcomes and men's risks of violence outcomes. Marijuana use increases men's risks of all three multinomial housing insecurity and violence outcomes and women's risks of experiencing housing insecurity without violence and violence without housing insecurity.

A complicated and somewhat perplexing picture emerges from the mental and physical health variables. As expected, increased psychological distress raises the risks of all three multinomial housing insecurity and violence outcomes for women and raises the risks of housing insecurity (with and without violence) for men. Surprisingly however, other mental and physical health problems appear to be protective. In particular, poorer health is associated with lower rates of housing security with violence for women and lower rates of housing insecurity without violence for men. Disability is associated with lower rates of housing insecurity with violence for women, while diagnoses of psychological conditions are associated with lower rates of housing insecurity with violence for men. Cobb-Clark et al.

(2015) similarly found that some bad health outcomes reduced the duration of homelessness spells. On their face, the results for the health status, disability, and psychological diagnosis measures are puzzling; however, the estimated associations might reflect these conditions leading to either prioritised social services or a more consistent provision of services (e.g., fewer requirements on the receipt of services).

Lastly, we find that having homeless friends increases women's risks of housing insecurity with and without violence. Although social networks are usually seen as a source of support, elements of disadvantaged people's networks might instead be a source of demands.

Alternative measures. As we discussed, the JH survey asked about other types of victimisation, and we use these measures in sensitivity analyses. One question involved robberies and physical assaults that were reported to police. The incidence of these events was lower than for the physical violence measure with rates of 10 percent for men and 11 percent for women, suggesting that many violent events go unreported to the police. We created an alternative victimisation measure that took on a value of one if a person indicated either experiencing physical violence or reporting a robbery or assault to the police and then formed a multinomial housing insecurity and violence variable based on the revised indicator. Probabilities of the outcomes of this alternative measure calculated conditionally on the lagged values of the same measure are shown in the top panel of Figure 3. The patterns are nearly identical to those for our primary measure from Figure 1. We also re-estimated our dynamic MNL model using the revised measure and obtained results that were similar to those from Table 3.[7]

The JH survey also asked whether people had been sexually assaulted in the six months preceding their interviews. Sexual assault is far rarer in the JH survey than physical

[7] Detailed results are omitted but available upon request.

violence; just under three percent of women and one percent of men indicated that they had been sexually assaulted. As with physical violence, the rates of sexual violence in the JH survey are several times those among Australians generally, which are estimated to be 0.5 for women and 0.1 for men.[8] We created a multinomial housing insecurity and violence measure that included experiences with either physical violence or sexual assault in the violence component. Conditional probabilities for this measure are shown in the middle panel of Figure 3. The conditional probabilities and multivariate results from a respecified MNL model were similar to those based on our primary measure.

We also considered a measure of primary homelessness, which we defined as spending any time during preceding six months (wave 1) or the time between interviews (waves 2-6) sleeping rough or squatting in an abandoned building, in place of our measure of housing insecurity. Only seven percent of JH men and three percent of JH women reported being homeless in the months leading up to their interviews. Conditional probabilities of multinomial homelessness and violence outcomes are shown in the bottom panel of Figure 3. The principal difference between the estimates based on homelessness and those based on housing insecurity is the much lower incidence of homelessness. For men, the patterns of results for homelessness outcomes are otherwise very similar to those for our primary measure. For women, there are some noticeable differences, such as the homelessness and no violence outcome (status 1) and the housed and no violence outcome (status 2) being highest among those who were previously homeless with violence (status 3). Because of the low incidence of homelessness, it was not possible to estimate a full MNL specification for the revised measure.

[8] "4530.0 – Crime Victimisation, Australia, 2013-14," <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4530.0Main+Features12013-14>, released 17 Feb. 2015).

Conclusions

In this paper we have used longitudinal data from the *Journeys Home Survey* to investigate how disadvantaged Australians' experiences with violence and housing insecurity over a series of (approximately) six-month periods affect their experiences with violence and housing insecurity in the subsequent (approximately) six-month periods. Our study is one of only a few to have examined these outcomes prospectively. It is also distinctive in examining outcomes for women and men and in disaggregating its analyses by gender. We undertake descriptive analyses but also estimate dynamic multivariate MNL models that incorporate many controls for other observed characteristics, include flexible finite-mixture controls for time-invariant unobserved characteristics, and account for initial conditions to mitigate biases that might otherwise arise from serially correlated errors.

The disaggregation by gender reveals that disadvantaged women's and men's experiences with violence and housing insecurity are markedly different. Policy prescriptions emphasise the role of intimate partner violence as a leading cause of women's homelessness. Consistent with that concern, we find that one-in-seven JH women suffers physical violence in a given six-month period, that intimate partners perpetrate most of that violence, and that JH women are much more likely than JH men to report being harmed or experiencing later anxiety as a result of violence.

As horrifying as those statistics are, men in the JH survey experience even more violence! Men also experience more housing insecurity, including more time in primary homelessness and more time in culturally inappropriate accommodations, such as caravans and boarding homes, than women. Thus, the descriptive analyses tell us that violence and housing insecurity are substantial problems for disadvantaged women and men.

Our multivariate analyses further demonstrate that violence and housing insecurity are related problems. Estimates from the models show that disadvantaged Australian men's and

women's chances of being housing secure without suffering violence are much lower if they previously experienced housing insecurity, violence, or (especially) both. Thus, there is substantial evidence of state dependence in these outcomes, even though our models also control for other observed and unobserved characteristics that would also lead to these patterns. We also find evidence of state dependence regarding men's and women's simple violence and housing outcomes—that is, episodes of violence increase the risks of subsequent violence, and episodes of housing insecurity increase the risks of subsequent housing insecurity. Although there are sizeable associations in these outcomes for both genders, the associations are much stronger for men than for women.

Besides the differences in magnitudes of these general associations, our multivariate results point to gender differences in the associations between some specific conditional outcomes. For example, among women who are *housing secure*, an episode of violence increases the probability that they will subsequently be housing insecure, which is consistent with domestic violence causing housing problems. However, among women who are *housing insecure*, an episode of violence reduces the probability of subsequent housing insecurity, which is consistent with violence also prompting housing insecure women to reattain stable housing. For men, a distinctive finding is that previous experiences with violence and housing security are strongly associated with most combinations of subsequent outcomes but are not associated with the specific outcome of experiencing violence while housing secure.

In addition to the results regarding lagged outcomes, we find that heavy drinking, marijuana use, psychological distress, and a history of childhood abuse and neglect increase the risks of violence and housing insecurity for both genders. We also find that the presence of children and maintaining contacts with family reduce the risks of housing insecurity for both genders. However, there are also some gender-specific findings. In particular, women who are bisexual or lesbian and women with homeless friends face elevated risks of housing

insecurity, while men's sexual orientation and friend networks seem less relevant.

There are some crucial qualifications regarding our results. The chief qualification is that the JH survey is representative of an especially disadvantaged set of public assistance clients who were at risk of housing insecurity. This is a relevant population to focus on, but it is more disadvantaged than public assistance clients generally and obviously not representative of the overall Australian population. Differences in the populations can be seen in the high rates of violence reported by the JH respondents as well as in the high rates of health, psychological, and substance abuse problems and the low rates of employment. Combinations of violence and housing insecurity outcomes predict subsequent changes in these outcomes among our vulnerable JH sample; however, the associations may differ for Australians with more resources.

A second qualification is that the sample sizes of several of the cross-categorised, multinomial outcome groups that we examine, such as the outcome of experiencing both housing insecurity and violence among those who had previously experienced the same multinomial outcome, are modest. This leads to some imprecise estimates and a corresponding inability to distinguish a few sizeable associations from null associations. The JH survey is large enough to support most of the stratifications that we consider, and the analyses, which reveal many differences between men and women and between the alternative combinations of violence and housing insecurity, indicate the need for these stratifications. Nevertheless, small cell sizes limit us from providing definitive results for some outcomes.

The results from our analyses add to the research literature on the contributions of negative shocks to housing problems among vulnerable people. Our analyses show that violence has properties of a shock in the sense that it is hard to predict. The analyses also show that violence is associated with subsequent housing insecurity. The results suggest that

social services that reduce violence may also help to address housing problems. Evidence from our multinomial specifications further indicates that violence and housing services should be coordinated.

Our findings should also prompt housing advocates and public officials to more carefully consider the importance of men's violence. Men's and women's victimisation are frequently listed as consequences of homelessness. Women's victimisation is also seen as an antecedent for housing problems and is therefore the target of special, coordinated programs. The same cannot be said of men's victimisation. Our results show that violence is a substantial risk factor for both men's and women's housing problems. Initiatives to improve disadvantaged men's safety and to assist male victims could help to reduce men's high rates of housing insecurity.

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Table 1. Characteristics of violence and housing insecurity

Panel A: Characteristics of violence conditional on gender and housing insecurity

Characteristic	All	Men H. secure	Men H. insecure	All	Women H. secure	Women H. insecure
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Among entire analysis sample</u>						
Experienced violence (%)	19.1	15.0	23.5***	14.7***	11.6	20.5***
Person-wave observations (*N*)	3211	1664	1547	2514	1641	873
<u>Among those who experienced violence</u>						
Harmed (%)	58.7	55.4	60.9	75.8***	69.8	82.0***
Experienced anxiety, fear (%)	33.2	29.6	35.6	69.5***	66.3	72.9
Experienced mult. events (%)	10.5	7.2	14.0***	8.8**	6.1	13.8***
Relationship to assailant[a]			/**	/***		/*
Stranger (%)	44.5	52.2	39.2	13.3	12.7	14.0
Non-cores. rom. Partner (%)	4.4	5.7	3.6	20.7	20.1	21.2
Co-res. part. at interview (%)	1.8	1.6	1.9	5.4	6.4	4.5
Co-res. part. at time (%)	3.6	2.4	4.4	13.0	8.5	17.9
Former co-res. partner (%)	2.0	1.6	2.2	17.4	17.5	17.3
Other known person (%)	43.7	36.4	48.6	30.2	34.9	25.1
Person-wave observations (*N*)	614	250	364	369	190	179

Panel B. Characteristics of housing insecurity conditional on gender and violence

Characteristic	All	Men No vio.	Men Violence	All	Women No vio.	Women Violence
<u>Among entire analysis sample</u>						
Housing insecure (%)	48.2	45.6	59.3***	34.7***	32.4	48.5***
Person-wave observations (*N*)	3211	2597	614	2514	2145	369
<u>Among those who were housing insecure</u>						
Time housed in own place (%)	21.6	20.9	23.8	32.6***	32.2	34.3
Time in house or unit (%)	54.6	54.0	56.6	72.9***	72.9	72.8
Time prim. homeless (%)	6.3	5.7	8.4**	3.5***	3.2	4.3
Time in tert. homelessness (%)	35.4	37.1	29.8***	22.6***	23.1	20.7
Person-wave observations (*N*)	1547	1183	364	873	694	179

Note: The tables report statistics for respondents reporting each characteristic that were calculated using unweighted longitudinal data from the JH survey. Asterisks indicate statistically significant differences in the characteristic by either gender (column (4)) or housing insecurity or violence status (columns (3) and (6)) based on χ^2 and *t* tests.

[a] Asterisks indicate results from χ^2 tests of differences in the relationship distribution.

* Significant at 0.1 level. ** Significant at 0.5 level *** Significant at 0.01 level.

Table 2. Current housing and violence outcomes conditional on previous outcomes

Men: multinomial outcomes

		Outcomes in current wave				
		Hou. secure, no violence	Hou. insecure, no violence	Hou. secure, violence	Hou. insecure, violence	Total
Outcomes in previous wave	Hou. secure, no violence	782 71.5%	193 17.6%	77 7.0%	42 3.8%	1,094 100.0%
	Hou. insecure, no violence	242 26.6%	534 58.6%	34 3.7%	101 11.1%	911 100.0%
	Hou. secure, violence	75 37.5%	43 21.5%	44 22%	38 19.0%	200 100.0%
	Hou. insecure, violence	45 16.0%	106 37.6%	31 11.0%	100 35.5%	282 100.0%
	Total	1,144 46.0%	876 35.2%	186 7.5%	281 11.3%	2,487 100.0%

Men: simple outcomes

		Outcomes in current wave	
		Housing insecure	Violence
Outcomes prev. wave	Housing secure	316 24.4%	201 15.5%
	Housing insecure	841 70.5%	266 22.3%
	No violence	870 43.4%	254 12.7%
	Violence	287 59.5%	213 44.2%

Women: multinomial outcomes

		Outcomes in current wave				
		Hou. secure, no violence	Hou. insecure, no violence	Hou. secure, violence	Hou. insecure, violence	Total
Outcomes in previous wave	Hou. secure, no violence	862 76.4%	166 14.7%	71 6.3%	30 2.7%	1,129 100.0%
	Hou. insecure, no violence	223 40.4%	263 47.6%	24 4.4%	42 7.6%	552 100.0%
	Hou. secure, Violence	79 51.3%	27 17.5%	35 22.7%	13 8.4%	154 100.0%
	Hou. insecure, violence	37 26.1%	47 33.1%	18 12.7%	40 28.2%	142 100.0%
	Total	1,201 60.8%	503 25.4%	148 7.5%	125 6.3%	1,977 100.0%

Women: simple outcomes

		Outcomes in current wave	
		Housing insecure	Violence
Outcomes prev. wave	Housing secure	236 18.4%	149 11.6%
	Housing insecure	392 56.5%	124 17.9%
	No violence	501 29.8%	167 9.9%
	Violence	127 42.9%	106 35.8%

Note: The tables show numbers and percentages (of row totals) of people experiencing each listed housing and violence outcome conditional on their previous experiences with the listed outcomes using unweighted longitudinal data from the JH survey.

Table 3. Selected longitudinal MNL housing and violence model results

	Men			Women		
	Housing insecure, no violence	Housing secure, violence	Housing insecure, violence	Housing insecure, no violence	Housing secure, violence	Housing insecure, violence
Housing insecure, no violence $t-1$	1.588 ***	0.582 **	1.962 ***	1.044 ***	0.248	0.566 *
	(0.152)	(0.247)	(0.223)	(0.173)	(0.296)	(0.324)
	0.220	*-0.005*	*0.095*	*0.154*	*-0.002*	*0.001*
Housing secure, violence $t-1$	1.083 ***	0.651 **	1.753 ***	0.338	1.127 ***	0.828 *
	(0.238)	(0.322)	(0.292)	(0.288)	(0.270)	(0.436)
	0.133	*0.011*	*0.094*	*0.012*	*0.080*	*0.028*
Housing insecure, violence $t-1$	2.264 ***	1.335 ***	3.125 ***	0.802 ***	1.440 ***	1.349 ***
	(0.228)	(0.339)	(0.259)	(0.304)	(0.397)	(0.449)
	0.257	*0.005*	*0.187*	*0.060*	*0.098*	*0.045*
Aboriginal or Torres St. islander	0.156	-0.002	-0.110	0.055	0.307	0.043
	(0.203)	(0.301)	(0.243)	(0.229)	(0.270)	(0.396)
	0.031	*-0.001*	*-0.015*	*0.003*	*0.020*	*-0.001*
Migrated from non-Eng. country	0.227	-1.112	-1.156 **	-0.027	-0.125	0.074
	(0.294)	(0.706)	(0.567)	(0.300)	(0.403)	(0.632)
	0.087	*-0.042*	*-0.072*	*-0.004*	*-0.007*	*0.005*
Bisexual, gay, or lesbian	-0.309	-0.345	-0.554	0.700 ***	-0.259	0.708 *
	(0.329)	(0.520)	(0.422)	(0.250)	(0.353)	(0.428)
	-0.029	*-0.009*	*-0.029*	*0.099*	*-0.028*	*0.020*
Non-intact family at age 14	-0.040	0.235	-0.110	-0.089	0.168	-0.123
	(0.147)	(0.231)	(0.171)	(0.174)	(0.215)	(0.306)
	-0.006	*0.015*	*-0.010*	*-0.013*	*0.012*	*-0.005*
In foster or inst. care as child	0.274	-0.427	0.059	-0.014	-0.016	-0.788 **
	(0.174)	(0.267)	(0.195)	(0.199)	(0.240)	(0.378)
	0.050	*-0.026*	*-0.001*	*0.014*	*0.003*	*-0.032*
Childhood abuse, neglect score	-0.052	0.413 ***	0.272 ***	-0.149 *	0.333 ***	0.221
	(0.069)	(0.110)	(0.081)	(0.077)	(0.092)	(0.134)
	-0.023	*0.017*	*0.019*	*-0.033*	*0.017*	*0.011*
Homeless as child	0.013	-0.200	0.126	0.190	-0.268	0.481
	(0.164)	(0.248)	(0.186)	(0.188)	(0.250)	(0.339)
	0.000	*-0.013*	*0.012*	*0.022*	*-0.022*	*0.019*
Incarcerated before JH survey	-0.326 **	-0.176	0.030	-0.029	0.104	0.246
	(0.152)	(0.240)	(0.182)	(0.275)	(0.280)	(0.477)
	-0.054	*-0.006*	*0.017*	*-0.011*	*0.006*	*0.012*
Age	-0.054	-0.156 ***	-0.036	-0.114 **	0.039	-0.170 *
	(0.036)	(0.060)	(0.047)	(0.047)	(0.060)	(0.090)
	0.001 [a]	*-0.002*	*-0.001*	*-0.003*	*0.002*	*-0.003*
Age^2 / 100	0.068	0.162 **	0.018	0.135 **	-0.035	0.162
	(0.045) [a]	(0.077)	(0.062)	(0.063)	(0.078)	(0.120)

10-11 years of schooling	0.452 *	-0.338	-0.207	0.108	0.061	0.280
	(0.234)	(0.342)	(0.247)	(0.259)	(0.309)	(0.455)
	0.088	*-0.025*	*-0.030*	*0.009*	*0.001*	*0.010*
12+ years of schooling	0.204	-0.250	-0.006	0.120	0.208	0.197
	(0.228)	(0.335)	(0.241)	(0.252)	(0.299)	(0.447)
	0.037	*-0.019*	*-0.005*	*0.011*	*0.011*	*0.005*
College degree	0.677 *	-1.425	0.151	-0.232	0.121	0.208
	(0.396)	(0.889)	(0.499)	(0.510)	(0.503)	(0.892)
	0.124	*-0.068*	*-0.003*	*-0.038*	*0.010*	*0.014*
Small city *t*−1	0.228	-1.312 ***	-0.089	0.022	-0.394	0.308
	(0.208)	(0.394)	(0.271)	(0.246)	(0.381)	(0.419)
	0.057	*-0.056*	*-0.006*	*0.001*	*-0.024*	*0.017*
Rural area *t*−1	0.071	0.355	-0.640	0.291	-0.003	0.036
	(0.319)	(0.417)	(0.493)	(0.355)	(0.525)	(0.697)
	0.024	*0.031*	*-0.051*	*0.044*	*-0.005*	*-0.005*
ln area rental price	0.189	-1.145 *	0.524	0.469	0.622	0.854
	(0.365)	(0.636)	(0.471)	(0.479)	(0.653)	(0.881)
	0.028	*-0.071*	*0.049*	*0.042*	*0.029*	*0.026*
Unemployment rate	0.017	-0.084	-0.047	0.057	-0.029	0.088
	(0.047)	(0.076)	(0.066)	(0.056)	(0.080)	(0.104)
	0.006	*-0.004*	*-0.004*	*0.007*	*-0.003*	*0.003*
Couple *t*−1	-0.298	0.066	0.036	-0.426 **	0.084	0.286
	(0.182)	(0.272)	(0.220)	(0.181)	(0.247)	(0.294)
	-0.051	*0.007*	*0.013*	*-0.069*	*0.010*	*0.023*
Number of children *t*−1	-0.311 **	0.115	-0.261	-0.249 ***	-0.026	-0.406 **
	(0.127)	(0.159)	(0.169)	(0.092)	(0.098)	(0.175)
	-0.044	*0.014*	*-0.012*	*-0.028*	*0.004*	*-0.012*
ln personal income *t*−1	-0.063	-0.006	-0.086	-0.105	0.018	0.422 *
	(0.079)	(0.139)	(0.100)	(0.089)	(0.146)	(0.235)
	-0.007	*0.001*	*-0.005*	*-0.025*	*0.001*	*0.022*
Employed *t*−1	-0.268	0.237	0.005	-0.199	0.082	-1.205 ***
	(0.167)	(0.260)	(0.221)	(0.190)	(0.267)	(0.414)
	-0.048	*0.018*	*0.008*	*-0.009*	*0.014*	*-0.043*
Poor health scale *t*−1	-0.184 ***	0.071	-0.030	-0.092	-0.260 **	-0.142
	(0.064)	(0.103)	(0.083)	(0.076)	(0.105)	(0.140)
	-0.030	*0.007*	*0.003*	*-0.007*	*-0.014*	*-0.003*
Disabled *t*−1	-0.137	-0.152	-0.106	-0.261	0.158	-0.586 **
	(0.141)	(0.227)	(0.186)	(0.165)	(0.224)	(0.285)
	-0.017	*-0.006*	*-0.002*	*-0.028*	*0.017*	*-0.022*
Kessler distress scale *t*−1	0.030 **	-0.015	0.062 ***	0.027 *	0.060 ***	0.111 ***
	(0.013)	(0.021)	(0.016)	(0.015)	(0.020)	(0.028)
	0.003	*-0.002*	*0.004*	*0.001*	*0.003*	*0.004*
Psychological condition *t*−1	-0.120	0.053	-0.647 ***	-0.110	0.453	0.257
	(0.149)	(0.230)	(0.184)	(0.191)	(0.317)	(0.383)
	0.004	*0.012*	*-0.052*	*-0.028*	*0.027*	*0.012*

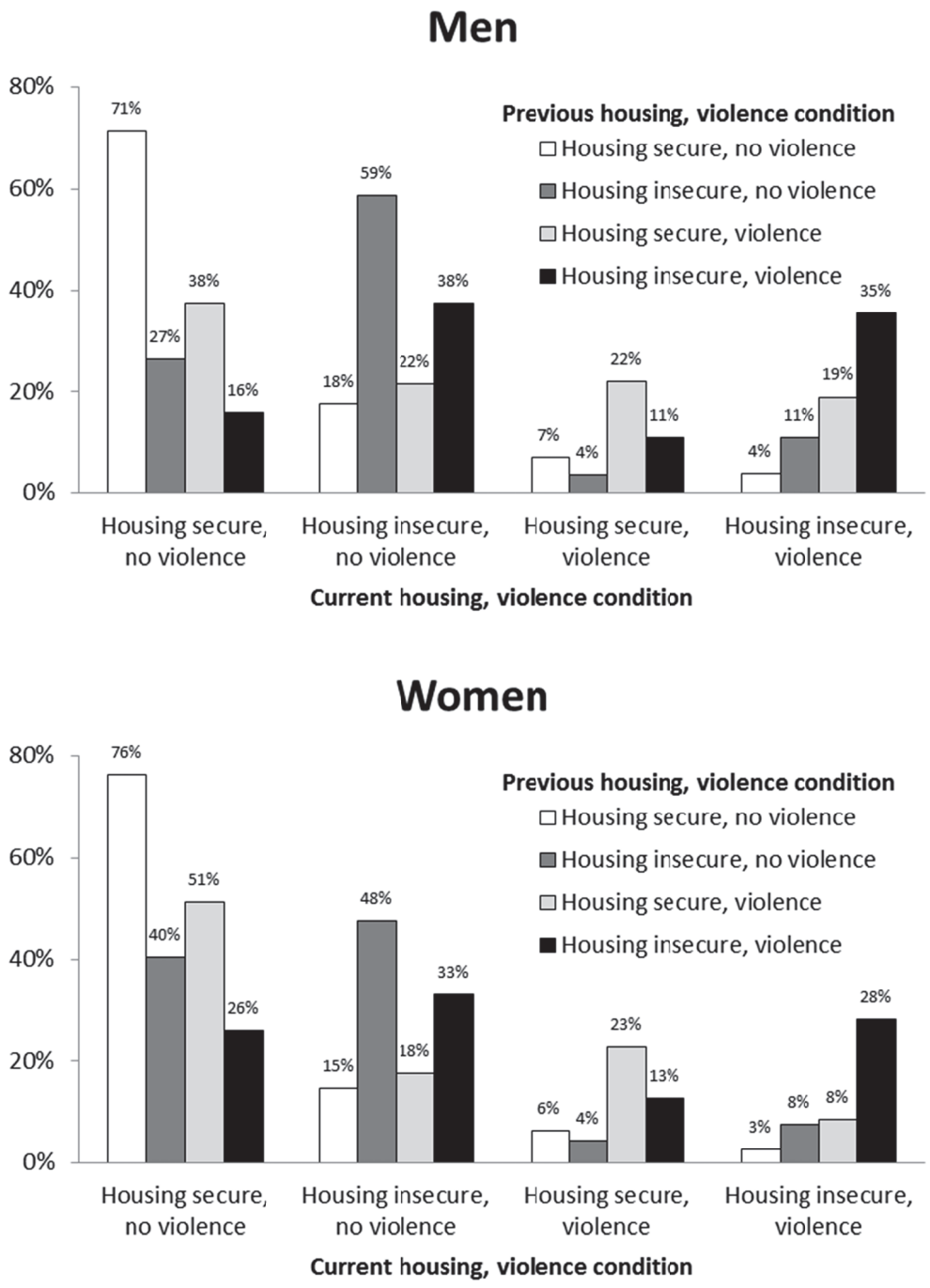
Times 5+ drinks per month $t-1$	0.003	0.032 **	0.033 ***	0.029 *	0.048 ***	0.063 ***
	(0.009)	(0.013)	(0.010)	(0.015)	(0.015)	(0.020)
	-0.001	*0.001*	*0.002*	*0.002*	*0.002*	*0.002*
Any marijuana use $t-1$	0.331 **	0.814 ***	0.495 ***	0.718 ***	0.594 **	0.443
	(0.142)	(0.216)	(0.175)	(0.216)	(0.261)	(0.339)
	0.025	*0.038*	*0.021*	*0.094*	*0.027*	*0.001*
Incarcerated $t-1$	0.186	-0.758	0.537	1.072	-0.352	1.813
	(0.370)	(0.717)	(0.392)	(1.018)	(1.274)	(1.142)
	0.016	*-0.039*	*0.050*	*0.120*	*-0.040*	*0.087*
Any family contact $t-1$	-0.378 **	-0.324	-0.397 *	-0.395 *	0.148	-0.285
	(0.185)	(0.286)	(0.229)	(0.238)	(0.334)	(0.414)
	-0.044	*-0.009*	*-0.016*	*-0.058*	*0.016*	*-0.005*
Any employed friends $t-1$	0.032	-0.084	-0.095	0.171	0.058	0.318
	(0.133)	(0.214)	(0.175)	(0.150)	(0.213)	(0.268)
	0.010	*-0.004*	*-0.008*	*0.018*	*0.000*	*0.011*
Any homeless friends $t-1$	-0.028	-0.154	-0.086	0.369 **	-0.016	0.630 **
	(0.144)	(0.231)	(0.185)	(0.170)	(0.256)	(0.276)
	0.001	*-0.007*	*-0.004*	*0.042*	*-0.010*	*0.023*
Friends using drugs, imprisoned $t-1$	-0.003	0.037	0.073	-0.212	0.112	0.273
	(0.137)	(0.218)	(0.181)	(0.177)	(0.233)	(0.286)
	-0.004	*0.001*	*0.006*	*-0.039*	*0.009*	*0.017*
λ_j	1.000	-1.882 **	-0.212	1.000	0.135	1.474 ***
		(0.814)	(0.321)		(0.228)	(0.231)
ln likelihood		-3130.30			-2217.74	
Observations		2,487			1,977	

Note: Authors' estimates from longitudinal MNL models (see equations (1) and (2)) using unweighted data from the JH survey. Coefficients for intercepts, wave effects, and missing value indicators, and coefficients for initial conditions models estimated but not shown. Huber-White standard errors shown in parentheses; estimated marginal effects shown in italics.

[a] Marginal effects of age include linear and quadratic effects.

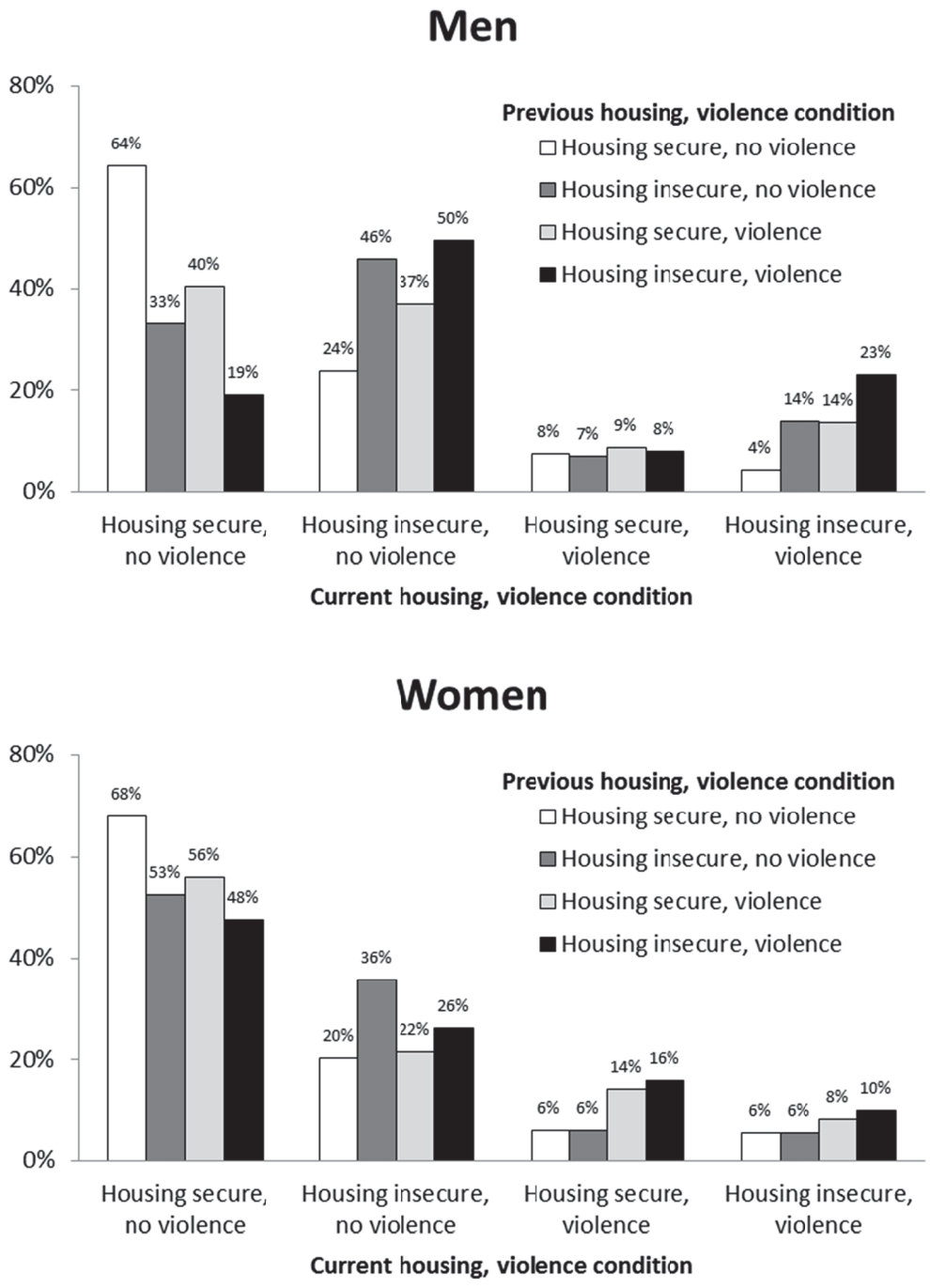
* Significant at 0.10 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

Figure 1. Current housing and violence outcomes conditional on previous outcomes



Note: The figures show percentages of people experiencing each combination housing and violence outcome conditional on their previous experiences with these outcomes using unweighted longitudinal data from the JH survey.

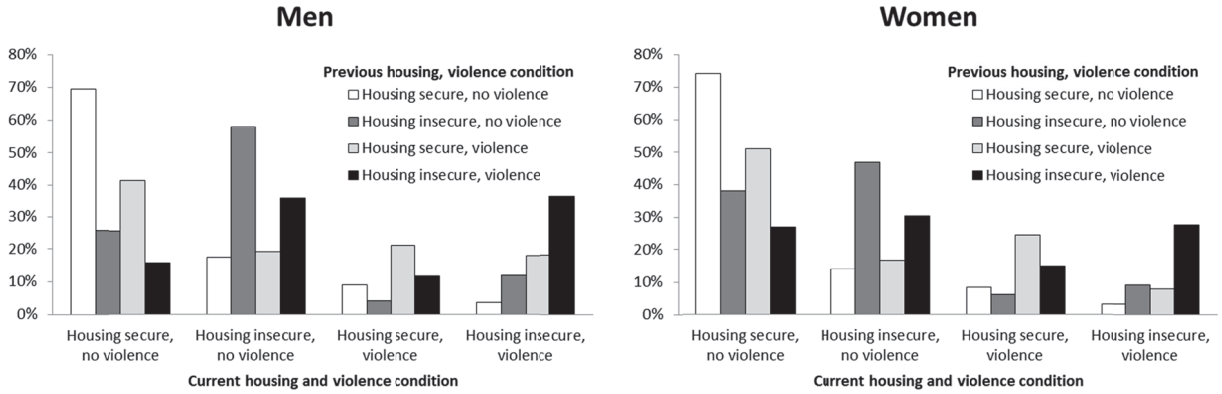
Figure 2. Predicted (model-adjusted) current housing and violence outcomes conditional on previous outcomes



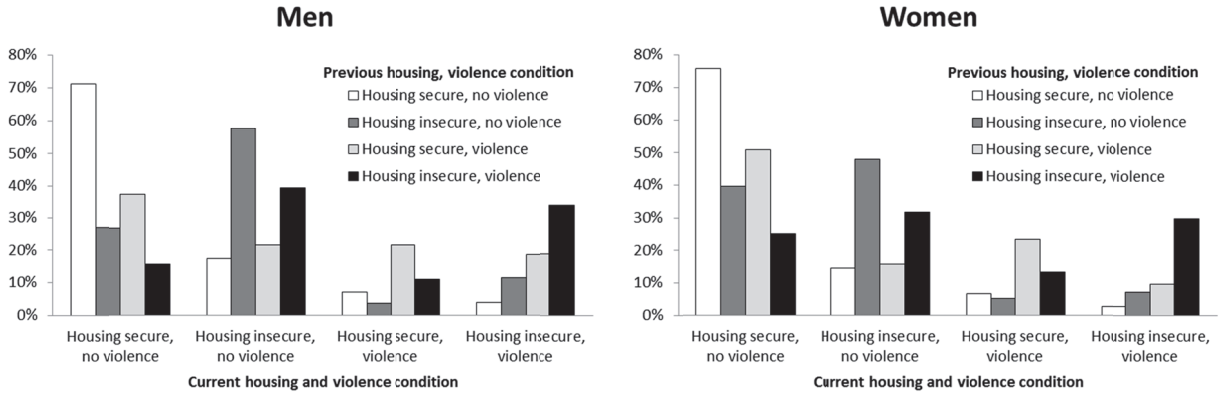
Note: The figures show percentages of people predicted to experience each combination housing and violence outcome conditional on their previous experiences with these outcomes using unweighted longitudinal data from the JH survey and coefficient estimates from our multivariate models.

Figure 3. Current housing and violence outcomes conditional on previous housing and violence outcomes – alternative definitions

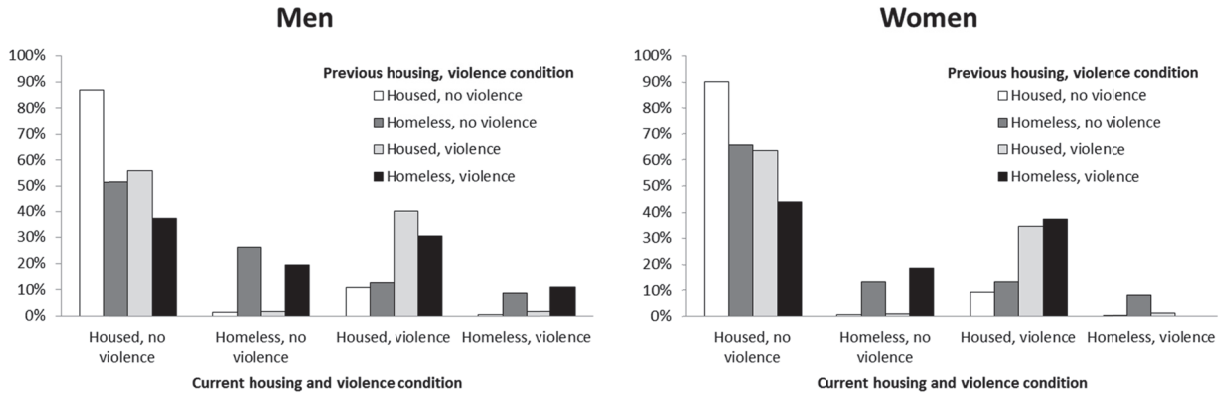
a. Violence includes assaults and robberies reported to police



b. Violence includes sexual assaults



c. Housing insecurity redefined as primary homelessness



Note: The figures show percentages of people experiencing each combination housing and violence outcome conditional on their previous experiences with these outcomes using unweighted longitudinal data from the JH survey.

Appendix A. Means of explanatory variables in longitudinal analysis sample

	Men	Women
Aboriginal or Torres Strait Islander	0.136	0.160
Migrated from non-English country	0.059	0.082
Bisexual, gay, or lesbian	0.053	0.105
Non-intact family at age 14	0.491	0.576
In foster or institutional care as child	0.230	0.235
Childhood abuse, neglect score (0-4)	1.332	1.435
Childhood abuse information missing	0.028	0.052
Homeless as child	0.421	0.411
Incarcerated before *Journeys Home Survey*	0.469	0.128
Age	35.71	33.23
10-11 years of schooling	0.356	0.353
12+ years of schooling but no college degree	0.462	0.460
College degree	0.035	0.040
Small city $t-1$	0.158	0.136
Rural area $t-1$	0.041	0.042
Area weekly rental price	338.24	327.46
Unemployment rate	5.705	5.890
Couple $t-1$	0.185	0.241
Number of children $t-1$	0.184	0.822
Personal income $t-1$	454.73	494.42
Personal income missing $t-1$	0.042	0.030
Employed $t-1$	0.290	0.232
Poor health scale (1-5) $t-1$	3.133	3.158
Disabled $t-1$	0.486	0.451
Disabled information missing $t-1$	0.008	0.011
Kessler distress scale (0-24) $t-1$	7.578	8.427
Psychological condition $t-1$	0.637	0.735
Psychological condition information missing $t-1$	0.035	0.028
Times consuming 5+ drinks per month $t-1$	4.392	2.039
Drinking information missing $t-1$	0.015	0.008
Any marijuana use $t-1$	0.364	0.156
Incarcerated $t-1$	0.028	0.005
Any family contact $t-1$	0.871	0.916
Any employed friends $t-1$	0.640	0.578
Any homeless friends $t-1$	0.227	0.193
Friends using drugs, arrested or imprisoned $t-1$	0.448	0.252
Wave (2-6)	3.802	3.832
Person/wave observations	2,487	1,977

Note: The tables report averages of the listed variables that were calculated using unweighted longitudinal data from the JH survey.

Appendix B. Selected longitudinal MNL housing and violence model results from specifications with alternative controls

	Men			Women		
	Housing insecure, no violence	Housing secure, violence	Housing insecure, violence	Housing insecure, no violence	Housing secure, violence	Housing insecure, violence
			No controls			
Housing insecure, no violence $t-1$	2.191 ***	0.355	2.050 ***	1.812 ***	0.267	1.689 ***
	(0.112)	(0.219)	(0.198)	(0.124)	(0.248)	(0.251)
	0.410	*-0.033*	*0.072*	*0.329*	*-0.019*	*0.050*
Housing secure, violence $t-1$	0.843 ***	1.785 ***	2.244 ***	0.574 **	1.682 ***	1.554 ***
	(0.207)	(0.224)	(0.254)	(0.238)	(0.238)	(0.352)
	0.039	*0.150*	*0.152*	*0.028*	*0.164*	*0.058*
Housing insecure, violence $t-1$	2.256 ***	1.945 ***	3.723 ***	1.886 ***	1.776 ***	3.436 ***
	(0.195)	(0.262)	(0.239)	(0.236)	(0.313)	(0.294)
	0.199	*0.040*	*0.316*	*0.184*	*0.064*	*0.255*
			Controls for observed characteristics			
Housing insecure, no violence $t-1$	2.122 ***	0.328	1.931 ***	1.622 ***	0.348	1.456 ***
	(0.117)	(0.226)	(0.206)	(0.130)	(0.261)	(0.268)
	0.377	*-0.036*	*0.067*	*0.272*	*-0.011*	*0.040*
Housing secure, violence $t-1$	0.708 ***	1.373 ***	1.814 ***	0.548 **	1.172 ***	1.133 ***
	(0.216)	(0.238)	(0.269)	(0.252)	(0.258)	(0.382)
	0.044	*0.095*	*0.110*	*0.048*	*0.083*	*0.037*
Housing insecure, violence $t-1$	2.123 ***	1.561 ***	3.130 ***	1.675 ***	1.531 ***	2.738 ***
	(0.207)	(0.281)	(0.256)	(0.250)	(0.333)	(0.328)
	0.243	*0.022*	*0.210*	*0.196*	*0.059*	*0.140*
			Controls for observed and unobserved characteristics (Table 3 specifications)			
Housing insecure, no violence $t-1$	1.588 ***	0.582 **	1.962 ***	1.044 ***	0.248	0.566 *
	(0.152)	(0.247)	(0.223)	(0.173)	(0.296)	(0.324)
	0.220	*-0.005*	*0.095*	*0.154*	*-0.002*	*0.001*
Housing secure, violence $t-1$	1.083 ***	0.651 **	1.753 ***	0.338	1.127 ***	0.828 *
	(0.238)	(0.322)	(0.292)	(0.288)	(0.270)	(0.436)
	0.133	*0.011*	*0.094*	*0.012*	*0.080*	*0.028*
Housing insecure, violence $t-1$	2.264 ***	1.335 ***	3.125 ***	0.802 ***	1.440 ***	1.349 ***
	(0.228)	(0.339)	(0.259)	(0.304)	(0.397)	(0.449)
	0.257	*0.005*	*0.187*	*0.060*	*0.098*	*0.045*

Note: Authors' estimates from alternative longitudinal MNL model specifications using unweighted data from the JH survey. MNL specifications in the middle panel have the same explanatory variables as specifications in Table 3. Huber-White standard errors shown in parentheses; estimated marginal effects shown in italics.
* Significant at 0.10 level. ** Significant at 0.05 level. *** Significant at 0.01 level.