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PROTECTIVE OR DESTRUCTIVE? INVESTIGATING THE RELATIONSHIP BETWEEN GENTRIFICATION AND CHILDHOOD HEALTH OUTCOMES

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by

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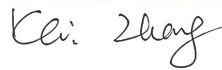
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DEDICATION

To my parents— Bobbie Kaye Henson and Miguel Mar Garcia— for their steadfast support and incredible love as well as every single resilient student who, despite their hardship and misfortune, remain.

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PROTECTIVE OR DESTRUCTIVE? INVESTIGATING THE RELATIONSHIP
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ABSTRACT: Gentrification is a wildly contentious, highly politicalized issue that some scholars view as beneficial and others view as harmful. Historically, public health researchers have studied several neighborhood effects on health but only recently has this research field evolved to include studies specifically looking at the health ramifications associated with this neighborhood-change process. This secondary analysis is one of the first studies to examine the effect neighborhood-level gentrification has on mental health status in a childhood and adolescent sample. Results find that no main effect exists between gentrification and mental health problems directly. However, a statistically significant interaction-- between gentrification and perceptions of community safety-- was discovered to increase the odds of having children with mental health problems for caregivers perceiving their gentrifying communities as safe. Future researchers should reattempt to unearth a similar interaction effect as well as determine if gentrification acts indirectly to compromise emotional health in childhood. Finally, the minority stress theory should be looked at as a potential model to frame the evidence being produced at the intersection of gentrification and mental health.

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BACKGROUND

Literature Review

Over recent years, scholars in the field of public health have found that where we live impacts health. Specifically, past literature has found that living in a disadvantaged neighborhood, or living in neighborhoods that consist of poor social control and collective efficacy (Handley et al., 2015), is associated with coronary heart disease (Sundquist et al., 2004; Roux et al., 2001), ischemic stroke (Brown et al., 2011), access to healthcare (Kirby & Kaneda, 2005), infant birth weight (Masi et al., 2007), and adolescent cardiovascular health (D’Agostino et al. 2018). Also, a wealth of literature supports associations between neighborhood disadvantage and mental illness. One such study, for example, found that negative perceptions of one’s neighborhood aesthetic predicted low levels of mental wellness among adults (Bond et al., 2012). In 2015, a narrative analysis identified neighborhoods as key places for children to ascertain socialization skills that, in turn, impact mental health and wellbeing (Hooper et al., 2015). Further, Donnelly et al. (2016) concluded that “neighborhood collective efficacy supports adolescent mental health across diverse populations and urban settings” and argued for a more detailed analysis of potential interactions between neighborhood factors on mental health status. Moreover, approximately 82% of the total publications reviewed by Mair et al. (2008) reported correlations between depressive symptomology and neighborhood environment with the strongest effects observed in studies focused on adolescent and geriatric populations. Nonetheless, this collection of results begs

research to consider components of an individual's community to be considered as plausible determinants of mental health.

Though relationships between community characteristics and mental wellbeing have been extensively researched, it is uncertain if these associations are preserved when studies begin to consider neighborhoods as dynamic and ever-changing environments. Gentrification—commonly understood as the urban renewal of historically disinvested neighborhoods and communities (Mallach 2008)—has been studied for decades, yet, the neighborhood change phenomena has only recently begun to be analyzed in relation to health. Over the years, scholars have debated whether gentrification is harmful or beneficial to individuals. The most prevalent **hypothesis** is that gentrification as a systematically biased effort that disproportionately forces lower-income individuals from the communities they have traditionally belonged to in the name of community investment and renewal. This involuntary out-migration of incumbent residents has been termed *exclusionary displacement* (Marcuse 1985). While displacement is generally regarded as a consequence of gentrification, it is still a contentious notion that certain investigators wholeheartedly defend (Schill, Nathan, and Persaud 1983; Atkinson 2000) whereas others adamantly dismiss (Freeman 2005).

The unique health ramifications gentrification has on individuals has only started to be unraveled, and results are mixed. Some investigators have found gentrification to be detrimental to health, and others have found it to be protective of health. In their qualitative review of the evidence, Medipanah and colleagues (2018) concluded that planning efforts that catalyzed gentrification “tended to have negative health effects” especially in low-income

individuals and advocates for the inclusion of community-participatory strategies in urban revitalization efforts as a means to prevent gentrification-related health risks. Furthermore, it was reported that residence in a non-gentrifiable neighborhood predicted poor self-rated health while residence in gentrifying neighborhoods was found to be associated with good self-rated health (Izenberg et al., 2018). Additionally, increases in mental health issues were shown to be driven by neighborhood-level gentrification in another study (Smith et al., 2018). On the other hand, lower odds of reporting poor self-rated health were found in people who lived in gentrifying areas and who were highly exposed to green spaces (Cole et al., 2019) indicating a potential protective effect of gentrification. Similarly, living in a gentrifying area was found to strengthen neighborhood collective efficacy and, thus, promote health and wellbeing (Steinmetz-Wood et al., 2017).

Public Health Significance

Investigating health outcomes as a function of gentrification has major implications for how public health professionals, urban planners, and government officials target their work. A majority of the studies conducted on this topic have excessively used self-rated health indicators as outcomes; few studies have included mental health outcomes in this type of research. Also, the link between gentrification and mental health outcomes has not been evaluated empirically within child and adolescent populations. Given the profuse evidence linking various aspects of the neighborhood environment to childhood emotional health, an inquiry into the mechanisms by which gentrification might contribute to mental health status in child and adolescent populations is exceedingly warranted. For example, findings from these

types of studies would inform urban planners whether gentrification should be prevented or promoted within the neighborhoods they design. Policymakers could also benefit from this data by implementing zoning laws that could possibly impact the emotional wellbeing of their constituents.

Research Objectives

The overall goal is of this study is to better understand potential associations between neighborhood-level gentrification, perceptions of community safety, and mental health in a sample of children and adolescents. Specifically, our research aims are:

1. To describe the prevalence of mental health problems in a sample of children living within Dallas County in 2015.
 - 1.1. Hypothesis: The prevalence of students having mental health problems will be relatively low.
2. To evaluate the main association between neighborhood gentrification status and mental health problems, including adjustments for race/ethnicity, parental housing status, family occupancy status, and household income.
 - 2.1. Hypothesis: There will be a statistically significant association found between gentrification and mental health status. Respondents living in gentrifying neighborhoods will be at increased odds of mental health issues. Many of the covariates will also be significant in the multivariate model.
3. To evaluate the main association between perceptions of community safety and mental health problems, including adjustments for race/ethnicity, parental housing status, family occupancy status, and household income.

- 3.1. Hypothesis: There will be a statistically significant association found between perceptions of community safety and mental health status. Respondents indicating unsafe neighborhoods will be at increased odds of mental health issues. Many of the covariates will also be significant in the multivariate model.
4. To evaluate the interaction between perceptions of community safety and neighborhood gentrification status on mental health problems among a sample of children living within Dallas County in 2015.
- 4.1. Hypothesis: There will be a statistically significant interaction present between perceptions of community safety and neighborhood-level gentrification status.

METHODS

Study Setting and Subjects

The Children's Dallas Health Assessment and Planning Survey was administered in 2015 and was randomly distributed to 26,570 households in five counties within the Dallas-Fort Worth metroplex. The survey was taken by caregivers of youth between 0 to 17 years of age. The response rate for the Children's Health Assessment and Planning Survey was approximately 31%. A subset of participants was pooled for the present analysis. Specifically, the original dataset was modified to include respondents whose addresses fell within one of the five hundred and twenty-seven census tracts that exist within Dallas County. Address information was deidentified, and census tract was assigned to each respondent even before investigators received the dataset to maintain confidentiality and privacy. The final sample size was 3,409.

Outcomes

The main outcome was mental health status (MHS). MHS was operationalized using the survey item, “Has this child ever needed mental healthcare?”. Response options for MHS were presented to respondents in a dichotomous fashion with [0] indicative of previous mental healthcare need and [1] indicative of no previous mental healthcare need.

Exposures

There were two main exposures included in this analysis: (1) residence within a gentrifying census tract (GENT) and (2) perception of neighborhood safety (SAFE). The characterization of census-tracts as gentrifying or not-gentrifying was adapted from the Freeman protocol (Freeman 2005). All census tracts for Dallas County were pulled from the American Community Survey (ACS) database. The methodology set by Freeman 2005 asserts that for tracts to be gentrifying, they must be designated as “central city tracts” at the beginning of the period being analyzed. Additionally, potentially gentrifying tracts will also have a median household income that is less than the median estimate for the corresponding metropolitan statistical area (i.e., the Dallas-Fort Worth MSA). If these requirements are not initially met, then the tract is said to be not vulnerable to gentrification and, thus, not-gentrifying. Of tracts that are identified as potentially gentrifying by said criteria, the tract must also meet the following three requirements (all measures relative to the MSA estimate): (1) contain a higher than average proportion of housing built within the past two decades; (2) contain higher than average percent increase in educational attainment of residents; and (3) contain higher than average housing prices. This protocol recommends observing these demographic changes over two non-overlapping time intervals; therefore, our analysis utilized

the 2005-2010 ACS 5-year estimates, and the 2011-2015 ACS 5-year estimates to understand how these indicators changed over time. Census tracts were ultimately dichotomized to [0] = not gentrifying and [1] = gentrifying.

The second exposure was the perception of neighborhood safety (SAFE). SAFE was operationalized using the survey item “I feel that this child is safe in our neighborhood” and was originally measured on a 5-point Likert scale and later dichotomized. The response categories, *Strongly Agree* and *Agree*, were combined to represent [1] = safe whereas the response categories, *Neither agree or disagree*, *Disagree*, and *Strongly Disagree* were combined to represent [0] = unsafe.

Covariates

The child’s *race and ethnicity*, *gender*, and *age* were assessed in the survey and included in our as potential confounding variables. Responses for race and ethnicity were categorized into four groups: (1) non-Hispanic White, (2) non-Hispanic Black, (3) Hispanic, and (4) other. Similarly, age was categorized into four groups: (1) 0 to 4, (2) 5 to 9, (3) 10 to 14, and (4) 15 to 17. Moreover, the survey allowed caregivers to pick two options for their child’s gender— either male or female.

In addition, *parental marital status* and *family occupancy status* were also included as covariates. Parental marital status was assessed by the item ‘What is your marital status?’ and originally included five options: (1) single, never married; (2) married or domestic partner; (3) widowed; (4) divorced; or (5) separated. For our analysis, we dichotomized responses to [0] single or [1] married or domestic partner. Furthermore, family occupancy status was assessed

by the item ‘Do you own or rent your home?’ and allowed respondents to choose between [0] = rent and [1] = own.

Data Analysis

Univariate analyses were conducted to determine descriptive statistics (i.e., race and ethnicity, age, gender, annual household income, parental marital status) for our sample. We utilized bivariate logistic regression to evaluate the effects between our exposures (i.e., gentrification and SAFE) and outcome (mental health). We assessed confounding and effect modification with multivariate logistic regression models, which incorporated the covariates we hypothesized were relevant for the questions being asked in this secondary analysis. STATA was utilized in our data analysis (StataCorp, 2017).

RESULTS

Table 1 includes a description of our sample. The majority of adolescents were non-Hispanic (NH) White (51.7%), between the ages 10 and 14 (36.5%), male (51.5%), and lived in households that were owned (81.95%) and with parents who were married or domestic partners (77.6%). Most of the sample did not live in a gentrifying neighborhood (83.4%), never had a mental health issue (83.4%), and had parents who felt safe within their neighborhoods (91.0%).

Table 2 includes statistics for the bivariate and multivariate models produced for exploring the association between neighborhood gentrification status and mental health issues. There was no statistically significant association between gentrification and mental health problems. Adjusting for race and ethnicity, age, gender, household income, family occupancy status, and parental marital status did not impact the association between these two factors. A

few of these covariates were found to be significantly associated with mental health problems, such as family occupancy status (OR=0.46 95% CI=0.36, 0.59) and race and ethnicity (NH Black; OR=1.34; 95% CI=0.99, 1.80 and Hispanic; OR=1.30; 95% CI=0.99, 1.68).

Table 3 displays the bivariate and multivariate models between perceptions of community safety to mental health issues. Perceptions of community safety were significantly associated with mental health problems (OR=1.74; 95% CI=1.31, 2.30). After controlling for covariates, the odds remained significant (OR=1.48; 95% CI=1.09, 2.01). More specifically, caregivers who perceived their neighborhoods as unsafe were approximately 47% more likely to report having a child with a previous mental health issue compared to caregivers who perceived their communities as safe.

Table 4 displays statistical interactions between perceptions of community safety and neighborhood gentrification status on the mental health. Overall, an increased odds in mental health issues was observed for respondents who resided in a gentrifying census tract and perceived their communities as safe for their children (OR=3.80; 95% CI=1.42, 10.14). In other words, caregivers who perceived their gentrifying communities as safe were nearly four times more likely to report mental health problems in their children compared to other caregivers in this sample.

DISCUSSION

Overall, this study evaluated how neighborhood-level factors related to the development of mental health problems in childhood. As we previously mentioned, a plethora of studies have found evocative neighborhood effects impacting an array of health outcomes

(references), but to our knowledge, this is the first study to look specifically at gentrification in relation to emotional health among children. Unlike other scholars who have aimed their questions at the intersection of gentrification and health, we did not observe a meaningful main effect between the two variables. Problems with sample size and statistical power might explain why no relationship was observed between the two variables.

The present analysis did, however, discern a statistically significant main effect between caregiver's perceptions of community safety and mental health status and a significant interaction term. The interaction effect we observed should be taken lightly given the issues we had in ensuring adequate sample size. More explicitly, the cell sizes within the cross-tabulation between SAFE and GENT were not all above 30 – which is an essential guiding assumption of logistic regression. Particularly, there were only 21 respondents reporting both feelings of community unsafety and that resided within a gentrifying community; all other cells in our cross-tabulation met the count minimum. It is noteworthy to mention that caregivers who reported feeling safe in their gentrifying communities were more likely to report mental health conditions in their children which is contrary to what we initially hypothesized. Originally, our thought was high levels of community safety and residence in gentrifying communities were protective to childhood emotional health. However this interaction effect serves as evidence for the opposite. Instead, assuming the finding is not artificial, for this specific group of caregivers, perceiving a community as safe and living in a gentrifying census tract synergistically contribute to increased odds of mental health issues in our sample. As illustrated by the main effect unearthed in this study between neighborhood safety and mental health problems, caregivers who felt safe in their neighborhoods were less likely to have

children with mental health issues compared to caregivers who felt unsafe in their neighborhoods—a finding that has been replicated in past studies (Giurgescu et al., 2015; Ford & Rechel, 2012; Butler et al., 2012; Generaal et al., 2019). It was strange, at first, to observe higher odds of mental health issues in this subset of the sample, but **we believe that neighborhood-level gentrification may be working in an additive manner to contribute negatively toward mental health.** Ultimately, we believe that this finding could potentially support the idea that gentrification is deleterious to adolescent mental wellbeing. That being said, future analyses, with appropriate sample size, should be conducted to determine whether this interaction can be replicated.

One theory that potentially supports gentrification's additive effect on childhood wellbeing is the minority stress theory that originally emerged from findings within the social psychology literature. For decades, social psychologists have concluded that individuals who identify as LGBTQ report higher than normal levels of mental health issues (Meyer, 1995; Sandfort et al., 2007) which is what led to the theoretical development and consideration of a minority-specific stress model. This theory can be understood best as an extension of social stress theory which advances that stressors in the social environment impact health outcomes at the individual level (Aneshensel, 1992). The minority stress perspective adds to this by proposing that when people exist as a minority within a social structure, they are subject to unique social stressors (i.e., racism, sexism, classism) that, first, are intrinsically linked to their minority position and identity and, second, that the majority group are fortunate enough not to be exposed to. This rationale is why scholars have conceptualized minority stress as an additive effect that disproportionately threatens minority individuals.

Various scholars have framed gentrification positively highlighting that the neighborhood change process brings about racial diversity and “social mix” (Cole and Goodchild, 2001; Cameron, 2003; Newman and Wyly, 2006). Both of these environmental consequences have been thought to promote social connectedness, social capital, and neighborhood collective efficacy among people in gentrifying neighborhoods. Yet, as Walks & Maaranen (2008) state, “...there is little systematic evidence that gentrification actually leads to greater levels of social mix at the neighborhood scale” and warn that the evidence in support of the positive effects associated with “social mix” is questionable at best (Ostendorf et al., 2001; Joseph, 2006; August, 2007). What we do know, though, is that gentrification drives the racial and economic transformation of a place in such a way that low-income communities of color become richer and whiter. Additionally, gentrification has been shown, in certain cases, to amplify racial discrimination between residents in these neighborhoods (Newman & Wyly, 2006). If future research further corroborates discrimination as a result of gentrification, then gentrification itself could potentially be interacting with other environmental factors to induce excess minority stress and, in turn, poor mental health outcomes.

LIMITATIONS

There were several limitations in the present study that may have influenced results. The sample this analysis included is not demographically representative of the greater DFW area. We know from the literature that gentrification is a racialized process affecting people of color differently than white individuals so the overabundance of NH White respondents in this analysis might skew results. Additionally, most individuals in this sample were extremely high

income and owned their dwellings which are both factors that give individuals the privilege of staying in place. Future research should ensure that sampling methods capture a group that is demographically balanced.

Moreover, the way gentrification was operationalized here is not an entirely accurate understanding of the process. As mentioned previously, “gentrification” has been defined and conceptualized in countless ways over time. The Freeman 2005 measurement of neighborhood-level gentrification primarily utilizes a change in certain demographic indicators over time, but demographic change is only one component of the way the phenomenon manifests. The issue with Freeman’s conceptualization of gentrification is that it does not take into account *exclusionary displacement* which is what authors argue distinguishes authentic gentrification from other forms of community revitalization. At first, we attempted to typify census tracts using a measurement method that included a *demographic change* indicator as well as a *vulnerability to displacement* indicator. While this protocol provided a more precise measurement of the neighborhood change process, when applied to our sample the number of individuals who resided in demographically changing, displacement-vulnerable areas represented an enormously small set of the sample. This small sample size was problematic in our analysis given the sample size requirements needed to perform logistic regression analyses. Using the protocol laid out by Freeman 2005, although less sincere of gentrification, resulted in a larger sample size and, therefore, a more accurate analysis. Future directions should attempt to apply this alternate measurement method in research efforts looking at the relationship between emotional health and gentrification while simultaneously ensuring ample sample is achieved. Furthermore, a standardized conceptualization and measurement style for

census-level gentrification would greatly benefit studies that exist at these interdisciplinary crossroads.

CONCLUSION

More research is needed to authenticate gentrification's harmful influence on childhood emotional wellbeing. Given the rise in childhood mental illness together with the astronomical rates of gentrification occurring in urban places, there is a dire need for future research endeavors to figure out how mental health is affected by neighborhood change. We found that most of the theoretical work attempting to explain the role gentrification has on health inequity applies social disorganization theory, but we believe that future work should utilize social stress theory and the minority stress theory to defend empirical work on this topic.

Table 1 Sample description, 2015 (N= 3,468)		
Age		
0-4		503 (14.51%)
5-9		970 (27.99%)
10-14		1,265 (36.50%)
15-17		728 (21.00%)
Gender		
Male		1,783 (51.46%)
Female		1,682 (48.54%)
Race/ethnicity		
NH White		1,793 (51.70%)
NH Black		562 (16.21%)
Hispanic		799 (23.04%)
Other		314 (9.05%)
Parental marital status		
Single		774 (22.38%)
Married or domestic partner		2,685 (77.62%)
Family occupancy status		
Rented		621 (18.05%)
Owned		2,820 (81.95%)
Annual Household Income		
< \$14,999		200 (6.78%)
\$15,000 to \$34,999		446 (15.12%)
\$35,000 to \$49,999		285 (9.66%)
\$50,000 to \$99,999		904 (30.64%)
> \$100,000		1,115 (37.80%)
Gentrification status		
Gentrifying		228 (6.57%)
Non-gentrifying		3,240 (93.43%)
Mental health problem		
Yes		571 (16.63%)
No		2,863 (83.37%)
Perception of community safety		
Felt unsafe		309 (9.00%)
Felt safe		3,123 (91.00%)

Table 2 Univariate and multivariate logistic regression models associating neighborhood gentrification status to mental health problems.		
	Univariate model OR (95% CI)	Multivariate model OR (95% CI)
Gentrification status 0 = not gentrifying 1 = gentrifying	0.813 (0.577, 1.144)	0.839 [0.577, 1.219]
Parental marital status 0 = single 1 = married or domestic partner		1.205 [0.932, 1.559]
Family occupancy status 0 = rent dwelling 1 = own dwelling		0.459*** [0.357, 0.591]
Age 0-4		REF
5-9		1.332** [0.974, 1.822]
10-14		1.004 [0.747, 1.349]
15-17		0.784 [0.571, 1.076]
Annual Household Income < \$14,999		REF
\$15,000 to \$34,999		0.923 [0.608, 1.399]
\$35,000 to \$49,999		1.085 [0.673, 1.749]
\$50,000 to \$99,999		1.079 [0.704, 1.655]
> \$100,000		1.229 [0.781, 1.933]
Race/ethnicity NH White		REF
NH Black		1.337** [0.996, 1.802]
Hispanic		1.291** [0.994, 1.677]
Other		1.108 [0.771, 1.592]
p-value < 0.1; * p-value < 0.001; NH=Non-Hispanic		

Table 3 Univariate and multivariate logistic regression models associating perceptions of neighborhood safety to mental health problems.			
	Univariate model OR (95% CI)	Multivariate model OR (95% CI)	
Perceptions of community safety 0 = unsafe 1 = safe	1.735*** (1.314, 2.291)	1.477*** [1.088, 2.005]	
Parental marital status 0 = single 1 = married or domestic partner		1.212 [0.936, 1.569]	
Family occupancy status 0 = rent dwelling 1 = own dwelling		0.464*** [0.360, 0.598]	
Age 0-4 5-9 10-14 15-17		REF 1.328** [0.968, 1.821] 0.987 [0.733, 1.330] 0.777 [0.565, 1.069]	
Annual Household Income < \$14,999 \$15,000 to \$34,999 \$35,000 to \$49,999 \$50,000 to \$99,999 > \$100,000		REF 0.930 [0.611, 1.415] 1.080 [0.669, 1.744] 1.072 [0.698, 1.647] 1.205 [0.764, 1.902]	
Race/ethnicity NH White NH Black Hispanic Other		REF 1.363** [1.009, 1.841] 1.310** [1.007, 1.704] 1.116 [0.776, 1.604]	
p-value < 0.1; * p-value < 0.001			
NH=Non-Hispanic			

Table 4 Interaction between perceptions of community safety and gentrification status on mental health problems.	
	Mental health problem (OR; 95% CI)
Non-gentrifying Felt unsafe in community Felt safe in community	REF REF
Gentrifying Felt unsafe in community Felt safe in community	REF 3.799 [1.424, 10.137]

REFERENCES

- Atkinson, R. (2000). The hidden costs of gentrification: Displacement in central london. *Journal of Housing and the Built Environment*, 15(4), 307-326. doi:10.1023/A:1010128901782
- Aneshensel, C. S. (1992). Social stress: Theory and research. *Annual Review of Sociology*, 18(1), 15-38. doi:10.1146/annurev.so.18.080192.000311
- August, M., 2007, Is Social Mix Socially Beneficial? Evaluating the Philosophy of Social Mix in Toronto's Public Housing Redevelopments. Paper presented at the Associate Collegiate Schools of Planning Annual Meeting, October 20, 2007.
- Bond, L., Kearns, A., Mason, P., Tannahill, C., Egan, M., & Whitely, E. (2012). Exploring the relationships between housing, neighbourhoods and mental wellbeing for residents of deprived areas. *Bmc Public Health*, 12(1), 48-48. doi:10.1186/1471-2458-12-48
- Brown, A. F., Liang, L., Vassar, S. D., Stein-Merkin, S., Longstreth, J., W T, Ovbiagele, B., Escarce, J. J. (2011). Neighborhood disadvantage and ischemic stroke: The cardiovascular health study (CHS). *Stroke*, 42(12), 3363-3368. doi:10.1161/STROKEAHA.111.622134
- Butler, A. M., PhD, Kowalkowski, M., Jones, H. A. & Raphael, Jean L. (2012). The relationship of reported neighborhood conditions with child mental health. *Academic Pediatrics*, 12(6), 523-531. doi:10.1016/j.acap.2012.06.005
- Cameron, S. (2003). Gentrification, housing redifferentiation and urban regeneration: 'going

- for growth' in newcastle upon tyne. *Urban Studies*, 40(12), 2367-2382.
doi:10.1080/0042098032000136110
- Cole, I., & Goodchild, B. (2000). Social mix and the 'balanced community' in british housing policy – a tale of two epochs. *Geojournal*, 51(4), 351-360.
doi:10.1023/A:1012049526513
- Cole, H. V. S., Triguero-Mas, M., Connolly, J. J. T., & Anguelovski, I. (2019). Determining the health benefits of green space: Does gentrification matter? *Health and Place*, 57, 1-11. doi:10.1016/j.healthplace.2019.02.001
- D'Agostino, E. M., Patel, H. H., Hansen, E., Mathew, M. S., Nardi, M., & Messiah, S. E. (2018). Longitudinal analysis of cardiovascular disease risk profile in neighbourhood poverty subgroups: 5-year results from an afterschool fitness programme in the USA. *Journal of Epidemiology and Community Health*, 72(3), 193-201. doi:10.1136/jech-2017-209333
- Donnelly, L., McLanahan, S., Brooks-Gunn, J., Garfinkel, I., Wagner, B. G., Jacobsen, W. C., . . . Gaydos, L. (2016). Cohesive neighborhoods where social expectations are shared may have positive impact on adolescent mental health. *Health Affairs (Project Hope)*, 35(11), 2083-2091. doi:10.1377/hlthaff.2016.0721
- Gaydos, L. (2016). Cohesive neighborhoods where social expectations are shared may have positive impact on adolescent mental health. *Health Affairs*, 35(11), 2083-2091. doi:10.1377/hlthaff.2016.0721
- Giurgescu, C., Misra, D. P., Sealy-Jefferson, S., Caldwell, C. H., Templin, T. N., Slaughter-

- Acey, J. C., & Osypuk, T. L. (2015). The impact of neighborhood quality, perceived stress, and social support on depressive symptoms during pregnancy in african american women. *Social Science & Medicine*, 130, 172-180. doi:10.1016/j.socscimed.2015.02.006
- Ford, J. L., & Rechel, M. (2012). Parental perceptions of the neighborhood context and adolescent depression. *Public Health Nursing*, 29(5), 390-402. doi:10.1111/j.1525-1446.2012.01015.x
- Freeman, L. (2005). Displacement or succession?: Residential mobility in gentrifying neighborhoods. *Urban Affairs Review*, 40(4), 463-491. doi:10.1177/1078087404273341
- Generaal, E., Timmermans, E., Dekkers, J., Smit, J., & Penninx, B. (2019). Not urbanization level but socioeconomic, physical and social neighbourhood characteristics are associated with presence and severity of depressive and anxiety disorders. *Psychological Medicine*, 49(1), 149-161. doi:10.1017/S0033291718000612
- Giurgescu, C., Misra, D. P., Sealy-Jefferson, S., Caldwell, C. H., Templin, T. N., Slaughter-Acey, J. C., & Osypuk, T. L. (2015). The impact of neighborhood quality, perceived stress, and social support on depressive symptoms during pregnancy in african american women. *Social Science & Medicine*, 130, 172-180. doi:10.1016/j.socscimed.2015.02.006
- Handley, E. D., Rogosch, F. A., Guild, D. J., & Cicchetti, D. (2015). Neighborhood disadvantage and adolescent substance use disorder: The moderating role of maltreatment. *Child Maltreatment*, 20(3), 193-202. doi:10.1177/1077559515584159

- Hooper, C. M., Ivory, V. C., & Fougere, G. (2015). Childhood neighbourhoods as third places: Developing durable skills and preferences that enhance wellbeing in adulthood. *Health and Place*, 34, 34-45. doi:10.1016/j.healthplace.2015.03.017
- Izenberg, J. M., Mujahid, M. S., & Yen, I. H. (2018). Health in changing neighborhoods: A study of the relationship between gentrification and self-rated health in the state of california. *Health and Place*, 52, 188-195. doi:10.1016/j.healthplace.2018.06.002
- Joseph, M. L., 2006, Is mixed-income development an antidote to urban poverty? *Housing Policy Debate*, Vol. 17, No. 2, 209–234.
- Kirby, J. B., & Kaneda, T. (2005). Neighborhood socioeconomic disadvantage and access to health care. *Journal of Health and Social Behavior*, 46(1), 15-31. doi:10.1177/002214650504600103
- Mair, C., A V Diez Roux, & Galea, S. (2008). Are neighbourhood characteristics associated with depressive symptoms? A review of evidence. *Journal of Epidemiology and Community Health* (1979-), 62(11), 940-946. doi:10.1136/jech.2007.066605
- Masi, C. M., Hawkey, L. C., Harry Piotrowski, Z., & Pickett, K. E. (2007). Neighborhood economic disadvantage, violent crime, group density, and pregnancy outcomes in a diverse, urban population. *Social Science & Medicine*, 65(12), 2440-2457. doi:10.1016/j.socscimed.2007.07.014
- Marcuse, P. (1985). Gentrification, abandonment, and displacement: Connections, causes, and policy responses in new york city. *Washington University Journal of Urban and Contemporary Law*, 28, 195.
- Mehdipanah, R., Marra, G., Melis, G., & Gelormino, E. (2018). Urban renewal,

- gentrification and health equity: A realist perspective. *European Journal of Public Health*, 28(2), 243-248. doi:10.1093/eurpub/ckx202
- Meyer, I. H. (1995). Minority stress and mental health in gay men. *Journal of Health and Social Behavior*, 36(1), 38-56. doi:10.2307/2137286
- Newman, K., & Wyly, E. K. (2006). The right to stay put, revisited: Gentrification and resistance to displacement in new york city. *Urban Studies*, 43(1), 23-57. doi:10.1080/00420980500388710
- Ostendorf, W., Musterd, S., and De Vos, S., 2001, Social mix and the neighbourhood effect. Policy ambitions and empirical evidence. *Housing Studies*, Vol. 16, No. 3, 371–380.
- Sandfort, T. G. M., Melendez, R. M., & Diaz, R. M. (2007). Gender nonconformity, homophobia, and mental distress in latino gay and bisexual men. *Journal of Sex Research*, 44(2), 181-189. doi:10.1080/00224490701263819
- Schill, M. H., Nathan, R. P., & Persaud, H. (1983). *Revitalizing America's cities: Neighborhood reinvestment and displacement*. Albany: State University of New York Press.
- Smith, R., Lehning, A., & Kim, K. (2018). Aging in place in gentrifying neighborhoods: Implications for physical and mental health. *Gerontologist*, 58(1), 26-35. doi:10.1093/geront/gnx105
- Steinmetz-Wood, M., Wasfi, R., Parker, G., Bornstein, L., Caron, J., & Kestens, Y. (2017). Is

- gentrification all bad? positive association between gentrification and individual's perceived neighborhood collective efficacy in montreal, canada. *International Journal of Health Geographics*, 16(1), 24. doi:10.1186/s12942-017-0096-6
- StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC
- Sundquist, K., Malmström, M., & Johansson, S. (2004). Neighbourhood deprivation and incidence of coronary heart disease: A multilevel study of 2.6 million women and men in sweden. *Journal of Epidemiology and Community Health* (1979-), 58(1), 71-77. doi:10.1136/jech.58.1.71
- Roux, A. V. D., Merkin, S. S., Arnett, D., Chambless, L., Massing, M., Nieto, F. J., Watson, R. L. (2001). Neighborhood of residence and incidence of coronary heart disease. *The New England Journal of Medicine*, 345(2), 99-106. doi:10.1056/NEJM200107123450205
- Walks, R., & Maaranen, R. (2008). Gentrification, social mix, and social polarization: Testing the linkages in large canadian cities. *Urban Geography*, 29(4), 293-326. doi:10.2747/0272-3638.29.4.293
- Wyly, E., & Hammel, D. (2004). Gentrification, segregation, and discrimination in the american urban system. *Environment and Planning a*, 36(7), 1215-1241. doi:10.1068/a3610