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Aging in Place in Gentrifying Neighborhoods: Implications for Physical and Mental Health

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Abstract

Background and Objectives: In the United States, the older adult population and the proportion of neighborhoods experiencing gentrification are both growing. However, there is limited scholarship on the effects of gentrification on older adults, with most work focusing on those who leave rather than stay. This study examines the effects of remaining in a gentrifying neighborhood on older adults' self-rated health and mental health, with particular attention to outcomes for those who are economically vulnerable.

Research Design and Methods: Data are from 6,810 community-dwelling respondents in metropolitan areas from the first wave of the National Health & Aging Trends Study combined with the 1970–2010 National Neighborhood Change Database. We estimate the effects of gentrification on self-rated health and mental health separately using a quasi-experimental approach and comparing two methods: matching design and linear regression.

Results: Economically vulnerable older adults in gentrifying neighborhoods reported higher self-rated health than economically vulnerable older adults in low-income neighborhoods. Both economically vulnerable and higher-income older adults in gentrifying neighborhoods had more depression and anxiety symptoms than those living in more affluent areas. Higher-income older adults in gentrifying neighborhoods had poorer mental health than their counterparts in low-income neighborhoods.

Discussion and Implications: Findings call attention to the complexity of gentrification, and the need for more research examining how the intersection of neighborhood and individual characteristics influences older adults' health. Results reinforce the need for neighborhood-level interventions as well as relocation support to promote health in later life and caution against an overemphasis on aging in place.

Keywords: Self-rated health, Mental health, Urban, Disparities, Relocation

In the United States, the number of gentrifying neighborhoods has doubled since 1980 (Smith, Pride, & Schmitt-Sands, 2017). While gentrification involves investment in economically deprived neighborhoods, both scholarship and reports by the media note negative consequences for vulnerable populations, including increasing housing costs, involuntary displacement, and loss of social ties (Duggan, 2016; Lees, Slater, & Wyly, 2008). Concurrent with this rise of gentrification is a growing effort to help older adults age in place in their homes or communities. Some scholars have criticized this prioritization for ignoring older adults who are stuck in place in a neighborhood that fails to meet their needs (Golant, 2008; Hillcoat-Nalletamby & Ogg, 2013). Economically vulnerable older adults may be particularly

at risk for poor health outcomes if they lack the financial means to relocate to better neighborhoods. To date, however, there has been limited scholarship on the effects of gentrification on older adults, with most focusing on those who leave (either voluntarily or involuntarily) rather than those who stay. To address this gap in the literature, this study examines the effects of living in a gentrifying neighborhood on older adults' self-rated health and mental health, with particular attention to outcomes for those who are economically vulnerable.

Background and Literature Review

Building on Ruth Glass' (2010) work in the 1960s, scholars have understood gentrification as a market process in which low-income neighborhoods become higher income, typically in conjunction with the in-migration of new residents (Lees et al., 2008). Gentrification is part of a shift by cities to a market orientation prioritizing capital investment over the well-being of existing residents (Lees et al., 2008). Articles in the popular press emphasize the dangers of gentrification, including the loss of neighborhood character, steeply rising rents, and relocation of longtime residents (Duggan, 2016; Editorial Board, 2016; Swan, 2016). However, the scholarly literature is less clear as to whether gentrification is beneficial or detrimental to neighborhood residents. One potential consequence is what Marcuse (1986) referred to as exclusionary displacement, by which economically vulnerable residents are priced out of gentrifying neighborhoods and forced into low-income neighborhoods because they have no other options. Newman and Wyly (2006) note the risk of displacement has been a main focus of gentrification scholarship. Critical scholars view this displacement as unjust and advocate for coordinated policy responses such as the protection of affordable housing units (Marcuse, 2015). However, findings from New York City (Freeman & Braconi, 2004), Boston (Vigdor, Massey, & Rivlin, 2002), and other major cities in the United States suggest that gentrification does not necessarily result in the displacement of poor residents (Freeman, 2005; McKinnish, Walsh, & White, 2010).

Questions remain about the connection between gentrification and displacement, and less is known about the consequences of continuing to live in a gentrifying area. Those who stay may lose vital informal networks as others are displaced, yet may also gain from improved safety and services (Freeman & Braconi, 2004; Newman & Wyly, 2006). Furthermore, the effects of gentrification are complex and may differ depending on individual demographic, social, and health characteristics. For example, Gibbons and Barton (2016) found that while gentrification is associated with better self-rated health overall, it has the opposite effect for African Americans.

Similarly, current understanding of the effects of gentrification on older adults, whether low-income or otherwise, remains limited. The aging of residents combined with the aging of housing stock can create conditions for gentrification (Myers, 1978; Myers & Pitkin, 2009)—for example, low-income older adults make an assistance move or pass away, and their homes are subsequently occupied by higher-income residents (Hochstenbach & Van Gent, 2015; Van Criekingen & Decroly, 2003). Much work on the consequences of gentrification for older adults has focused also on their risk for displacement. Henig (1981) concluded that neighborhoods with the potential for gentrification experience a decrease in retired residents concomitant with an increase in young professionals. In a case study of older adults living in New York City, Singelakis (1990) found that gentrification is associated with both an increase in rents and a decrease in older adults. Alternatively, Freeman (2005) reported that older adults in gentrifying neighborhoods are less likely to move than other age groups, suggesting many older adults remain. To our knowledge, there has been little research examining outcomes for older adults who stay in a gentrified neighborhoods, including self-rated health or mental health.

It is important to study this link because disjunctions can occur between the aging individual and their changing neighborhood environment. The majority of older adults express a preference to stay in their current home and neighborhood (AARP Public Policy Institute, 2005) and aging in place is thought to foster place attachment, health, and well-being in later life (Burns, Lavoie, & Rose, 2012; Rubinstein & Parmelee, 1992). However, remaining in the same home and neighborhood is not an optimal situation for everyone. Golant (2008) has warned against "one-size-fits-all aging in place solutions" (p. 393) that fail to acknowledge relocation as a necessary or desirable choice. For example, aging in place may not be an ideal living situation as household size decreases and home maintenance costs increase (Hillcoat-Nalletamby & Ogg, 2013). Furthermore, some older adults may be "stuck in place" (Torres-Gil & Hifland, 2012) or "involuntary stayers" (Wiseman, 1980) because they do not have the financial resources to relocate. The limited research on older adults who are stuck in place indicates they are not only disadvantaged compared to other older adults in terms of their socioeconomic status, but also in their physical functioning, mental health, and social engagement (Strohschein, 2012). There is a need for research to expand our understanding of the effects of neighborhood gentrification on older adults who stay, particularly those who are economically vulnerable and therefore possibly stuck in place.

Purpose of the Study

In summary, gerontological scholars have raised questions about the health consequences for older adults living in gentrifying neighborhoods characterized by an influx of higher-income younger residents along with services and businesses designed to meet their wants and needs (Scharf, Phillipson, & Smith, 2005). Gentrification scholars have documented concerns about consequences for poor residents of all ages, including those who stay and those who are displaced; however, as noted by Newman and Wyly (2006), "the literature on gentrification has failed to quantify accurately the negative impacts of gentrification" (p. 28).

Because of the limited attention to older adults continuing to live in gentrifying neighborhoods, it remains unclear whether they are advantaged or disadvantaged compared to those living in low-income or affluent areas. Even less is known about economically vulnerable older adults who may be stuck in place. Although gentrification could bring new investment and services that improve health, it may also negatively affect health via skyrocketing housing costs, loss of formal and informal supports, or threat of eviction.

According to one recent analysis, the number of U.S. neighborhoods experiencing gentrification doubled from 1980 to 2010 (Smith et al., 2017). Furthermore, by 2010 almost 1 in 10 neighborhoods in center cities and inner suburbs had experienced gentrification pressure. More research is critical. The purposes of our study are to: (a) compare self-rated health and mental health of those living in gentrifying neighborhoods to those in low-income and higher-income neighborhoods, and (b) assess variations in these relationships by economic vulnerability.

Methods

Data and Sample

We used data from the baseline (2011) wave of the National Health and Aging Trends Study (NHATS), a representative sample of Medicare beneficiaries aged 65 or older in the United States that aims to examine disability trends and dynamics in late life, and understand how late-life changes affect social and economic circumstances (Kasper & Freedman, 2012). Using the Medicare enrollment database as the sampling frame, NHATS employed a stratified three-stage sample design to ensure sufficient participation by age and race/ethnicity, oversampling those aged 90 or older, and African Americans (Montaquila, Freedman, Edwards, & Kasper, 2012a). A total of 8,245 older adults participated in 2011, for a response rate of 71%.

NHATS data are available with census tract identifiers through a restricted data application. We merged these data with the 1970–2010 National Neighborhood Change Database (NCDB) produced by Geolytics (2014) to link census tracts across the decades. The NCDB includes census tracts within metropolitan Core Based Statistical Areas (formerly referred to as Metropolitan Statistical Areas; Office of Management and Budget, 2013). We restricted our sample to community-dwelling respondents in metropolitan areas for a final selected sample of 6,810.

Measures

Health Outcomes

To examine the effects of gentrification on older adults' health, we separately examined two dependent variables. First, we measured *self-rated health* using a single-item on a 5-point response scale ("*Would you say that in general your health is…*" 0 = *poor*, 1 = *fair*, 2 = *good*, 3 = *very good*, 4 = *excellent*). Self-rated health is a general measure used routinely in the literature that captures physical, social, emotional, and psychological well-being (Dowd & Zajacova, 2007; Ferraro, Farmer, & Wybraniec, 1997). Self-rated health tends to be low among those with low socioeconomic status (SES) (Subramanian, Kubzansky, Berkman, Fay, Kawachi, 2006) or living in neighborhoods characterized by low SES (Wen, Hawkley, Cacioppo, 2006).

Second, we measured *mental health* by examining depression and anxiety symptoms using the Patient Health Questionnaire-4 (PHQ-4), which assesses how often (0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, 3 = *nearly every day*) a respondent had little interest, felt down, felt nervous, or was unable to stop worrying over the past month. Summed scores range from 0 to 12, where a higher score indicates greater levels of depression and anxiety (Kroenke, Spitzer, Williams, & Löwe, 2009). Although some studies report a significant association between neighborhood characteristics and mental health (Aneshensel et al., 2007), a systematic review found mixed evidence for a link between neighborhoods and mental health (Yen, Michael, & Perdue, 2009). One study of urban-dwelling older adults, for example, reported that depressive symptoms appear primarily driven by individual characteristics rather than environmental ones (Wight, Cummings, Karlamangla, & Aneshensel, 2009).

Neighborhood Type

We created three neighborhood types. First, we measured *gentrifying neighborhoods* using baseline conditions in the previous decade (Freeman, 2009; Galster & Peacock, 1986). If in the year 2000 a neighborhood had an average household income less than the 40th percentile of the metropolitan area and resided in a primary city or inner-ring suburb, we categorized it as gentrifying if there was an increase in: (a) median household income, (b) percent of college-educated residents, (c) median owner-occupied housing values, and (d) median rent (Freeman, 2005, 2009; Hanlon, 2009). We identified *low-income neighborhoods* as those that had an average household income less than the 40th percentile of the metropolitan area in 2000 and did not gentrify by 2010. We categorized all other metropolitan neighborhoods as *moderate-to-high income neighborhoods*.

Economic Vulnerability

We used the receipt of Medicaid, a public program that provides health care coverage to low-income Americans, as an indicator of *economic vulnerability* (0 = *no*, 1 = *yes*). Although there is some variation in the financial eligibility requirements among states, Medicaid is only available to older adults with low incomes (e.g., <133% of the U.S. federal poverty level) and few financial assets.

Control Variables

We adjusted for characteristics found to be associated with self-rated health and mental health. Demographic characteristics included *age in years*, *years at current address*, *born in the United States*, *high school graduate*, *female*,

and *race/ethnicity*. Health characteristics included *number of diagnosed conditions* (count of: heart attack, heart disease, high blood pressure, arthritis, osteoporosis, diabetes, lung disease, stroke, dementia, or cancer); *number of activities of daily living (ADL) limitations* (count of difficulty with: eating, bathing, toileting, dressing, getting around the house, and getting in and out of bed); and *has regular doctor* (0 = *no*, 1 = *yes*). We also created a count variable of interviewer-observed *number of neighborhood problems* (i.e., presence of litter, graffiti, vacant houses, and/or foreclosure signs; range 0–4). Finally, social measures included *number of people in social network* (range 0–5) and *any participation restriction* in the following activities: visiting with friends and family; attending religious services; participating in clubs, classes, or other organized activities; and going out for enjoyment (0 = *no*, 1 = *yes*).

Analysis Plan

To assess the impact of "exposure" to neighborhood type, we employed a quasi-experimental design. One threat to internal validity in this study is selection bias—unobserved characteristics associated with moving into a gentrifying neighborhood may be associated with outcomes. To account for selection bias, we used two methods in Stata 14 to estimate the average treatment effect on the treated (ATET), which is the difference in means between the treatment (e.g., living in gentrifying neighborhood) and comparison group (e.g., living in low-income neighborhood) after conditioning on these observed personal characteristics. First, we used a matching design that biases the estimate of ATET toward zero to ensure against a false positive. Second, we estimated a linear regression with endogenous treatment effects using maximum likelihood with survey weights. These regression estimates are less likely to have a false negative than the matched pair design. Because missing data were low (i.e., each item missing <2%), we used pairwise deletion.

In the first design, to create the comparison groups, we matched on personal characteristics that influence neighborhood selection (i.e., age, years at current address, being born in the United States, educational attainment, number of children in the household, income, gender, race/ethnicity). We tested the assumption of conditional independence (Austin, 2009) and whether the treatment and comparison group have common support (i.e., a shared distribution; Sekhon, 2009). These assumptions were not violated.

In our second design, we used linear regression with endogenous treatment effects. We employed the NHATS sampling weights to adjust for oversampling and nonresponse (Montaquila et al., 2012a; Montaquila, Freedman, Spillman, & Kasper, 2012), and calculated Taylor series linearized standard errors. We also calculated rho, the correlation between the treatment assignment error term and the outcome regression error term, as an informative diagnostic to detect selection bias (Peel, 2014). For each dependent variable, we compared: (a) respondents in gentrifying neighborhoods versus respondents in low-income neighborhoods and (b) respondents in gentrifying neighborhoods versus respondents in moderate- or high-income neighborhoods. We report results separately for two mutually exclusive subpopulations: the economically vulnerable, and those with higher incomes.

Results

Table 1 presents descriptive statistics for the sample by neighborhood types and economic vulnerability. Based on bivariate comparisons, among respondents living in gentrifying neighborhoods higher-income older adults were more likely to have better mental health status, live longer at their current addresses, have a high school diploma, and own their home compared to economically vulnerable older adults. There was no significant difference in health conditions by economic vulnerability. Among those living in low-income neighborhoods and moderate-to-high-income neighborhoods, higher-income older adults reported better health and mental health status, fewer levels of neighborhood problems, and lower levels of participation restriction than economically vulnerable older adults.

Self-Rated Health

For the matched pair design, the subpopulation of economically vulnerable respondents in gentrifying neighborhoods reported a .47 higher average difference in self-rated health to the subpopulation of economically vulnerable respondents in low-income neighborhoods (95% confidence interval [CIs] [.09, .85], p = .02). There were no statistically significant differences in self-rated health otherwise (not presented, results available on request).

See Table 2 for multivariate regression models for self-rated health. The economically vulnerable respondents in gentrifying neighborhoods had a 1.81 higher average rating on self-rated health compared to economically vulnerable respondents in low-income neighborhoods. The relationship was in the same direction as the matched pair design, but the estimated effect size was higher after adjusting for control variables. This estimate is statistically significant with 95% CIs [1.10, 2.51], p < .001. Also in Table 2, the negative relationship on rho = –.78 indicates the estimated treatment effect is unlikely a false positive because unobserved variables that improve self-rated health are correlated with unobserved variables that lower the odds of living in a gentrifying neighborhood (i.e., the two selection biases may cancel each other out). Consistent with the matched pair design, other comparisons were not significant.

Mental Health

For the matched pair design, there were no statistically significant differences in mental health as measured by PHQ-4

Table 1. Characteristics of Selected Sample From 2011 Wave of National Health and Aging Trends Study ($N = 6810$)

	Gentrifying ($n = 153$)[a]		Low-income ($n = 1,416$)[a]		Moderate-to-high income ($n = 5,241$)[a]	
	Economically vulnerable ($n = 47$)	Higher income ($n = 101$)	Economically vulnerable ($n = 383$)	Higher income ($n = 990$)	Economically vulnerable ($n = 596$)	Higher income ($n = 4,517$)
	M (*SD*)/*n* (%)	*M* (*SD*)/*n* (%)	*M* (*SD*)/*n* (%)	*M* (*SD*)/*n* (%)	*M* (*SD*)/*n* (%)	*M* (*SD*)/*n* (%)
Self-rated health	1.83 (1.07)	1.92 (1.18)	1.49 (1.08)	1.98 (1.09)	1.59 (1.08)	2.33 (1.09)
Mental health (PHQ-4)	3.26 (3.21)	2.11 (2.99)	2.97 (2.91)	2.05 (2.49)	3.05 (3.24)	1.74 (2.34)
Age	78.72 (8.19)	78.56 (8.13)	77.93 (7.86)	77.42 (7.54)	78.16 (8.22)	77.07 (7.68)
Years at current address	20.21 (17.00)	30.87 (18.98)	20.77 (18.32)	27.51 (17.88)	18.26 (17.53)	23.15 (17.88)
Born in US	34 (72.34%)	93 (92.08%)	287 (74.93%)	888 (89.70%)	418 (70.13%)	4,121 (91.25%)
High school grad	12 (25.53%)	64 (63.37%)	142 (37.08%)	661 (66.84%)	240 (40.68%)	3,695 (81.87%)
Female	30 (63.83%)	65 (64.36%)	254 (66.32%)	603 (60.91%)	390 (65.44%)	2,476 (54.82%)
Own home (yes)	16 (34.04%)	75 (74.26%)	129 (33.77%)	712 (71.99%)	250 (42.23%)	3,718 (82.62%)
Race/ethnicity						
White	5 (10.64%)	40 (39.60%)	51 (13.35%)	403 (40.83%)	250 (42.02%)	3,721 (82.49%)
African American	29 (61.70%)	51 (50.50%)	239 (62.57%)	489 (49.54%)	207 (34.79%)	511 (11.33%)
Latino (any race)	8 (17.02%)	8 (7.92%)	60 (15.71%)	74 (7.50%)	100 (16.81%)	185 (4.10%)
Other	5 (10.64%)	2 (1.98%)	32 (8.38%)	21 (2.13%)	38 (6.39%)	94 (2.08%)
Income ($)	14,965.01 (12,055.52)	64,221.79 (395,999.39)	16,146.00 (60,489.21)	38,339.89 (184,679.90)	18,021.43 (50,076.20)	58,727.91 (141,616.20)
# Diagnosed conditions	2.77 (1.70)	2.88 (1.64)	2.94 (1.71)	2.66 (1.58)	3.04 (1.78)	2.51 (1.56)
# Limitations in ADLs	1.23 (1.78)	1.00 (1.53)	1.45 (1.88)	0.89 (1.43)	1.43 (1.85)	0.64 (1.25)
Has regular doctor	44 (93.62%)	97 (96.04%)	359 (93.73%)	934 (94.44%)	567 (95.13%)	4,318 (95.64%)
# Neighborhood problems	0.66 (0.96)	0.55 (1.01)	0.79 (1.10)	0.48 (0.93)	0.44 (0.88)	0.14 (0.51)
# in social network	1.76 (1.14)	2.04 (1.47)	1.57 (1.16)	1.84 (1.27)	1.80 (1.23)	1.98 (1.30)
Any participation restriction	11 (23.40%)	26 (25.74%)	125 (32.64%)	226 (22.83%)	202 (33.89%)	761 (16.85%)

Note: Statistically significant bivariate comparisons between economically vulnerable and higher-income respondents $p < .05$: (a) gentrifying neighborhoods: "mental health," "years at current address," "born in US," "high school graduate," "own home," "White," and "other race"; (b) low-income neighborhoods: all were significant except "age" and "has regular doctor"; and (c) moderate-to-high-income neighborhoods: all were significant except "has regular doctor." ADL = activities of daily living.

[a]There are discrepancies in sample size within a neighborhood type. For example, in gentrifying neighborhoods, columns add up to only 148 because of missing data on Medicaid receipt.

between respondents in gentrifying and low-income neighborhoods or those in moderate-to-high-income neighborhoods for either subpopulation (not presented, results available upon request).

Table 3 presents the multivariate results for mental health. Economically vulnerable respondents in a gentrifying neighborhood had a 4.79 higher score on the PHQ-4 (CI = 2.79–6.78) compared to economically vulnerable respondents in moderate- or high-income neighborhoods after adjusting for control variables. In addition, higher-income respondents in a gentrifying neighborhood had a 3.64 higher score on the PHQ-4 (CI = 2.87–4.41) compared to higher-income respondents in moderate- or high-income neighborhoods after adjusting for control variables. For both subpopulations, the negative relationship on rho (–.76 and –.77, respectively) indicates the estimated treatment effect is unlikely to be a false positive. Somewhat surprisingly, higher-income respondents in a gentrifying neighborhood had a 3.62 higher score on the PHQ-4 (CI = 2.84–4.41) compared to higher-income respondents in low-income neighborhoods after adjusting for control variables. The negative relationship on rho = –.81 indicates that our estimated treatment effect is unlikely to be a false positive. In summary, although the conservative matched pair designs were not significant, the adjusted regression estimates identified subgroups in gentrifying neighborhoods with more symptoms of anxiety and depression.

Discussion

Our results contribute to an understanding of the consequences of living in a neighborhood undergoing renewal

Table 2. Linear Regression of Neighborhood Gentrification on Self-Rated Health

	Gentrifying vs low-income				Gentrifying vs moderate-to-high income			
	Economically vulnerable		Higher income		Economically vulnerable		Higher income	
	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI
Gentrification	1.81***	1.10, 2.51	−0.09	−0.75, 0.56	0.58	−1.66, 2.82	−0.05	−0.60, 0.49
Age	−0.02*	−0.03, −0.00	0.00	−0.00, 0.01	0.01	−0.00, 0.02	−0.00	−0.01, 0.00
Years at current address	0.00	−0.01, 0.01	−0.00	−0.01, 0.00	−0.01*	−0.01, −0.00	−0.00*	−0.00, −0.00
Born in U.S.	0.66**	0.20, 1.13	0.25*	0.01, 0.50	−0.18	−0.41, 0.05	0.00	−0.16, 0.17
High school grad	0.13	−0.17, 0.43	0.09	−0.06, 0.25	0.24	−0.02, 0.49	0.31***	0.20, 0.42
Own home	0.39*	0.06, 0.72	0.26**	0.11, 0.41	0.41**	0.18, 0.64	0.10	−0.01, 0.20
Female	0.15	−0.09, 0.39	0.16*	0.04, 0.28	0.02	−0.19, 0.24	0.06*	0.00, 0.12
Race/ethnicity (white ref)								
African American	−0.66**	−1.02, −0.29	−0.34***	−0.47, −0.20	−0.13	−0.44, 0.19	−0.24***	−0.34, −0.15
Other	−0.23	−0.78, 0.31	−0.16	−0.53, 0.20	−0.69***	−1.06, −0.32	−0.21	−0.44, 0.03
Latino	−0.15	−0.71, 0.40	−0.41**	−0.65, −0.17	−0.47**	−0.82, −0.13	−0.35***	−0.50, −0.19
Income (logged)	−0.03	−0.09, 0.04	0.04	−0.00, 0.08	0.01	−0.03, 0.05	0.06***	0.03, 0.09
# Diagnosed conditions	−0.15***	−0.21, −0.08	−0.20***	−0.24, −0.16	−0.20***	−0.26, −0.14	−0.25***	−0.27, −0.23
# Limitations in ADLs	−0.10*	−0.18, −0.02	−0.16***	−0.22, −0.11	−0.17***	−0.24, −0.11	−0.23***	−0.26, −0.19
Has regular doctor	0.11	−0.52, 0.73	0.04	−0.23, 0.31	−0.28	−0.66, 0.11	−0.09	−0.22, 0.04
#Neighborhood problems	0.06	−0.09, 0.20	−0.01	−0.09, 0.07	−0.04	−0.11, 0.04	−0.03	−0.09, 0.03
# in social network	0.04	−0.03, 0.11	0.04	−0.01, 0.09	0.13*	0.05, 0.20	0.05***	0.03, 0.07
Any participation restrictions	−0.60***	−0.92, −0.28	−0.41***	−0.59, −0.23	−0.20	−0.44, 0.04	−0.30***	−0.40, −0.21
_cons	3.12***	1.74, 4.50	1.64	0.97, 2.31	1.68*	0.38, 2.99	2.56***	2.05, 3.07
Rho	−0.78	−0.91, −0.54	0.04	−0.23, 0.31	−0.19	−0.89, 0.79	−0.02	−0.24, 0.20

Note: We measured gentrification's effects using survey weights using svy etregress in Stata 14 to calculate the linearized standard errors. ADL = activities of daily living; Coef = coefficient; CI = confidence interval.
*$p < .05$; **$p < .01$; ***$p < .001$.

by examining the effects of living in a gentrifying neighborhood on older adults' health. Of particular concern are outcomes for older adults who are economically vulnerable, given the recognition that a segment of the older adult population may be stuck in place in neighborhoods that do not support their needs (Phillipson, 2007). For physical health, economically vulnerable respondents in gentrifying neighborhoods have better self-rated health than those in low-income neighborhoods. For mental health, although the conservative matched pair design did not find any significant effects, the adjusted regression estimates showed that both economically vulnerable and higher-income older adults living in gentrifying neighborhoods have greater risk for anxiety and depression than those in other neighborhoods. Taken together, these findings reinforce prior work acknowledging the complexity of the effects of gentrification, including how effects differ based on individual characteristics.

Although previous literature notes the potential for deleterious outcomes of living in either low-income or gentrifying neighborhoods (Scharf et al., 2005), our results suggest gentrifying neighborhoods are a more optimal environment for economically vulnerable older adults for self-rated health. Low-income neighborhoods often have physical and social deprivations, including limited access to amenities and services or a lack of social cohesion (Mujahid, Diez Roux, Morenoff, & Raghunathan, 2007), which in turn are associated with poor health outcomes, including functional decline (Balfour & Kaplan, 2002), cognitive impairments (Lee, Glass, James, Bandeen-Roche, & Schwartz, 2011), and lower quality of life (Yen, Yelin, Katz, Eisner, & Blanc, 2006). In gentrifying neighborhoods, by contrast, economically vulnerable older adults may benefit from reinvestment. It is possible that economically vulnerable older adults rely more on what is in their immediate neighborhood, whereas higher-income older adults are able to access resources outside their neighborhood by traveling or having resources brought to them.

Our findings regarding mental health indicate that both higher income and economically vulnerable older adults in gentrifying neighborhoods are disadvantaged in terms of depressive and anxiety symptoms compared to their counterparts in moderate-to-high-income neighborhoods. We also found that higher-income older adults in gentrifying neighborhoods have more depression and anxiety symptoms compared to those in low-income neighborhoods, but there are no such differences among economically vulnerable older adults. Those with higher incomes may not be immune to the stresses of living in a changing neighborhood. Increasing housing costs, fears about displacement, and the

Table 3. Linear Regression of Neighborhood Gentrification on Mental Health (PHQ-4)

	Gentrifying vs low-income				Gentrifying vs moderate-to-high income			
	Economically vulnerable		Higher income		Economically vulnerable		Higher income	
	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI
Gentrification	0.74	−2.07, 3.56	3.62***	2.84, 4.41	4.79***	2.79, 6.78	3.64***	2.87, 4.41
Age	−0.03	−0.08, 0.02	−0.03	−0.06, 0.00	−0.04	−0.08, 0.01	−0.02**	−0.03, −0.01
Years at current address	0.00	−0.02, 0.02	−0.01	−0.02, 0.01	0.01	−0.01, 0.03	−0.00	−0.00, 0.00
Born in U.S.	−2.31***	−3.33, −1.29	0.17	−0.59, 0.94	−0.71	−1.50, 0.07	0.01	−0.30, 0.32
High school grad	−0.38	−1.08, −0.32	−0.12	−0.60, 0.35	−0.41	−1.01, 0.20	−0.33**	−0.55, −0.11
Own home	−0.55	−1.20, 0.11	0.20	−0.35, 0.75	−0.45	−1.05, 0.14	−0.31*	−0.59, −0.03
Female	−0.18	−0.81, 0.45	0.31	−0.12, 0.73	0.01	−0.80, 0.80	0.28***	0.13, 0.42
Race/ethnicity (White ref)								
African American	0.23	−0.51, 0.98	−0.28	−0.74, 0.18	−0.55	−1.28, 0.17	−0.34*	−0.64, −0.04
Other	−1.86**	−3.14, −0.59	−0.15	−0.86, 0.55	−0.71	−1.88, 0.47	0.00	−0.41, 0.41
Latino (any race)	−1.10	−2.27, 0.26	0.66	−0.25, 1.58	−0.37	−1.39, 0.65	0.01	−0.59, 0.61
Income (log)	−0.02	−0.17, 0.13	−0.07	−0.23, 0.08	−0.15*	−0.27, −0.02	−0.04	−0.09, 0.01
# Diagnosed conditions	0.46***	0.25, 0.68	0.11	−0.01, 0.23	0.39***	0.22, 0.56	0.21***	0.16, 0.26
# Limitations in ADLs	0.31*	0.03, 0.60	0.51***	0.30, 0.73	0.50***	0.32, 0.68	0.58***	0.48, 0.67
Has regular doctor	0.72	−0.12, 1.57	−0.14	−0.62, 0.34	0.12	−1.10, 1.33	−0.18	−0.51, 0.14
#Neighborhood problems	−0.10	−0.41, 0.22	0.01	−0.18, 0.19	0.05	−0.22, 0.25	0.06	−0.05, 0.17
# in social network	0.08	−0.12, 0.29	−0.02	−0.11, 0.08	0.02	−0.22, 0.31	0.00	−0.04, 0.05
Any participation restrictions	2.02***	1.13, 2.90	0.70*	0.17, 1.23	1.04**	0.40, 1.68	0.59***	0.36, 0.82
_cons	4.67*	0.96, 8.37	3.57*	0.36, 6.78	5.30**	1.65, 8.94	2.98***	1.95, 4.02
Rho	0.03	−0.51, 0.56	−0.81	−0.89, −0.67	−0.76	−0.90, −0.48	−0.77	−0.86, −0.65

Note: We measured gentrification's effects using survey weights using svy etregress in Stata 14 to calculate the linearized standard errors. ADL = activities of daily living; Coef = coefficient; CI = confidence interval.
*$p < .05$; **$p < .01$; ***$p < .001$.

replacement of businesses and services cited in the literature (e.g., Duggan, 2016; Lees, et al., 2008) may be more problematic for the mental health of higher-income older adults compared to those in low-income neighborhoods.

Implications

Our findings have several implications for research, policy, and practice. Differences between the economically vulnerable and higher-income respondents, as well as inconsistent findings when comparing the results for self-rated health and mental health, suggest critical directions for future research. These include addressing the limitations of the current study, such as designating Medicaid receipt as a proxy for economic vulnerability and the absence of some relevant variables in NHATS, including place attachment and residential satisfaction. Furthermore, we employed Census tract data to define gentrification instead of direct observation, which is an imperfect reflection of the spaces that actually matter to individuals (Sampson, Morenoff, & Gannon-Rowley, 2002). Due to confidentiality concerns, NHATS does not offer access to respondents' addresses. Although the model had time ordering, it cannot account for simultaneity or time-varying covariates that are correlated with the outcome. The findings for PHQ-4 results are not robust to a conservative matched pair design, indicating the findings of the regression model are not necessarily spurious but should be interpreted with caution.

Furthermore, future research should examine the implications for neighborhood and demographic change as the number of gentrifying neighborhoods and proportion of older Americans remaining in their community and out of institutional care are increasing (Hayutin, 2012; Smith et al., 2017). More in-depth information is needed from older adults, including the extent to which they are aging in place by choice or stuck in place. For example, Phillipson (2007) categorizes some older adults as the "elected," in the sense that they have the power to exercise choice over where they live, whereas others are excluded from a changing neighborhood environment but lack the resources to change their situation. This reinforces the need for future studies to examine not only length of residence in a neighborhood, but the aging individual's feelings of place attachment. Future research could measure gentrification using direct observation or Google Street View to rate block by block the level of gentrification (Hwang, & Sampson, 2014), and study different types of gentrifying neighborhoods (Gibbons & Barton, 2016). Finally, while this study focused on the intersection of economic vulnerability and neighborhood gentrification, other key dimensions to examine include ethnicity, gender, and age.

In terms of policy and practice implications, while we were unable to assess the extent to which NHATS participants are stuck in place, our findings support work cautioning against an overemphasis on aging in place (Golant, 2008; Hillcoat-Nalletamby & Ogg, 2013; Phillipson, 2007; Scharf et al., 2005). This sample lived in their current home for a mean of 23.5 years, with three quarters having been in their home at least 7 years. Respondents in gentrifying neighborhoods had lived in their home an average of 27.13 years. There are two strategies to address the potential negative consequences of gentrification. First, policymakers and practitioners can support the relocation of older adults who wish to move to a different neighborhood. For example, in Detroit a university/community partnership is facilitating desired relocation through an assessment tool for aging services providers to identify quality affordable housing, particular those that accept housing vouchers, in desirable neighborhoods (Perry, Wintermute, Carney, Leach, Sanford, & Quist, 2015). Such a strategy, however, depends on the availability of affordable housing, which is currently in short supply (Kochera, 2006). Indeed, nearly 1.5 million older adult households are low-income renters who do not receive government housing assistance and pay more than half of their income on rent, live in poor housing conditions, or both (U.S. Department of Housing and Urban Development, 2015). Therefore, any efforts to support older adults' relocation options need to be integrated with long-term affordable housing development, consistent with the recommendations of Marcuse (2015).

Second, there is a need for policies, programs, and infrastructure changes to support older adults who wish to age in place in a gentrifying neighborhood. One prominent example of this approach is the growing number of age-friendly community initiatives (AFCIs) that engage residents, multiple sectors, and professions to modify a neighborhood's physical and social environment to meet the needs of older adults. AFCIs face a number of challenges, including the potential exclusion of certain older adults (including those who are low-income, older, frailer, or from diverse racial and ethnic backgrounds), limited empirical evidence to identify best practices, and the difficulties of moving from an assessment phase to an action phase. But they also offer the promise of better aligning individual needs with neighborhood supports and opportunities (Scharlach & Lehning, 2016). While gentrification raises critical concerns for vulnerable residents, any approach that embraces social justice must ensure that the positive effects of gentrification be shared by all and not just the newly arrived younger and wealthier residents.

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Conflict of Interest

None reported.

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