

The Effects of Length of Residence and Exposure to Violence on Perceptions of Neighborhood Safety in an Urban Sample

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Published online: 14 March 2018
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Abstract Perceptions of neighborhood safety shape the well-being of individuals and communities, affecting neighborhood walkability, associated physical activity behaviors, and health conditions. However, less is known about the factors that determine perceptions of safety. One factor that may affect perceptions of neighborhood safety is the length of time someone has lived in their neighborhood. We use a representative, adult sample of urban low-income residents from the 2015 New Haven Health Survey ($n = 1189$) to investigate the associations between length of residence (new residents of < 1 year in neighborhood versus longer-term residents of 1 or more years in neighborhood) and perceptions of neighborhood safety (whether feeling unsafe to walk at night). We then examine the potential moderating effect of exposure to neighborhood violence on these associations. We find that the association between length of residence and perceived safety differs by exposure to neighborhood violence. Among those unexposed to neighborhood violence, longer-term neighborhood residents were more likely to feel unsafe compared to new residents (OR = 2.03, 95% CI 1.19, 3.45). Additionally, the effect of

exposure to violence on feelings of safety was larger for new residents (OR = 9.10, 95% CI 2.72, 30.44) compared to longer-term residents (OR = 1.88, 95% CI 1.28, 2.77). Our findings suggest that length of residence may have implications for feelings of safety, and that experiences of violence may uniquely contribute to feelings of unsafety among new residents. These findings hold implications for interventions and policy efforts aimed at neighborhood safety improvements through community development, housing, or city urban planning initiatives, particularly for new neighborhood residents or those who experience neighborhood violence.

Keywords Perceptions of safety · Residential stability · Length of residence · Exposure to violence · Violence · Neighborhood

Introduction

A breadth of literature describes the effects of perceived neighborhood safety on the well-being of individuals and communities. In particular, research finds that perceived safety is an important determinant of neighborhood walkability [1, 2], consequent physical activity and exercise [3–6], and health conditions [7–9] particularly in urban environments [10, 11]. Indeed, feeling unsafe in one's neighborhood is associated with increased risk of overweight status and obesity in children and adolescents [12, 13], in turn affecting risks of related health conditions such as cardiovascular disease [14, 15]. Perceptions of one's neighborhood as unsafe are

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also linked with adverse mental health outcomes including emotional disorders [16], psychological distress such as depression and anxiety [17], and overall self-rated health [18, 19].

While research has demonstrated the importance of perceived neighborhood safety for health, there is less evidence of the factors that influence perceptions of safety. Previous studies suggest that perceptions of safety are affected not only by the built environment [20–22] and actual crime levels [23–25] but also by many indirect, multidimensional factors particularly in urban neighborhoods [26, 27]. One factor that may affect perceptions of neighborhood safety is the length of time someone has lived in their neighborhood. Literature indicates that length of residence is an important determinant of how people relate to their neighborhood [28, 29]. High residential turnover rates weaken community attachment [30, 31], while longer length of residence leads to the development of neighborhood social ties [32–34] and civic engagement [35, 36] which may increase feelings of safety. Additionally, longer-term residence may provide confidence in navigating neighborhood risks [37]. In this way, longer-term residents may feel safer in their neighborhood, compared to new residents.

While longer-term residence may lead to increased feelings of safety, conversely, longer residence in a neighborhood may increase awareness of actual neighborhood risks. Exposure to violence is linked to perceptions of safety [38–41] and may also be tied to length of neighborhood residence. Owing to their greater opportunity for exposure, longer-term residents are more likely to have experienced neighborhood violence. Thus, in neighborhoods with more risk of exposure to violence, longer-term residence may be associated with perceptions of neighborhoods as unsafe.

Although the effects of length of residence, perceptions of safety, and exposure to violence have all been discussed separately, the mechanisms of how these factors together affect neighborhood health are not well understood. In this paper, we examine the associations between length of residence and perceptions of safety while considering neighborhood violence exposure in an urban, adult sample. We hypothesize that new residents may be more likely to perceive their neighborhoods as unsafe compared to longer-term residents, and the protective effect of longer residence on perceived safety will be stronger among those exposed to neighborhood violence compared to those without this exposure. We test our hypotheses using data from a

neighborhood survey conducted among urban adults ($n = 1189$) residing in six low-income neighborhoods of New Haven, CT.

Methods

Procedures

Data for this study came from the 2015 New Haven Health Survey, a sample of 1189 adults surveyed on measures of health, civic engagement, and social-behavioral attributes. Data were weighted to account for lack of household-level randomization and probability of selection for participation, and multiple imputation ($m = 5$) assigned missing data for age, gender, number of adults per housing unit, and number of units within each address [42]. Post-stratification weights for data weighted each sample response up to the neighborhood populations per 2010 US decennial census data for age and gender, which provided estimated responses from all 29,675 residents of the 6 neighborhoods sampled aged 18 to 65 years. All results are weighted as indicated.

Participants and Sampling

Households of the six lowest-income neighborhoods in New Haven were randomly selected to participate based on a citywide list of residential addresses, stratified by neighborhood using a population-based research design. The six neighborhoods had similar overall income distributions, with majority of households in each neighborhood earning less than \$30,000 in annual income. Less than 4% of households in each neighborhood reported earning more than \$100,000 a year. One resident aged 18–65 years per household was interviewed face-to-face by trained community surveyors [43], with a 64% household participation rate [42]. Detailed information on the 2015 New Haven Health Survey is reported elsewhere [42].

Measures

Perception of Safety Given our interest in resident perceptions, perception of safety within one's neighborhood was the primary outcome. Individuals responded to the statement "I feel unsafe to go on walks in my neighborhood at night" on a 4-point scale. This measure was dichotomized with "Strongly disagree" or

“Somewhat disagree” as a “no” response, and “Somewhat agree” or “Strongly agree” as a “yes” response. This measure and other neighborhood health questions were based on the Physical Activity Neighborhood Environment Survey, previously assessed for reliability and validity [44].

Length of Residence Length of residence was assessed as the primary independent variable. Individuals responded to the statement “How long have you lived in this neighborhood” on a 6-point scale (< 1 year, 1, 2, 3, 4, or 5 or more years) [44]. In order to examine the effect of being a new resident in one’s neighborhood, we dichotomized this measure to compare “< 1 year” of residence in neighborhood as “new residents” with all other lengths of residence (1 year or more) as “longer-term residents.”

Exposure to Violence Due to our interest in the larger population exposed to neighborhood violence, rather than those who experienced violence personally, exposure to violence was assessed by yes or no responses to the statement “Have any of your family members or close friends been hurt by a violent act in your neighborhood?” Exposure to violence items created by the Project on Human Development in Chicago Neighborhoods [45] were pilot tested and incorporated into the 2015 New Haven Health Survey specific to neighborhood of respondent [46]. Prior neighborhood health studies have employed similar measures of indirect exposure to violence such as family or friends’ exposure to violence [47, 48].

Covariates Self-reported demographic and living characteristics (gender, age, race, US-born status, marital status, presence of children in household, highest education level attained, yearly household income, employment status, type of residence) were considered as covariates. Categorizations are noted in Table 1.

Statistical Analysis

We conducted all statistical analysis using SAS 9.4 software. In all analyses, significance was assessed at $p < 0.05$, and a finite population correction and a neighborhood stratification variable were applied to account for design effect. We conducted simple univariate and bivariate analyses using the SURVEYFREQ procedure with the main predictor of interest, length of residence in one’s neighborhood (new residents < 1 year), to describe

the study sample by demographic and living characteristics. Bivariate analyses using the same procedure were conducted with the main outcome of interest, perception of safety (feeling unsafe to walk at night in neighborhood). We assessed second-order χ^2 s for statistical significance in all bivariate associations, and odds ratios were calculated.

Utilizing the SURVEYLOGISTIC procedure to model survey data responses and incorporate the sample design, we performed multivariable logistic regression to estimate odds ratios and examine associations between length of residence and perceptions of neighborhood safety. We controlled for demographic and living characteristics including age, race, marital status, education level, yearly household income, employment status, and type of residence. We used the change in beta approach to identify covariates for inclusion in the final model, assessing a 10% or greater change in logistic regression parameter estimate when potential covariates were added into model. Potential covariates not meeting the change in beta approach but exhibiting non-linear trends with variables of interest were included in the final model, as these covariates still showed an association with variables of interest.

To determine whether exposure to neighborhood violence moderated the associations between length of residence and perceptions of safety, an interaction term for exposure to violence was added to the multivariable logistic regression model. We conducted stratified multivariable logistic regression to examine differential associations between length of residence and perceptions of safety by exposure to violence, controlling for demographic and living characteristics. We also used this method to investigate associations between exposure to violence and perceptions of safety by length of residence, controlling for demographic and living characteristics.

Results

Demographic and Living Characteristics Table 1 shows the demographic and living characteristics of the sample of 1189 residents weighted by gender and age, stratified by length of residence (new residents as < 1 year, longer-term residents as 1 year or more). Of the total weighted sample, 51.7% identified as female, 48.9% identified as non-Hispanic Black, with the majority of the sample being US-born (87.8%). The majority were under 55 years of age (84.7%), never married

Table 1 Description of the Sample, by Length of Residence in Neighborhood, Weighted Column %^a

Characteristic	Unweighted <i>n</i> (total =1189)	Weighted <i>n</i> (%) (total =29 675)	New Residents <1 year (col%) (<i>n</i> =4917 ^b)	Longer Term Residents ≥ 1 year (col%) (<i>n</i> =24 758 ^b)	<i>p</i> [*]
Gender					0.455
Male	416	14 337 (48.3)	44.1	49.1	
Female	773	15 337 (51.7)	55.9	50.9	
Age (years)					0.049
18-24	138	6297 (21.2)	32.2	19.1	
25-34	282	7896 (26.6)	32.5	25.4	
35-44	209	5988 (20.2)	14.2	21.4	
45-54	267	4950 (16.7)	10.4	17.9	
55-65	291	4537 (15.3)	10.6	16.2	
Race					0.025
Non-Hispanic White	128	3924 (13.3)	25.2	10.9	
Non-Hispanic Black	718	14 478 (48.9)	36.1	51.5	
Hispanic/Latino	267	9434 (31.9)	32.5	31.7	
Non-Hispanic other or multiracial	72	1766 (6.0)	6.2	5.9	
U.S. Born					0.927
Yes	1081	26 039 (87.8)	87.5	87.8	
No	107	3634 (12.3)	12.6	12.2	
Marital status, <i>n</i> (%)					0.012
Never married	625	16 674 (56.8)	70.9	54.1	
Married or cohabiting	376	9370 (31.9)	19.1	34.5	
Separated, Divorced, or Widowed	180	3286 (11.2)	10.0	11.4	
Children in Household					0.003
Yes	613	16 339 (55.4)	38.3	58.8	
No	572	13 139 (44.6)	61.7	41.2	
Education					0.252
< High school degree	166	4642 (15.7)	22.8	14.2	
High school degree or GED	480	12 150 (41.0)	33.3	42.5	
Some college/Associate's degree	377	9600 (32.4)	30.0	32.9	
Bachelor's degree or more	164	3242 (10.9)	13.9	10.4	
Household Income, \$					0.287
<15 000	388	10 520 (36.8)	41.5	35.9	
15 000- <30 000	383	9777 (34.2)	36.5	33.8	
30 000- <50 000	202	4995 (17.5)	16.6	17.7	
≥ 50 000	156	3281 (11.5)	5.4	12.7	
Employment Status					0.121
Unemployed	131	3679 (12.4)	16.9	11.6	
Employed	677	17 979 (60.8)	47.6	63.4	
Not in labor force	373	7894 (26.7)	35.5	25.0	
Type of Residence					0.034
Own	260	3649 (12.3)	2.9	14.2	
Rent	777	20 476 (69.3)	71.8	68.8	
Live w/ family, friends, or other	147	5422 (18.3)	25.3	17.0	
Family/friends hurt by neighborhood violence					0.093
Yes	318	8462 (28.6)	19.6	30.4	
No	868	21 115 (71.4)	80.4	69.6	

* *p* value for analysis of second order χ^2 test with finite population correction

^a Column percentages may not sum to 100% due to rounding

^b Weighted *n*

(56.8%), living with children (55.4%), and currently employed (60.8%). Of the sample, 36.8% reported a yearly household income of less than \$15,000. New residents were younger compared to longer-term residents ($p = 0.049$) and less likely to be non-Hispanic Black compared to longer-term residents (36.1% versus 51.5%) ($p = 0.025$). New residents were more likely to have never married compared to longer-term residents (70.9% versus 54.1%) ($p = 0.012$) and were less likely to be living with children compared to longer-term residents (38.3% versus 58.8%) ($p = 0.003$). There were no significant differences by length of residence for gender, US-born status, education level, household income, employment status, and having a family or close friends hurt by neighborhood violence ($p < 0.05$).

Associations of Participant Characteristics with Perceptions of Safety Table 2 provides the unadjusted associations between study variables and perceptions of feeling unsafe walking in one's neighborhood at night. Among new residents, 50.0% reported feeling unsafe walking at night compared to 56.0% of longer-term residents, although difference was not statistically significant. Participants not born in the US were more likely to feel unsafe walking in their neighborhood at night compared to US-born participants (73.6% versus 52.4%) ($p = 0.016$). Those who had family or close friends hurt by violence in their neighborhood were more likely to feel unsafe at night relative to those who did not experience exposure to this violence (68.1% versus 49.9%) ($p < 0.001$). There were no significant differences in perceptions of safety by gender and age.

Multivariable Logistic Regression There was no association between length of residence and perception of safety as a basic model; however, when adjusting for demographic and living characteristics in a model without an interaction term, this association was significant ($p = 0.049$) with new residents significantly more likely to feel unsafe in their neighborhood compared to longer-term residents (OR = 1.66, 95% CI 1.00, 2.74). An assessment of multicollinearity yielded covariate VIF values all less than 2.87, indicating that there is no strong indication of multicollinearity among variables.

Effect Modification by Exposure to Neighborhood Violence Exposure to neighborhood violence significantly moderated the association between length of residence and perceptions of safety ($p = 0.015$). In the

fully adjusted model with interaction term (Table 3), among those exposed to violence, there was no significant difference in perceptions of safety between new residents and long-term residents (OR = 2.38, 95% CI 0.74, 7.71). For those without exposure to neighborhood violence, longer-term residents were significantly more likely to feel unsafe in their neighborhood than new residents (OR = 2.03, 95% CI 1.19, 3.45).

Effect Modification by Length of Residence Table 4 illustrates the effect of exposure to violence on perceptions of safety, modified by length of residence. Among new residents, exposure to violence resulted in 9.10 times increased odds of feeling unsafe at night, compared to those unexposed to neighborhood violence ($p < 0.001$, 95% CI 2.72, 30.44). Among longer-term residents, exposure to violence resulted in 1.88 times increased odds of feeling unsafe at night, compared to those unexposed to neighborhood violence ($p = 0.001$, 95% CI 1.28, 2.77). In other words, the effect of neighborhood violence exposure on perceptions of safety was stronger for new residents than for those who had lived in a neighborhood for 1 year or more.

Discussion

This study highlights the intersecting effects of violence exposure and length of residence on the perception of neighborhood safety. Consistent with our initial hypothesis, we found that new residents were more likely to perceive their neighborhood as unsafe relative to longer-term residents. However, we also found that this relationship was moderated by exposure to violence. Among those unexposed to neighborhood violence, new residents experienced a protective effect, as longer-term residents were significantly more likely to report feeling unsafe at night in their neighborhood compared to new residents. These findings contradict our expectation that longer-term residents would feel more safe. One explanation for these findings is that longer-term residents may gain greater awareness of neighborhood violence or harms even if unexposed to violence, while new residents may not become aware of neighborhood violence and may enter their new place of residence with a sense of comfort or safety [40].

We also found that the effect of violence exposure on feelings of safety was much larger among new residents

Table 2 Unadjusted associations between study variables and perception of safety in neighborhood at night, Weighted Row %^a

Characteristic	Weighted <i>n</i> ^a (total =29 675)	Feel Unsafe Walking at Night (row %) (<i>n</i> =16 287 ^b)	<i>p</i> [*]
Length of Residence			0.375
New Residents (<1 year)	4906	50.0	
Longer Term Residents (≥ 1 year)	24 699	56.0	
Gender			0.265
Male	14 318	52.1	
Female	15 287	57.8	
Age (years)			0.397
18-24	6297	50.6	
25-34	7834	57.2	
35-44	5980	49.4	
45-54	4950	55.6	
55-65	4537	64.1	
Race			0.088
Non-Hispanic White	3912	52.9	
Non-Hispanic Black	14 434	49.1	
Hispanic/Latino	9420	61.7	
Non-Hispanic other, multiracial	1766	70.9	
U.S. Born			0.016
Yes	25 969	52.4	
No	3634	73.6	
Marital status, <i>n</i> (%)			0.124
Never married	16 631	52.0	
Married or cohabiting	9344	56.1	
Separated, Divorced, or Widowed	3286	67.6	
Children in Household			0.114
Yes	16 289	58.5	
No	13 120	50.6	
Education			0.462
< High school degree	4642	60.8	
High school degree or GED	12 143	56.4	
Some college/Associate's degree	9549	49.7	
Bachelor's degree or more	3231	57.1	
Household Income, \$			0.359
<15 000	10 520	53.0	
15 000- <30 000	9777	59.8	
30 000- <50 000	4995	57.9	
≥ 50 000	3262	45.4	
Employment Status			0.063
Unemployed	3679	48.8	
Employed	17 910	51.9	
Not in labor force	7894	64.5	
Type of Residence			0.897
Own	3649	54.9	
Rent	20 406	54.3	
Live w/ family, friends, or other	5422	56.8	
Family/friends hurt by neighborhood violence			<0.001
Yes	8426	68.1	
No	21 081	49.9	

**p* value for second order χ^2 test with finite population correction

^aNumbers may not sum to total due to missing data

^bWeighted *n*

Table 3 Association between length of residence and perceptions of safety in neighborhood at night, by exposure to neighborhood violence ($N = 1099$ unweighted, 27,839 weighted)

	Adjusted OR (95% CI)	p^*
Exposed to neighborhood violence ^a	2.38 (0.74, 7.71) 1.00	0.147
Unexposed to neighborhood violence ^a	0.49 (0.29, 0.84) 1.00	0.010

* p values from χ^2 test with finite population correction

^aComparing new residents to longer-term residents. Adjusted model is the interaction model including interaction term and adjusting for age, race, marital status, education level, yearly household income, employment status, and type of residence. While age was not assessed to be a confounder by percent change in beta, it was included in the final model due to its non-linear association with primary variables of interest. For those unexposed to neighborhood violence, OR 2.03, 95% CI (1.19, 3.45) when comparing longer-term residents to new residents

than among longer-term residents, indicating that new neighborhood experiences may greatly shape one's neighborhood perceptions for new residents. New residents may be particularly vulnerable to violence exposure, while literature shows that longer-term residents gain the social resources to buffer the effects of violence exposure on their perceptions of safety [32]. New residents may not have attained these same resources in their new neighborhoods given their short length of neighborhood stay. Alternatively, it is possible that violence exposure had a larger effect on perceptions of safety for new residents because these experiences of violence exposure were experienced more recently.

Table 4 Associations between exposure to neighborhood violence and perceptions of safety in neighborhood at night, by length of residence ($N = 1099$ unweighted, 27,839 weighted)

	Adjusted OR (95% CI)	p^*
Among new residents (< 1 year) ^a	9.10 (2.72, 30.44) 1.00	< 0.001
Among longer-term residents (≥ 1 years) ^a	1.88 (1.28, 2.77) 1.00	0.001

* p values from χ^2 test with finite population correction

^aComparing those exposed to neighborhood violence to those unexposed to neighborhood violence. Adjusted model is the interaction model including interaction term and adjusting for age, race, marital status, education level, yearly household income, employment status, and type of residence. While age was not assessed to be a confounder by percent change in beta, it was included in the final model due to its non-linear association with primary variables of interest

Limitations and Future Directions Our findings must be interpreted with consideration of some potential limitations. Due to the cross-sectional nature of the data, we cannot establish a causal association between residence and perceptions of safety. As noted above, it is important to consider the temporality of violence exposure as well. New residents were likely exposed to violence more recently (as they moved to their neighborhood within the last year), compared to longer-term residents, who may have experienced exposure to violence at any point, including long ago. Additionally, though the sample was constructed to be representative of the 6 neighborhoods from which it drew, it is unlikely to be generalizable to other geographic areas. While not captured in this dataset, personal experiences of violence could be investigated as a primary source of violence exposure, compared to indirect violence exposure through experiences of family and friends used in this study. Future studies or replication of this research should utilize a larger, more representative sample of citywide data in order to draw conclusions and comparisons across all city neighborhoods. Objective measures of neighborhood crime were not assessed in this study, due to primary interest in how perceived sense of personal safety may affect the actions of residents rather than crime itself; however, future studies could assess crime levels as an objective measure of neighborhood violence.

Despite these limitations, the results of this study expand on prior research and our understanding of the complex and intersecting factors that determine perceptions of neighborhood safety. Given the established link between perceptions of safety and walkability, our findings also have implications for understanding determinants of neighborhood physical inactivity and its related health risks, particularly for new neighborhood residents.

The results of our study are also relevant in light of severe housing challenges that contribute to high residential turnover in low-income neighborhoods [49, 50]. While some new residents move by choice, low-income renters experience greater forced displacement in the form of eviction, foreclosures, and condemned housing [51]. Existing research has documented the health consequences of this high residential mobility, particularly among those of low socioeconomic status [52]. Our findings extend this work, illustrating one pathway through which residential turnover may affect health.

Our findings suggest a need for interventions to mitigate the effects of both residential turnover and violence exposure. Individual or group-based counseling interventions to address psychological impacts of neighborhood violence may empower residents to build increased self-agency and healthy coping strategies [53]. Improved access to affordable housing can prevent disruptions in feelings of safety that may occur when residents are forced to move [54]. Urban planning interventions that improve perceived safety, such as shared public space for dense areas and mixed land use, could improve walkability and promote healthy behaviors [55, 56]. Additionally, initiatives such as increasing vegetation and greenery in urban planning design can decrease violence in neighborhoods [57]. Given the established link among perceptions of safety, walkability, and related health behaviors, policies that can address the determinants of perceived neighborhood safety are likely to have significant health benefits.

Acknowledgements This research was funded by the Patrick and Catherine Weldon Donaghue Medical Research Foundation (grant DF 08-202), Yale New Haven Health System, and the Centers for Disease Control and Prevention under the Health Promotion and Disease Preventions Research Centers Program (grant 5U48DP005023).

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