The Multi-Contextual Effects Through Which Environmental Economic Declines Impact Older Persons' Quality of Life

by

Jason Settels

A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy

Department of Sociology
University of Toronto

The Multi-Contextual Effects Through Which Environmental Economic Declines Impact Older Persons' Quality of Life

Jason Settels
Doctor of Philosophy

Department of Sociology
University of Toronto
2019

Abstract

The effects of city and neighbourhood contexts on individuals' well-being have long garnered sociological interest. Within this broader topic, scholarship has shown that the changing economic fortunes of cities and neighbourhoods influence residents' quality of life. However, the dynamics that determine whether and how contexts in decline impact residents' mental health and social lives are understudied. The three papers of this dissertation extend beyond current research by examining the mechanisms and contingencies that determined how declines in American cities and neighbourhoods through the Great Recession of 2007-2009 affected older residents' quality of life. As this recession was the greatest economic crisis the world had experienced since the Great Depression of the 1930s, it is an ideal context within which to study the effects of economic declines.

First, I study how rising home foreclosure rates and declining home prices in American cities led to rising depressive symptoms. Most research on the effects of this recession upon mental health has focused on personal financial losses. My results show that features of cities in decline affect residents' depressive symptoms above and beyond the effects attributable to their own total household assets declines. Second, my results reveal how declining resources at the city level and rising concentrated disadvantage within city neighbourhoods interacted

multiplicatively as they impacted depressive symptoms. Despite much scholarship arguing for a greater integration of city- and neighbourhood-level effects, few studies have investigated how these two contextual levels operate multiplicatively as they affect residents' health and well-being. Third, my findings show that rising concentrated disadvantage in American neighbourhoods led to smaller social networks through time, largely due to less acquisition of new close social ties. Within the context of the Great Recession, each paper thus makes a unique contribution to our understanding of whether and how contexts undergoing economic declines affect an important dimension of older persons' quality of life.

Acknowledgements

First and foremost, I would like to thank my supervisor, Professor Markus Schafer, whose mentorship, guidance, advice, and encouragement were invaluable for the development of this dissertation. Under Professor Markus Schafer's supervision, I have extensively learned how to conduct sound and effective social scientific research. I further thank the other members of my dissertation committee, Professor Brent Berry and Professor Geoffrey Wodtke, both of whom were highly supportive, were always available for consultation, provided highly constructive feedback, and offered fruitful ideas as my dissertation progressed. The mentorship of these three scholars has greatly contributed to my professional and scholarly development.

I would also like to acknowledge the Department of Sociology of the University of Toronto for its extensive financial support, including an Outstanding Admissions Award, a University of Toronto Fellowship, and numerous research and conference travel grants.

I further acknowledge the Social Sciences and Humanities Research Council of Canada for a 2016-2018 Doctoral Fellowship, as well as the Ontario Student Assistance Program for 2015-2016 and 2018-2019 Ontario Graduate Scholarships.

I would also like to thank my parents, Artemis Daskalaki and Franz Settels, my wife, Oana Settels, and my brother, Philip Settels, whose unwavering encouragement supported me throughout my undergraduate and graduate studies. I especially thank my parents for teaching me the value of hard work, knowledge, and education. I would not have been able to complete this dissertation without these family members.

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

Introduction

Why do individuals vary in their health and well-being? Various reasons span from features of the individual persons themselves to characteristics of the communities, cities, regions, and nations within which they live. Relevant features of individual persons include intelligence and character traits. Additionally, scholarship has shown that cities' and neighbourhoods' social, cultural, economic, and housing characteristics have potent effects upon various aspects of residents' quality of life (Chernick, Langley, and Reschovsky 2011; Hollander 2011; Peck 2012). Research has also revealed that variables at the level of the nation affect the health and well-being of residents (Simon et al. 2002; Van de Velde, Bracke, and Levecque 2010).

My focus in this dissertation is on city- and neighbourhood-level socioeconomic influences upon quality of life. Cities are an effective unit of analysis since they approximate housing markets (Houle and Light 2017; Iceland, Weinberg, and Steinmetz 2002). Additionally, their extents of social and economic integration make them effective approximations of labour markets (United States Census Bureau 2016). As such, they are effective for investigations, such as the present study, of the impacts of economic declines.

The value of studying neighbourhoods is highlighted by the fact that most people spend a large proportion of their time within their communities of residence. This is especially the case among older residents who are more spatially confined (Krantz-Kent and Stewart 2007). Therefore, there is reason to expect that neighbourhood conditions will potently affect many important individual-level outcomes. Many theories of contextual effects, such as social disorganization (e.g., Bursik 1988; Sampson and Groves 1989) and social capital (e.g., Putnam 2001) perspectives, highlight the substantial effects of neighbourhood social and economic conditions.

The context for my study of city and neighbourhood effects is the Great Recession of 2007-2009. This recession is widely considered to have been the most severe global economic shock since the 1930s' Great Depression (Meltzer, Steven, and Langley 2013) and it serves as a particular case that illustrates how cities and neighbourhoods change and adapt to economic crises.

This crisis largely originated in the development of mortgage-backed securities coupled with credit default swaps that allowed investors to counterbalance their credit risk, which led to steep rises in the subprime portion of the mortgage market (Demyanyk and Van Hemert 2009). Through time, the quality of subprime loans steadily deteriorated, resulting in great numbers of subprime loans passing into delinquency or reaching foreclosure (Demyanyk and Van Hemert 2009). In fact, more that 15 percent of mortgages in the United States defaulted through this economic recession (Modrek et al. 2013). This breakdown of the property market involved the plummeting of home prices, and it led to extensive losses throughout the economy as well as a profound recession during which the typical American family underwent a 40 percent decline in its total assets (Meltzer et al. 2013). Poverty rates substantially increased while America faced a loss of $8.3 trillion dollars in savings (Modrek et al. 2013). Moreover, America's decrease in gross domestic product and its increase in rates of unemployment were the most severe since the Great Depression (Modrek et al. 2013). Recovery from this crisis has been slow and weak (Baily and Bosworth 2013; Gray and Scardamalia 2014).

This brief description of the Great Recession grounds how I conceptualize city- and neighbourhood-level *declines* throughout this dissertation. I am most interested in measures of socioeconomic advantage/disadvantage. At the city level, I consider changes in measures of economic health and stability that were potently affected by the Great Recession, including rates of home foreclosures, unemployment, and family poverty, as well as two measures of resources, median home prices and household incomes (Arias, Gascon, and Rapach 2016; Chatterjee and Eyigungor 2015; Gray and Scardamalia 2014; Katz, Wallace, and Hedberg 2013; NBC News 2012; Wang and Immergluck 2018; Zivin, Paczkowski, and Galea 2011). Changes in these city-level measures lead to externalities that impact the physical conditions, socioeconomic status, and social organization of city neighbourhoods (Leonard and Murdoch 2009; Lerman and Zhang 2012). At the neighbourhood level, I study changes in an index of concentrated disadvantage, based on percentage of the population below the poverty line, of households on public assistance, of female-headed households, of individuals unemployed, of individuals less than 18 years of age, and of individuals who are non-white (Sampson, Raudenbush, and Earls 1997). These measures of neighbourhood-level socioeconomic disadvantage are significantly associated with community social cohesion and capacity to realize shared goals, as well as extents of crime (Sampson et al. 1997). For these reasons, I focus on these measures of decline within this dissertation. However, many other variables could potentially be employed as measures of

decline through an economic shock. These include residents' extents of trust in their political leaders and in each other, the educational achievement of young persons, direct measures of criminal activity, direct measures of involvement in community groups and activities, proportions of older persons involuntarily working for pay, etc.

Particularly notable for this dissertation are those studies that have linked economic declines through the Great Recession with detriments to individuals' quality of life. Increased home foreclosure rates through this recession were associated with higher depressive symptomatology, lower well-being, and higher suicide rates (Cagney et al. 2014; Houle 2014; Houle and Light 2014). Likewise, rising unemployment rates (Phillips and Nugent 2014), housing instability based on financial risks and difficulties, rental and mortgage payment delinquency, and low incomes and income-to-needs ratios (Burgard, Seefeldt, and Johnson 2011) through this recession were linked with declines in physical and mental health.

Also notable is the fact that the Great Recession was a highly difficult experience for many older Americans (Boen and Yang 2016; Cagney et al. 2014). Between 2007 and 2011, more than 1.5 million older Americans experienced home foreclosure (Trawinski 2012). From 2007 to 2010, the median family net worth of heads of household of at least 55 years of age substantially declined (Bricker et al. 2012). Additionally, the retirement security of many older Americans was compromised, pressuring many to postpone their retirement plans (Munnell and Rutledge 2013). More generally, the physical and cognitive declines that tend to accompany the aging process might make older adults more vulnerable to contextual stressors (Lawton and Nahemow 1973). Furthermore, higher likelihood of being retired and generally fewer years of paid work in the future make older adults more dependent upon their accumulated assets. Since scholarship has shown that city-level economic declines erode residents' personal wealth (Boen and Yang 2016; Bucks et al. 2009; Meltzer et al. 2013), older persons might be more vulnerable to economic downturns within their communities and cities (Boen and Yang 2016; Cagney et al. 2014).

The study of how contextual economic declines through the Great Recession affected older Americans' quality of life is further motivated by the substantial population aging occurring throughout the industrialized world (Brown 2011; Cooke 2006; McDaniel and Rozanova 2011; McDonald and Donahue 2011; Turcotte and Schellenberg 2007). Beyond increasing the numerical importance of older individuals, this has accentuated the significance of older persons' productive activities and social engagement. Scholarship has shown that healthier

older persons are more likely to remain involved in paid work (e.g., Austen and Ong 2009; van den Berg, Elders, and Burdorf 2010; van Rijn et al. 2014) and to be actively engaged in their communities (Cornwell, Laumann, and Schumm 2008; Kohli, Hank, and Kunemund 2009; Young, Russel, and Powers 2004). As such, population aging makes it increasingly important that we understand influences upon various aspects of older persons' health and quality of life.

In any study of how the Great Recession affected older Americans' quality of life, an important consideration is how 'quality of life' should be conceptualized. A diverse set of definitions and measures have been proposed for this complex and multidimensional construct (e.g., Diener 2000; Flanagan 1978; George and Bearon 1980). Despite the great many conceptualizations of 'quality of life,' several agreed-upon components of this construct are social integration, a subjective feeling of well-being, and independence (Birren et al. 1991). The World Health Organization (1997:1) defines 'quality of life' as:

> individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.

Informed by this conceptualization of 'quality of life,' I employ two groups of outcomes in this dissertation. One is an index of depressive symptoms that combines an overall measure of general happiness with an eleven-item short form version of the twenty-item Center for Epidemiologic Studies Depression (CES-D) Scale. Among the latter eleven items are the extent to which respondents felt depressed, had restless sleep, felt lonely, felt that people were unfriendly, etc., during the preceding week. The other group of quality of life outcomes is based on the size of one's network of close confidant and turnover through time in that network. Social network richness is especially important for 'successful aging' (Rowe and Kahn 1997) since it protects cognitive abilities (Barnes et al. 2004) as well as both physical and mental health (Cornwell and Waite 2009). Scholars have studied the many ways in which loss of close confidants can be detrimental to health and well-being (Cornwell 2015; Deflem 1989; Pescosolido 1992; Steger and Kashdan 2009) and in which gain of new close social ties can be beneficial to happiness (Cornwell and Laumann 2015; Li 2007; Kemp et al. 2012; Street and Burge 2012; Tan et al. 2009).

The focus of this dissertation is on how economic declines in American cities and neighbourhoods through the Great Recession affected older residents' depressive symptoms, as

well as the size of and turnover within their networks of close confidants. I aim to uncover some of the mechanisms and contingencies that help determine whether and how contextual economic declines affect these two sets of measures of quality of life. In Chapter 2, I extend beyond predominant research on the Great Recession that solely investigates the impacts of personal financial declines. I show how economic declines in American cities impacted older residents' depressive symptoms above and beyond the consequences of their own personal financial losses. In Chapter 3, I investigate how multiplicative interactions between economic declines as the city and neighbourhood levels affected older residents' depressive symptoms. Despite the claims of numerous scholars emphasizing that research should build bridges between different contextual levels of analysis (Kaplan, Everson, and Lynch 2000; van Kempen, Bolt, and van Ham 2016), few studies have investigated statistical interactions between city- and neighbourhood-level variables as influences upon physical and mental health outcomes. Chapter 4 is an examination of how social network size and turnover are affected by changes in neighbourhoods through time. While some scholars have studied how socioeconomic contexts affect social network size and qualities of network ties (e.g., Cornwell and Behler 2015; Haines, Beggs, and Hurlbert 2011; van Eijk 2010), there is a lack of research that investigates how *changing* features of communities lead to changes in social networks.

Orienting Ecological Frameworks

This dissertation is motivated by the work of numerous scholars who have considered how multiple layers of contexts can impact the experiences, health, and well-being of residents, including older persons. Most centrally, Bronfenbrenner's (1979:3) *ecological theory* suggests that one's environment should be "conceived as a set of nested structures, each inside the next, like a set of Russian dolls." Bronfenbrenner (1979) discussed how interconnections between different settings can have potent effects upon individual persons' development and outcomes. He emphasized that settings in which a person never enters can still impact a person very significantly through affecting what transpires in those settings in which a person does actively participate. Bronfenbrenner (1979:13) emphasized how larger overarching forces, including economic influences, that emanate "from more remote regions in the larger physical and social milieu" impact what occurs in the immediate environments in which people are directly involved. Of high relevance to this dissertation, he thus argued that a person's development is affected by his or her immediate settings, such as his or her neighbourhood, by what transpires in

larger contexts, such as cities, as well as by interconnections between these spatial levels of analysis.

Much scholarship concurs with Bronfenbrenner's (1979) ideas concerning the nesting of smaller spatial levels of analysis within larger ones. Schafer and Upenieks (2015) propose a *layered contextual framework*, according to which one's physical and social surroundings are composed of numerous layers, such as home, neighbourhood, and city, each of which potently influences one's quality of life (Schafer and Upenieks 2015). Kaplan et al. (2000:42) present a similar framework for studying contextual effects upon individual-level outcomes:

> Observations of the complex patterning of disease, the "lens" of epidemiology, leads instead to a new approach that attempts to bridge various levels of explanation and intervention, bringing together theory and empirical work that tie together observations of causal influence and mechanism at multiple levels. It thus represents an explanatory enterprise that does not exclusively privilege the proximal, but seeks opportunities for understanding and intervention at both upstream and downstream vantage points…Such a pursuit is in its infancy and represents a major challenge that will succeed only with a broad interdisciplinary vision accompanied by state-of-the-art thinking in multiple domains.

Kaplan et al. (2000) thus present an ecological theory, consonant with that of Bronfenbrenner (1979), according to which more proximal levels of analysis are nested within and interact with more distal levels of analysis. From most upstream to most downstream, Kaplan et al. (2000:43) present the following influences upon individual and population health: "social and economic policies," "neighborhoods and communities," "living conditions," "social relationships," "individual risk factors," "genetic/constitutional factors," and "pathophysiological pathways." In their study of how the social, cultural, physical, demographic, economic, and political characteristics of cities affect their residents, Galea, Freudenberg, and Vlahov (2005) propose mechanisms mediating between these city-level variables and the more proximal environmental conditions, such as neighbourhood circumstances, that are the central determinants of the health of urban residents. They propose that the effects of cities upon health must be studied at many levels of analysis, from the broader economic context to the genetics and behaviours of individual persons. In doing so, they place urban health within global, national, and regional contexts.

Chapters 2, 3, and 4 of this dissertation employ ideas from these ecological perspectives. In particular, I focus on stressors emanating from declines within cities and neighbourhoods, consequent to the Great Recession of 2007-2009. In Chapter 2, I consider how stressors within

declining cities impact older residents' depressive symptoms. In Chapter 3, I investigate how stressors emanating from the interface between neighbourhoods and cities increase older persons' depressive symptoms. Chapter 4 is a study of how stressors linked with rising neighbourhood-level concentrated disadvantage affect older residents' ability and motivation to keep their earlier close social ties and acquire new ones.

Overview of the Dissertation

Emphasis on the Importance of City-Level Factors during Economic Shocks

Most studies of how the Great Recession affected individual-level health and well-being have focused on the consequences of personal financial losses (e.g., Boen and Yang 2016; McInerney, Mellor, and Nicholas 2013; Wilkinson 2016; Yilmazer, Babiarz, and Liu 2015). These studies have revealed declines in personal wealth to be associated with higher systolic blood pressure and C-reactive protein levels (Boen and Yang 2016), increased use of antidepressant medications and decreases in subjective measures of mental health (McInerney et al. 2013), increased financial strains which potently led to higher levels of anxiety and depression (Wilkinson 2016), as well as rises in psychological distress (Yilmazer et al. 2015).

Yet, ecological perspectives suggest that features of contexts in decline might potently impact quality of life, beyond effects based on one's own asset losses. Accordingly, scholars have analyzed how significant economic shocks, such as the Great Recession of 2007-2009, can be to the detriment of cities' capacity to sustain and improve the well-being of their residents (Chernick et al. 2011; Peck 2012). For example, decreasing property values through the recession weakened the revenue bases cities could draw upon to provide their residents with numerous public goods and services, such as the upkeep of streets (Allen 2013), the forestalling of home foreclosures, the maintenance of abandoned buildings (Baumer, Wolff, and Arnio 2012), and schooling (Lerman and Zhang 2012). Additionally, many neighbourhoods within hard-hit cities faced rising crime and disorder (Leonard and Murdoch 2009; Lerman and Zhang 2012), causing increases in fear and decreases in generalized trust which negatively impacted mental health through reducing social engagement and involvement in community groups and activities (Aneshensel 2010; Aneshensel et al. 2011). Furthermore, increased housing instability within declining neighbourhoods caused rising homelessness, accentuated residential crowding, and increased risks of illness through the insects and other carriers of disease that tend to

accumulate within vacated and neglected buildings (Burgard and Kalousova 2015). More specifically, increased census tract-level rates of home foreclosures through this recession resulted in higher levels of significant depressive symptomatology (Cagney et al. 2014). Similarly, rising foreclosure rates in American counties (Houle 2014) and cities (Houle and Light 2014) were linked with worsened mental health and increased rates of suicide. At the level of the state, rising unemployment rates were associated with lower levels of both physical and mental health (Phillips and Nugent 2014).

Chapter 2 engages the topic of the effects of city-level economic declines that occur through personal financial losses and those that occur through changes to features of the contexts within which people live. At the level of the city, I focus on declines in median home prices and increases in home foreclosure rates, which are two central dimensions of economic decline through the Great Recession. At the level of the individual, I focus on losses in total household assets.

The ecological stress process model is used as an orienting theoretical framework as I consider features of contexts that can lead to increased depressive symptoms. This model is an elaboration upon the original stress process model developed by Pearlin et al. (1981), which elucidated how strains associated with life events, transitions, and circumstances, as well as one's set of roles, can lead to experiences of stress that cause undesirable psychological outcomes, including depression and anxiety. By incorporating ideas and concepts from Bronfenbrenner's (1979) ecological theory, the ecological stress process model considers how the layered social contexts within which people live can themselves by sources of significant stressors that can lead to adverse psychological outcomes.

Based on the ecological stress process model, I hypothesize that while significant proportions of the effects of city-level declines through the Great Recession upon older residents' depressive symptoms are mediated through personal asset losses, these effects will remain significant after accounting for mediation. If these effects remain significant after accounting for personal asset losses, it will suggest that future research on economic shocks should focus more on how contextual variables impact individual-level health and well-being.

The Importance of Interactions between City- and Neighbourhood-Level Variables

As earlier mentioned, scholars have emphasized that research on health and well-being should build bridges between multiple contextual levels of analysis (Kaplan et al. 2000). More

specifically, van Kempen et al. (2016) argue that comprehensive and accurate understandings of neighbourhood troubles require investigation of how neighbourhood circumstances are intertwined with processes taking place at the level of the city. Despite this scholarship, there is a dearth of research that has studied statistical interactions between city- and neighbourhood-level variables as they impact individual-level health and well-being (e.g. Acevedo-Garcia et al. 2003; Diez Roux 2001; Galea et al. 2005; Pemberton and Humphris 2016).

Chapter 3 studies numerous multiplicative interactions between economic circumstances at the city and neighbourhood levels as influences upon older residents' depressive symptoms. At the level of the city, I emphasize the importance of monetary resources by employing an index based on median home prices and median household incomes. At the level of the neighbourhood, my emphasis is on an index of concentrated disadvantage, based on six variables (percentage of the population below the poverty line, of households on public assistance, of female-headed households, of individuals unemployed, of individuals less than 18 years of age, and of individuals who are non-white) (Sampson et al. 1997), which operationalizes extent of need for resources.

In this study, I employ the compound disadvantage model. This theory suggests that "The effects of separate sources of disadvantage of the same type combine multiplicatively…" (Wheaton and Clarke 2003:695). Scholars have primarily applied this theory to understanding poor outcomes for socioeconomically disadvantaged individuals residing within disadvantaged neighbourhoods (Gilster 2014; Wheaton and Clarke 2003; Wodtke, Elwert, and Harding 2016). I develop an *ecological* compound disadvantage model as I consider unfavourable outcomes for individuals residing within declining neighbourhoods located within cities economically impacted by the Great Recession.

Based on an ecological compound disadvantage model, I hypothesize that declining resources at the city level will be especially harmful for the depressive symptoms of older residents of neighbourhoods that have undergone increased need for resources. If such a moderation effect is found, it will suggest that future research on quality of life should pay more attention to interactions between variables at different levels of context.

Social Network Turnover within Changing Neighbourhoods

One robust finding from the last few decades of sociological research is that social networks are highly consequential for many individual- and community-level outcomes (Coleman 1988; Wellman 1983). For example, social networks have been found to affect receipt

of emotional and instrumental support, socioeconomic achievement, satisfaction with one's life, as well as overall health and mortality (Ajrouch, Blandon, and Antonucci 2005; Cornwell 2015; Cornwell and Behler 2015; Cornwell and Waite 2009; Lin 1999; Wellman and Wortley 1990). As such, this dissertation includes social network variables among measures of 'quality of life.'

Recent scholarship has further shown the extent to which social networks change through time, especially in response to changes in life circumstances (Cornwell 2015; Degenne and Lebeaux 2005; Wellman et al. 1997; McPherson, Smith-Lovin, and Brashears 2006; Perry and Pescosolido 2012). Much research has shown how social networks adapt through important life changes, including transitions important in later life, such as health decline (Cornwell 2009; Perry and Pescosolido 2012), residential relocation (Stacey-Konnert and Pynoos 1992; Walters and Bartlett 2009), retirement (Cornwell and Laumann 2011), and the death of one's spouse (Cornwell et al. 2008; Hatch and Bulcroft 1992).

Understudied, however, are how socio-spatial changes lead to social network adaptations. Case studies have examined social network changes within specific gentrifying neighbourhoods (e.g., Chaskin and Joseph 2013; DeSena 2006; Newman and Wyly 2006). However, there is a lack of studies of social network dynamics within changing communities based on representative and comprehensive data from a large set of neighbourhoods.

Chapter 4 helps fill this research gap through a study of how the social networks of older residents within 387 census tracts adapted as their neighbourhoods changed through the Great Recession of 2007-2009. The measures of social networks I study include change in social network size, as well as loss and gain of new close network members. At the neighbourhood level, I focus on the same measure of concentrated disadvantage used in Chapter 3.

In Chapter 4, I employ social disorganization theory, according to which disadvantaged socioeconomic circumstances weaken the community institutions and broader social ties that regulate neighbourhood members' behaviour and activities while strengthening the community's capacity to collectively further its common interests and address its common concerns (Ansari 2013; Bursik 1988; Sampson and Groves 1989). This theory thus suggests that under circumstances of rising neighbourhood-level concentrated disadvantage, residents might lose close social ties and might be prevented from gaining new close social ties through rising levels of fear, decreasing extents of trust (Aneshensel 2010; Aneshensel et al. 2011; Ross, Mirowsky, and Pribesh 2001), and weakening of the community institutions that help foster close social ties among both local and nonlocal participants (van Eijk 2010).

Based on social disorganization theory, I hypothesize that rising neighbourhood-level concentrated disadvantage through the Great Recession will lead to smaller close social networks among older residents both through increasing the likelihood of loss of previous close social ties and through decreasing the probability of acquisition of new close social ties.

Summary

Collectively, the three papers of this dissertation add nuance to our understanding of how economic changes in cities and neighbourhoods lead to changes in residents' quality of life. This research is conducted within the context of the Great Recession of 2007-2009, which is ideal since this economic shock heavily impacted American cities and neighbourhoods. Since this recession was a very challenging experience for many older Americans, studying an older sample is effective for the aims of this dissertation. Two sets of measures of quality of life are studied: depressive symptoms and social network size/turnover. As such, this dissertation considers psychological and social aspects of the multidimensional concept of 'quality of life.'

Chapters 2, 3, and 4 contribute unique insights into mechanisms and contingencies that determine whether and how cities and neighbourhoods undergoing economic declines affect older residents' quality of life. Chapter 2 employs the ecological stress process model and questions whether features of declining cities impact depressive symptoms above and beyond the effects attributable to personal asset losses. Chapter 3 develops an ecological compound disadvantage model and considers whether the effects of declining city-level resources upon depressive symptoms are intensified within neighbourhoods undergoing increased concentrated disadvantage. Chapter 4 applies social disorganization theory as it addresses how worsening neighbourhood conditions affect the sizes of residents' networks of close confidants, and as it questions whether these effects are based mostly on likelihood of loss of previous close social ties or probability of gain of new close network ties. In pursuing these goals, this dissertation bridges numerous literatures and prominent theories concerning contextual effects upon individual-level outcomes.

References

Acevedo-Garcia, Dolores, Kimberly A. Lochner, Theresa L. Osypuk, and S. V. Subramanian. 2003. "Future Directions in Residential Segregation and Health Research: A Multilevel Approach." *American Journal of Public Health* 93(2):215–21.

Ajrouch, K. J., A. Y. Blandon, and T. C. Antonucci. 2005. “Social Networks among Men and Women.” *Journals of Gerontology Series B: Psychological Sciences and Social Sciences,* 60(6):S311–S317.

Allen, Ryan. 2013. “The Distribution and Evolution of Physical Neighborhood Problems during the Great Recession.” *City and Community* 12(3):260–79.

Aneshensel, Carol S. 2010. “Neighborhood as a Social Context of the Stress Process.” Pp. 35-52 in Advances in the Conceptualization of the Stress Process: Essays in Honor of Leonard I. Pearlin, edited by Avison, W. R., Aneshensel, C. S., Schieman, S., Wheaton, B. New York: Springer.

Aneshensel, Carol S., Michelle J. Ko, Joshua Chodosh, and Richard G. Wight. 2011. “The Urban Neighborhood and Cognitive Functioning in Late Middle Age.” *Journal of Health and Social Behavior* 52(2):163–79.

Ansari, Sami. 2013. “Social Capital and Collective Efficacy: Resource and Operating Tools of Community Social Control.” *Journal of Theoretical and Philosophical Criminology* 5(2):75–94.

Arias, Maria A., Charles S. Gascon, and David E. Rapach. 2016. “Metro Business Cycles.” *Research Division, Federal Reserve Bank of St. Louis, Working Paper Series*:1-35.

Austen, Siobhan and Rachel Ong. 2009. “The Employment Transitions of Mid-Life Women: Health and Care Effects.” *Ageing & Society* 30(02):207–27.

Baily, Martin Neil, and Barry Bosworth. 2013. "The United States Economy: Why Such a Weak Recovery?." Pp. 1-35 in *Nomura Foundation’s Macro Economy Research Conference,“Prospects for Growth in the World’s Four Major Economies,” September* (Vol. 11).

Barnes, Lisa L., C. F. Mendes De Leon, R. S. Wilson, J. L. Bienias, and D. A. Evans. 2004. “Social Resources and Cognitive Decline in a Population of Older African Americans and Whites.” *Neurology* 63(12):2322–26.

Baumer, Eric P., Kevin T. Wolff, and Ashley N. Arnio. 2012. “A Multicity Neighborhood Analysis of Foreclosure and Crime.” *Social Science Quarterly* 93(3):577–601.

Birren, James E., James E. Lubben, Janice Cichowlas Rowe, and Donna E. Deutchman. 1991. *The Concept and Measurement of Quality of Life in the Frail Elderly*. San Diego, CA: Academic Press.

Boen, Courtney and Y. Claire Yang. 2016. “The Physiological Impacts of Wealth Shocks in Late Life: Evidence from the Great Recession.” *Social Science and Medicine* 150:221–30.

Bricker, Jesse, Arthur B. Kennickell, Kevin B. Moore, and John Sabelhaus. 2012. “Changes in U.S. Family Finances from 2007 to 2010: Evidence from the Survey of Consumer Finances.” *Federal Reserve Bulletin* 98(2):1–80.

Bronfenbrenner, Urie. 1979. *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.

Brown, Robert L. 2011. "Economic Security in an Aging Canadian Population." *Canadian Journal on Aging* 30(3):391-399.

Bucks, Brian K., Arthur B. Kennickell, Traci L. Mach, and Kevin B. Moore. 2009. "Changes in U.S. Family Finances from 2004 to 2007: Evidence from the Survey of Consumer Finances." *Federal Reserve Bulletin* 95(February):1–56.

Burgard, Sarah A. and Lucie Kalousova. 2015. "Effects of the Great Recession: Health and Well-Being." *Annual Review of Sociology* 41:181–201.

Burgard, Sarah A., Kristin S. Seefeldt, and Sarah W. Johnson. 2011. "Housing Instability and Health: Findings from the Michigan Recession and Recovery Study." *National Poverty Center Working Paper Series* #11-23:1-37.

Bursik, Robert J. 1988. "Social Disorganization and Theories of Crime and Delinquency: Problems and Prospects." *Criminology* 26:519-51.

Cagney, Kathleen A., Christopher R. Browning, James Iveniuk, and Ned English. 2014. "The Onset of Depression during the Great Recession: Foreclosure and Older Adult Mental Health." *American Journal of Public Health* 104(3):498–505.

Chaskin, Robert J. and Mark L. Joseph. 2013. "'Positive' Gentrification, Social Control and the 'Right to the City' in Mixed-Income Communities: Uses and Expectations of Space and Place." *International Journal of Urban and Regional Research* 37(2):480–502.

Chatterjee, Satyajit and Burcu Eyigungor. 2015. "A Quantitative Analysis of the U.S. Housing and Mortgage Markets and the Foreclosure Crisis." *Review of Economic Dynamics* 18(2):165–84.

Chernick, Howard, Adam Langley, and Andrew Reschovsky. 2011. "The Impact of the Great Recession and the Housing Crisis on the Financing of America's Largest Cities." *Regional Science and Urban Economics* 41(4):372–81.

Coleman, James S. 1988. "Ecology of the Family as a Context for Human Development. Research Perspectives." *Developmental Psychology* 22(6):723–42.

Cooke, M. 2006. "Policy Changes and the Labour Force Participation of Older Workers: Evidence from Six Countries." *Canadian Journal on Aging* 25(4):387–400.

Cornwell, Benjamin. 2009. "Good Health and the Bridging of Structural Holes." *Social Networks* 31(1):92–103.

Cornwell, Benjamin. 2015. "Social Disadvantage and Network Turnover." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 70(1):132–42.

Cornwell, Erin Y. and Rachel L. Behler. 2015. “Urbanism, Neighborhood Context, and Social Networks.” *City & Community* 14(3):311–35.

Cornwell, Benjamin and Edward O. Laumann. 2011. “Network Position and Sexual Dysfunction: Implications of Partner Betweenness for Men.” *American Journal of Sociology* 117(1):172–208.

Cornwell, Benjamin and Edward O. Laumann. 2015. “The Health Benefits of Network Growth: New Evidence from a National Survey of Older Adults.” *Social Science and Medicine* 125:94–106.

Cornwell, Benjamin, Edward O. Laumann, and L. Philip Schumm. 2008. "The social connectedness of older adults: A national profile." *American Sociological Review* 73(2):185-203.

Cornwell, Erin York and Linda J. Waite. 2009. “Social Disconnectedness, Perceived Isolation, and Health among Older Adults.” *Journal of Health and Social Behavior* 50(1):31–48.

Deflem, Mathieu. 1989. “From Anomie to Anomia and Anomic Depression: A Sociological Critique on the Use of Anomie in Psychiatric Research.” *Social Science and Medicine* 29(5):627–34.

Degenne, Alain and Marie Odile Lebeaux. 2005. “The Dynamics of Personal Networks at the Time of Entry into Adult Life.” *Social Networks* 27(4):337–58.

Demyanyk, Yuliya and Otto Van Hemert. 2009. “Understanding the subprime mortgage crisis.” *The Review of Financial Studies* 24(6):1848-1880.

DeSena, Judith N. 2006. "“What’s a mother to do?” Gentrification, school selection, and the consequences for community cohesion." *American Behavioral Scientist* 50(2):241-257.

Diener, Ed. 2000. “Subjective Well-Being: The Science of Happiness and a Proposal for a National Index.” *American Psychologist* 55(1): 34-43.

Diez Roux, A. V. 2001. “Investigating Neighbourhood and Area Effects on Health.” *Am J Public Health* 91(11):1783–89.

Flanagan, John C. 1978. “A Research Approach to Improving Our Quality of Life.” *American Psychologist* 33(2): 138-47.

Galea, Sandro, Nicholas Freudenberg, and David Vlahov. 2005. “Cities and Population Health.” *Social Science and Medicine* 60(5):1017–33.

George, Linda K. and Lucille B. Bearon. 1980. *Quality of Life in Older Persons: Meaning and Measurement*. New York: Human Sciences Press.

Gilster, Megan E. 2014. “Neighborhood Stressors, Mastery, and Depressive Symptoms: Racial

and Ethnic Differences in an Ecological Model of the Stress Process in Chicago." *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91(4):690-706.

Gray, Tom and Robert Scardamalia. 2014. "America's Top Metros: Who's Leading the Recovery, and Why." *Civic Report* 89:1-41.

Haines, Valerie A., John J. Beggs, and Jeanne S. Hurlbert. 2011. "Neighborhood Disadvantage, Network Social Capital, and Depressive Symptoms." *Journal of Health and Social Behavior* 52(1):58–73.

Hatch, Laurie Russell, and Kris Bulcroft. 1992. "Contact with friends in later life: Disentangling the effects of gender and marital status." *Journal of Marriage and the Family* 54(1):222-232.

Hollander, Justin B. 2011. *Sunburnt Cities: The Great Recession, Depopulation and Urban Planning in the American Sunbelt*. Oxford, UK: Routledge.

Houle, Jason N. 2014. "Mental Health in the Foreclosure Crisis." *Social Science and Medicine* 118(C):1–8.

Houle, Jason N. and Michael T. Light. 2014. "The Home Foreclosure Crisis and Rising Suicide Rates, 2005 to 2010." *American Journal of Public Health* 104(6):1073–79.

Houle, Jason N. and Michael T. Light. 2017. "The Harder They Fall? Sex and Race/Ethnic Specific Suicide Rates in the U.S. Foreclosure Crisis." *Social Science and Medicine* 180:114–24.

Iceland, John, Daniel H. Weinberg, and Erika Steinmetz. 2002. *Racial and Ethnic Residential Segregation in the United States: 1980-2000 US Census Bureau, Series CENSR-3*. Washington, DC: US Government Printing Office.

Kaplan, G.A., Everson, S.A. and Lynch, J.W., 2000. "The contribution of social and behavioral research to an understanding of the distribution of disease: a multilevel approach." *Promoting Health*:37-80.

Katz, Charles M., Danielle Wallace, and E. C. Hedberg. 2013. "A Longitudinal Assessment of the Impact of Foreclosure on Neighborhood Crime." *Journal of Research in Crime and Delinquency* 50(3):359–89.

Kemp, Candace L., Mary M. Ball, Carole Hollingsworth, and Molly M. Perkins. 2012. "Strangers and Friends: Residents' Social Careers in Assisted Living." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 67 B(4):491–502.

Kohli, M., K. Hank, and H. Kunemund. 2009. "The Social Connectedness of Older Europeans: Patterns, Dynamics and Contexts." *Journal of European Social Policy* 19(4):327–40.

Krantz-Kent, Rachel, and Jay Stewart. 2007. "How Do Older Americans Spend their Time?" *Monthly Labor Review* 130:8-26.

Lawton, M.P. and Lucille Nahemow. 1973. *Ecology and the aging process*. Washington, DC, US: American Psychological Association.

Leonard, Tammy and James C. Murdoch. 2009. "The Neighborhood Effects of Foreclosure." *Journal of Geographical Systems* 11(4):317–32.

Lerman, Robert I. and Sisi Zhang. 2012 "Coping with the Great Recession: Disparate Impacts on Economic Well-Being in Poor Neighborhoods." *The Urban Institute*:1-20.

Li, Yunqing. 2007. "Recovering from Spousal Bereavement in Later Life: Does Volunteer Participation Play a Role?" *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 62(4):S257–66.

Lin, Nan. 1999. "Social Networks and Status Attainment." *Annual Review of Sociology* 25:467–87.

McDaniel, Susan A. and Julie Rozanova. 2011. "*Canada's Aging Population* (1986) Redux." *Canadian Journal on Aging* 30(3):511-521.

McDonald, Lynn and Peter Donahue. 2011. "Retirement Lost?" *Canadian Journal on Aging* 30(3):401-422.

McInerney, Melissa, Jennifer M. Mellor, and Lauren Hersch Nicholas. 2013. "Recession Depression: Mental Health Effects of the 2008 Stock Market Crash." *Journal of Health Economics* 32(6):1090–1104.

McPherson, Miller, Lynn Smith-Lovin, and Matthew E. Brashears. 2006. "Social isolation in America: Changes in core discussion networks over two decades." *American Sociological Review* 71(3):353-375.

Meltzer, Joshua, David Steven, and Claire Langley. 2013. "The United States after the Great Recession: The Challenge of Sustainable Growth." *Global Economy and Development at Brookings*:1-58.

Modrek, Sepideh, David Stuckler, Martin Mckee, and Mark R. Cullen. 2013. "A Review of Health Consequences of Recessions Internationally and a Synthesis of the US Response during the Great Recession." *Public Health Reviews* 35(1):1–33.

Munnell, Alicia H. and Matthew S. Rutledge. 2013. "The Effects of the Great Recession on the Retirement Security of Older Workers." *Annals of the American Academy of Political and Social Science* 650(1):124–42.

NBC News. 2012. "Cities with the most homes in foreclosure." Retrieved Oct. 16th, 2018 (https://www.nbcnews.com/businessmain/cities-most-homes-foreclosure-794509).

Newman, Kathe and Elvin K. Wyly. 2006. "Gentrification and Displacement Revisited A Fresh Look at the New York City Experience." *New York City Urban Studies* 43(1):23–57.

Pearlin, Leonard I., Elizabeth G. Menaghan, Morton A. Lieberman, and Joseph T Mullan. 1981. "The Stress Process." *Journal of Health and Social Behavior* 22(4):337-356.

Peck, Jamie. 2012. "Austerity Urbanism: American Cities under Extreme Economy." *City* 16(6):626–55.

Pemberton, Simon and Rachel Humphris. 2016. "Locality, Neighbourhood and Health : A Literature Review." *IRiS Working Paper Series No. 13/2016*.

Perry, Brea L. and Bernice A. Pescosolido. 2012. "Social Network Dynamics and Biographical Disruption: The Case of 'First-Timers' with Mental Illness." *American Journal of Sociology* 118(1):134–75.

Pescosolido, Bernice A. 1992. "Beyond rational choice: The social dynamics of how people seek help." *American journal of sociology* 97(4):1096-1138.

Phillips, Julie A., and Colleen N. Nugent. 2014. "Suicide and the Great Recession of 2007–2009: the role of economic factors in the 50 US states." *Social Science & Medicine* 116:22-31.

Putnam, Robert D. 2001. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Ross, Catherine E., John Mirowsky, and Shana Pribesh. 2001. "Powerlessness and the Amplification of Threat: Neighborhood Disadvantage, Disorder, and Mistrust." *American Sociological Review* 66(4):568-591.

Rowe, John W., and Robert L. Kahn. 1997. "Successful aging." *The Gerontologist* 37(4): 433-440.

Sampson, Robert J., and Byron W. Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94:774-802.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277(5328):918–24.

Schafer, Markus H. and Laura Upenieks. 2015. "Environmental Disorder and Functional Decline among Older Adults: A Layered Context Approach." *Social Science and Medicine* 124:152–61.

Simon, G. E., D. P. Goldberg, M. Von Korff, and T. B. Ustün. 2002. "Understanding Cross-National Differences in Depression Prevalence." *Psychological Medicine* 32(4):585–94.

Stacey-Konnert, C. and J. Pynoos. 1992. "Friendship and Social Networks in a Continuing Care Retirement Community." *Journal of Applied Gerontology* 11(3):298–313.

Steger, Michael F. and Todd B. Kashdan. 2009. "NIH Public Access." *Journal of Consulting Psychology* 56(2):289–300.

Street, Debra and Stephanie Woodham Burge. 2012. “Residential Context, Social Relationships, and Subjective Well-Being in Assisted Living.” *Research on Aging* 34(3):365–94.

Tan, Erwin J., George W. Rebok, Qilu Yu, Constantine E. Frangakis, Michelle C. Carlson, Tao Wang, Michelle Ricks, Elizabeth K. Tanner, Sylvia McGill, and Linda P. Fried. 2009. “The Long-Term Relationship between High-Intensity Volunteering and Physical Activity in Older African American Women.” *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 64(2):304–11.

Trawinski, Lori A. 2012. *Nightmare on main street: older Americans and the mortgage market crisis*. AARP Public Policy Institute.

Turcotte, Martin and Grant Schellenberg. 2007. *A portrait of seniors in Canada, 2006*. Statistics Canada, Social and Aboriginal Statistics Division.

United States Census Bureau. 2016. “Metropolitan and Micropolitan.” Retrieved Jan. 7th, 2018 (https://www.census.gov/programs-surveys/metro-micro/about/glossary.html).

van den Berg, Tilja IJ, Leo AM Elders, and Alex Burdorf. 2010. "Influence of health and work on early retirement." *Journal of Occupational and Environmental Medicine* 52(6):576-583.

Van de Velde, Sarah, Piet Bracke, and Katia Levecque. 2010. “Gender Differences in Depression in 23 European Countries. Cross-National Variation in the Gender Gap in Depression.” *Social Science and Medicine* 71(2):305–13.

van Eijk, Gwen. 2010. “Does Living in a Poor Neighbourhood Result in Network Poverty? A Study on Local Networks, Locality-Based Relationships and Neighbourhood Settings.” *Journal of Housing and the Built Environment* 25(4):467–80.

van Kempen, Ronald, Gideon Bolt, and Maarten van Ham. 2016. “Neighborhood Decline and the Economic Crisis: An Introduction.” *Urban Geography* 37(5):655–63.

van Rijn, Rogier M., Suzan J. W. Robroek, Sandra Brouwer, and Alex Burdorf. 2014. “Influence of Poor Health on Exit from Paid Employment: A Systematic Review.” *Occupational and Environmental Medicine* 71:295–301.

Walters, Peter, and Helen Bartlett. 2009. "Growing old in a new estate: establishing new social networks in retirement." *Ageing & Society* 29(2):217-236.

Wang, Kyungsoon and Dan Immergluck. 2018. “The Geography of Vacant Housing and Neighborhood Health Disparities After the U.S. Foreclosure Crisis.” *Cityscape* 20(2):145–70.

Wellman, Barry. 1983. "Network analysis: Some basic principles." *Sociological theory* 1 (1):155-200.

Wellman, Barry and Scot Wortley. 1990. “Different Strokes from Different Folks: Community Ties and Social Support.” *American Journal of Sociology* 96(3):558–88.

Wellman, Barry, Renita Yuk Lin Wong, David Tindall, and Nancy Nazer. 1997. “A Decade of Network Change: Turnover, Persistence and Stability in Personal Communities.” *Social Networks* 19(1):27–50.

Wheaton, Blair, and Philippa Clarke. 2003. “Space Meets Time: Integrating Temporal and Contextual Influences on Mental Health in Early Adulthood.” *American Sociological Review* 68(5):680-706.

Wilkinson, Lindsay R. 2016. “Financial Strain and Mental Health Among Older Adults During the Great Recession.” *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 71(4):745–54.

Wodtke, Geoffrey T., Felix Elwert, and David J. Harding. 2016. "Neighborhood effect heterogeneity by family income and developmental period." *American Journal of Sociology* 121(4):1168-1222.

World Health Organization. 1997. “Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. The WHOQOL Group.” *Psychological Medicine* 28(3):551–58.

Yilmazer, Tansel, Patryk Babiarz, and Fen Liu. 2015. “The Impact of Diminished Housing Wealth on Health in the United States: Evidence from the Great Recession.” *Social Science and Medicine* 130:234–41.

Young, Anne F., Anne Russell, and Jennifer R. Powers. 2004. “The Sense of Belonging to a Neighbourhood: Can It Be Measured and Is It Related to Health and Well Being in Older Women?” *Social Science & Medicine* 59(12):2627–37.

Zivin, Kara, Madgalena Paczkowski, and Sandro Galea. 2011. “Economic Downturns and Population Mental Health: Research Findings, Gaps, Challenges and Priorities.” *Psychological Medicine* 41(7):1343–48.

Chapter 2

Changes in City-Level Foreclosure Rates and Home Prices through the Great Recession and Depressive Symptoms among Older Americans

Abstract

Scholarship shows that the changing economic fortunes of cities influence mental health. However, the mechanisms through which this occurs are underexplored. I address this gap by investigating the Great Recession of 2007-2009. Using the National Social Life, Health, and Aging Project survey (N = 1,341), I study whether rises in cities' home foreclosure rates and declines in median home prices through the Great Recession increase older persons' depressive symptoms. I also study whether these effects are mediated by one's household asset declines. I find that increases in cities' home foreclosure rates and declines in median home prices increase depressive symptoms above and beyond the effects of personal financial losses. Results show no evidence of mediation through asset losses, suggesting effects through other channels. Supplementary analyses reveal that changes in city-level unemployment rates and median household incomes are less directly linked with changes in depressive symptoms.

Introduction

American cities vary substantially in the typical levels of mental health of their residents. In 2005, while the average citizen in Ames, IA had 2.1 days of depression per month, the corresponding amount was 3.6 in Little Rock-North Little Rock, AR, and 5.1 in Amarillo, TX (Sperling and Sander 2007). Why then do different people and contexts show varying levels of depression? The reasons are multiple and varied, spanning from individual dispositions to contextual characteristics of neighbourhoods, cities, states, and nations. Some micro-level causes are biological in nature, relating to temperament, personality, and intelligence. Other causes are meso-level; the demographic, economic, and housing characteristics of neighbourhoods and cities are consequential for health and well-being (Chernick, Langley, and Reschovsky 2011; Hollander 2011; Peck 2012). Still other causes exist at the macro level of the cultural, economic, and political features of nations (Simon et al. 2002; Van de Velde, Bracke, and Levecque 2010). I focus on causes of depression at the level of the city.

City effects upon well-being have long garnered sociological interest. Marans and Stimson (2011) emphasize city-level employment conditions, levels of education and income, extent of crime, rates of severe illnesses, climatic conditions, quality of transportation infrastructure, and provision of affordable and nutritious foods. Galea, Freudenberg, and Vlahov (2005) argue that all residents are affected by the physical, social, economic, and political features of their cities. Studies also show that momentous economic shocks, such as the Great Recession of 2007-2009, can worsen the demographic, economic, and housing characteristics of cities, harming residents' well-being (e.g., Chernick et al. 2011; Hollander 2011; Peck 2012). In studying these impacts, it is important to investigate the indirect pathways from city-level change to changes in individual-level resources, and to distinguish between stable resources and changes in resources. Through fixed-effects modelling, I focus on changes in resources.

Though city-level effects can be observed among people of all ages, this study is focused specifically on how changing urban contexts through the Great Recession affected older residents. Population aging, due to lower rates of fertility and higher life expectancies, is an increasingly important demographic trend throughout the industrialized world (Brown 2011; Cooke 2006; McDaniel and Rozanova 2011; McDonald and Donahue 2011; Turcotte and Schellenberg 2007). As populations have aged, people have increasingly concentrated in cities. Further, the health and functional declines that come with aging (Lawton and Nahemow 1973) might make older urban populations especially dependent on various city services and programs

that are negatively impacted within cities in decline (Chernick et al. 2011; Kazembe and Nickanor 2017; Leventhal and Brooks-Gunn 2003; Modrek et al. 2013; Tendler 1982; Peck 2012). It is thus important to study how older city residents were impacted by this recession.

I thus focus on older adults, among whom the Great Recession was a challenging experience (Boen and Yang 2016; Cagney et al. 2014). Over 1.5 million older Americans lost their homes to foreclosure between 2007 and 2011 (Trawinski 2012). Households headed by adults aged 55 and over saw substantial declines in net worth between 2007 and 2010 (Bricker et al. 2012). This recession put older Americans' retirement security at risk, forcing many to delay their retirement within a labour market not conducive to their continued employment (Munnell and Rutledge 2013). Additionally, the physical and cognitive vulnerabilities that come with aging might increase older persons' susceptibility to contextual stressors (Lawton and Nahemow 1973). Older persons' dependency on the assets accumulated over their lives might also accentuate the impact of the disadvantaged economic characteristics of the contexts in which they live (Boen and Yang 2016; Cagney et al. 2014).

Theoretical Perspectives

The ecological stress process orients my inquiry into whether and how stressors linked with changing city-level economic conditions affect depressive symptoms. This model is an extension of Pearlin et al.'s (1981) original stress process model, which emphasized how life events and strains within one's roles can be sources of stress that cause negative psychological outcomes, such as depression. Stressors can proliferate across institutional boundaries and role domains since the multiple sectors of a person's life intersect (Pearlin, Aneshensel, and LeBlanc 1997). Stressors associated with personal financial difficulties cause feelings of hopelessness, anxiety, and frustration (Drentea and Reynolds 2015). If these financial difficulties persist, they become chronic stressors (Burgard, Brand, and House 2007).

The ecological stress process model also adapts insights from Bronfenbrenner's (1979) ecological theory by incorporating multiple, overlapping layers of the physical and social environment as sources of stressors that can proliferate across different levels of context. Bronfenbrenner (1979:13) emphasized how larger overarching forces, including economic influences, that emanate "from more remote regions in the larger physical and social milieu" impact people's immediate environments. Accordingly, the ecological stress process model suggests that "the factors that contribute to environmental exposures, especially among urban populations, are complex and linked to larger social and political processes that affect access to

economic, political, and social resources" (Parker et al. 2004:505). As such, the processes that occur at the city level can affect the communities, homes, and individual lives of city residents, ultimately influencing their health and well-being (see Aneshensel 2010; Aneshensel et al. 2011). The present study focuses on depressive symptoms as outcomes of city-level changes.

Consistent with this model, research has identified pathways through which city-level stressors proliferate to the individual level. Most important for the present study, cities' housing market problems can erode residents' personal wealth and create financial strain (Boen and Yang 2016; Meltzer, Steven, and Langley 2013), which negatively impacts health (Boen and Yang 2016; Hajat et al. 2010, 2011; Pool et al. 2017; Robert and House 1996). I will therefore test this pathway between city-level declines and health.

Though the focus of this study is on how personal financial circumstances may mediate between city-level decline and mental health, there are additional pathways of stress proliferation suggested by the ecological stress process model. First, processes of social contagion facilitate the spread of threat and negative emotional states throughout urban neighbourhoods (Bastiampillai, Allison, and Chan 2013; Christakis and Fowler 2013), implying that others' financial troubles might impact even those neighbours who are not undergoing economic losses. Second, city-level economic declines proliferate to the neighbourhood level as they create externalities that reduce communities' cohesion and collective efficacy (Leonard and Murdoch 2009). As urban neighbourhoods become more socioeconomically disadvantaged, in turn, perceptions of disorder rise, and residents feel dwindling control over their communities' physical and social conditions (Kim 2010; Ross, Mirowski, and Pribesh 2001). Subsequent feelings of disempowerment, fear, and distrust proliferate to the individual level as they lead residents to stay within their homes, to limit their social interactions to close friends and family members, and to avoid community involvements (Aneshensel 2010; Aneshensel et al. 2011), all of which negatively affect mental health (Aneshensel 2010). These additional causal channels, though not assessed in the present study, imply that household asset decline will be only a partial mediator between city-level decline and mental health.

The present study focuses on depression; the stress process model states that depression is a central psychological outcome of stressful conditions, as well as an overall barometer of stress (Pearlin 1989; Pearlin et al. 1997; Pearlin et al. 1981). Among older adults, depression is possibly the most common form of emotional suffering (Blazer 2003) and is a powerful predictor of suicide (Blazer 2003; Fiske, Wetherell, and Gatz 2009; Vanderhorst and McLaren 2005).

Furthermore, depressed older persons suffer higher rates of morbidity, undergo detriments to their physical, cognitive, and social functioning, and show less self-care, all of which increase mortality (Blazer 2003; Fiske et al. 2009).

Context: The Great Recession of 2007-2009

I use the ecological stress process model to generate hypotheses about the mental health effects of the Great Recession, which was the most severe global economic crisis since the Great Depression of the 1930s (Meltzer et al. 2013). During this crisis, the property market collapsed, causing great losses within the financial sector and triggering an intense recession in which the median American family lost 40% of its net worth. Furthermore, from 2007 to 2009, America saw its unemployment rate increase from 4.6% to 9.3%, its real GDP drop by 3.1%, and its real personal income per capita decrease by 8.3% (Meltzer et al. 2013). Increased home foreclosures through this recession were linked with lower well-being (Cagney et al. 2014; Houle 2014) and higher suicide rates (Houle and Light 2014). Likewise, rising unemployment rates (Phillips and Nugent 2014) and income problems (Burgard, Seefeldt, and Johnson 2011) through this recession were linked with declines in physical and mental health.

Although the recession was widespread, American cities varied considerably in how they fared. Some cities recovered rapidly and successfully (e.g., Boston and Seattle), while others continue to experience difficulties (e.g., Detroit and Miami) (Arias, Gascon, and Rapach 2016; Davidson 2014; Dill 2014; Gray and Scardamalia 2014). Cities that fared better typically had larger and more educated populations (Arias et al. 2016; Florida 2016; Gray and Scardamalia 2014). Additionally, smaller shares of their economies were based on the housing industry (Arias et al. 2016; Florida 2016; Gray and Scardamalia 2014).

Hard-hit cities underwent high rates of foreclosed homes (Chatterjee and Eyigungor 2015; NBC News 2012; Wang and Immergluck 2018) and substantial decreases in real estate prices (Arias et al. 2016; Chatterjee and Eyigungor 2015; Gray and Scardamalia 2014). The latter were primarily responsible for American families' declines in median net worth (Bucks et al. 2009). While most past research on economic recessions and mental health focused on unemployment rates (Dooley, Fielding, and Levi 1996; Tefft 2011), the centrality of the housing market to the Great Recession suggests that foreclosure rates and home prices might be more relevant pathways for studying this economic downturn, particularly for older adults. Accordingly, these are the primary independent variables for the present study.

Numerous mechanisms link changes in city-level home prices and foreclosure rates through the recession with health and well-being. Among older Americans, decreased home values caused less money accessible for spending while retired, and in many cases prompted plans to delay retirement, both of which negatively impacted their quality of life (Munnell and Rutledge 2013). Those who underwent home foreclosure experienced heightened levels of psychological distress, including feelings of nervousness, hopelessness, and worthlessness, that served as obstacles to the ability and motivation to engage in work and regular daily activities (Yilmazer, Babiarz, and Liu 2015). Other mechanisms that are not directly tested in this study are based on pathways other than personal financial and housing circumstances. They thus provide potential explanations for why personal assets losses cannot fully explain the effects of the recession. Decreases in city-level home prices reduce a city's economic strength, and just like increased foreclosure rates, reduce the quality of city neighbourhoods. Weakened property values reduce cities' revenue bases for public goods and services, including schooling (Lerman and Zhang 2012), foreclosure prevention, the upkeep and repurchasing of vacated buildings (Baumer, Wolff, and Arnio 2012), and street maintenance (Allen 2013). They also lead to decreased consumption as residents save as protection against economic uncertainty and to rebuild their lost wealth, including that embedded in their homes (Huo and Ríos-Rull 2015; Ríos-Rull and Huo 2016; Lerman and Zhang 2012; Petev, Pistaferri, and Saporta 2012). Cities with highly reduced consumption faced a worsened and prolonged economic shock (Petev et al. 2012), affecting their neighbourhoods' quality and extents of crime and disorder (Leonard and Murdoch 2009; Lerman and Zhang 2012). Additionally, buildings abandoned through foreclosures accumulate insects and other carriers of disease (Burgard and Kalousova 2015). Even when any individual person faces a relatively low absolute risk of home foreclosure, a higher risk of foreclosure within his or her neighbourhood can cause stress (Cagney et al. 2014).

These downstream processes can all be precipitated by weakened city-level economic conditions. For numerous reasons, I focus on city-level (specifically, metropolitan statistical areas (MSAs)) declines. The recession affected urban and rural areas differently (Thiede and Monnat 2016), complicating any study addressing both. Because MSAs approximate housing markets (Houle and Light 2017; Iceland, Weinberg, and Steinmetz 2002), they are effective for studying this recession (Houle and Light 2017). Their economic and social integration (United States Census Bureau 2016) also makes them accurate approximations of labour markets.

Research Questions and Hypotheses

My central research questions are whether city-level economic declines through the Great Recession affected older residents' depressive symptoms, and to what extent these effects were mediated by their own asset losses. The ecological stress process model suggests that city-level economic shocks might affect depressive symptoms through personal financial losses as well as other pathways (which I will not directly test). Accordingly, I hypothesize that while significant proportions of the effects of changes in city-level foreclosure rates and median home prices through the recession upon depressive symptoms are mediated by changes in total household assets, these effects will remain significant after accounting for possible mediation.

Data and Methods

Dataset and Sample

I use individual-level variables from the first two waves of the National Social Life, Health, and Aging Project (NSHAP), which is a longitudinal study of a representative sample of older Americans focused on health, well-being, and social relationships. The NSHAP is based on a complex multi-stage area probability sample that includes 58 MSAs that varied substantially in their fortunes through the Great Recession. I linked respondents with their MSAs using protected geodata obtained from the National Opinion Research Center through special contractual arrangements. I study the subsample of respondents who resided within the same MSA at both waves (explained in more detail below). More information concerning the NSHAP's sampling design is provided in Suzman (2009) and O'Muircheartaigh, Eckman, and Smith (2009). 3,005 respondents from 57 to 85 years of age were interviewed at wave 1 (2005-2006). The response rate at wave 1 was 75.5%, and 75.2% of wave 1 respondents took part in wave 2 (2010-2011). Respondent retention between the first and second waves was similar for those initially residing within MSAs (76.0%), reducing concerns that my focus on MSA-dwellers introduces any biases based on differential likelihoods of retention. This dataset is especially effective since the first two waves bracket the peak of the Great Recession.

Because I am interested in how older residents are affected by changes within their cities over time, I study only respondents who did not change MSAs between the two waves. Of the 3,005 wave 1 NSHAP respondents, 2,073 resided within MSAs. A total of 731 (of the 2,073 MSA-dwellers) either did not take part in wave 2 (n = 397) or relocated to a new MSA (n = 334). The range of number of respondents per MSA is 1 to 61, with an average of 23.14. My analytical sample is 1,342 respondents.

Respondents initially living within MSAs (n = 2,073) did not differ statistically from the rest of the wave 1 sample (n = 932) according to gender, depression, smoking behaviour, and social support from family and friends. However, at baseline, they were generally younger, more racially/ethnically diverse, wealthier, healthier, more educated, more likely to be partnered or married, and more likely to be working for pay.

MSA-dwelling wave 1 respondents who were included within the present study's analytical sample (n = 1,342) did not differ statistically from those not included (n = 731) according to gender, race/ethnicity, total household assets, smoking behaviour, and social support from family and friends. On the other hand, they were overall younger, more educated, healthier, less depressed, more likely to be married/partnered, and more likely to be employed for pay. Retained respondents (n = 1,342) tended to live in MSAs with lower initial median household incomes, median home prices, and rates of home foreclosures.

Central Dependent Variable

My central outcome is depressive symptoms, studied through an index of eleven symptoms of depression and a rating of general happiness. The former were an eleven-item short form version of the twenty-item Center for Epidemiologic Studies Depression Scale (CES-D). Items include the extent to which respondents did not feel like eating, felt everything was an effort, felt happy, felt sad, etc., over the previous week. Answers were on an ordinal scale from (1) rarely or none of the time to (4) most of the time. Two of these measures were reverse coded to be in the direction of more depression. Respondents stated their general happiness on an ordinal scale from (1) unhappy usually to (5) extremely happy (reverse coded).

According to an exploratory factor analysis, these twelve measures were best combined into one factor at both waves (based on the Kaiser criterion). This corresponds with Payne et al. (2014), who found using the NSHAP that among older adults, these twelve measures form a single cluster of mental health and might be part of the same aspect of mental health. I created this factor by averaging standardized scores on these twelve measures, separately for each wave. At both waves, this index's Cronbach alpha is greater than 0.70. Results were substantively identical when using an index based only on the eleven CES-D symptoms of depression.

Independent Variables

I obtained foreclosure information pertaining to 57 of the 58 MSAs from ATTOM Data Solutions; I was unable to obtain foreclosure information for the remaining MSA. Therefore, all models employing foreclosure rates have 19 fewer respondents. To obtain percentage of homes

foreclosed, I divided the number of housing units in any stages of the foreclosure process (pre-foreclosure, auction, and bank owned (REO)) by the total number of housing units, and then I multiplied this quotient by 100.

I obtained MSA-level median home prices from the U.S. Census Bureau – American FactFinder (2017). Wave 1 amounts (based on 2005) were adjusted for inflation between waves 1 and 2 (based on 2010); following the U.S. Bureau of Labor Statistics – CPI Inflation Calculator (Consumer Price Index Inflation Calculator) (2017), they were multiplied by 1.11652. Because this variable is right skewed, I computed its natural logarithm at both waves. While normalizing the distribution, this transformation also allows the study of non-linear relationships between median home prices and other variables; the natural logarithm of a continuous variable allows it to be studied as ratios rather than absolute differences.

Mediating Variable

I test change in total household assets as a potential mediator. Assets are a more effective measure of NSHAP respondents' economic circumstances than income since a substantial proportion are retired. Prior research indicates that assets eclipse yearly income in importance for well-being in later life (Willson, Shuey, and Elder 2007; Robert and House 1996). Moreover, because house prices form large components of Americans' total wealth (De Nardi, French, and Benson 2012), total household assets are more responsive to housing market conditions.

Respondents stated in dollars the total assets of their households, including all sources of wealth subtracted by all forms of debt. Those who were uncertain or who declined to answer were provided a series of categories (e.g. between $10,000 and $50,000) from which to select. I assigned to these respondents the mid-point value of the selected range. Wave 1 amounts were multiplied by 1.11652 to adjust for inflation (U.S. Bureau of Labor Statistics – CPI Inflation Calculator 2017). I computed this variable's natural logarithm to correct the right skew. Since total household assets are assessed as a single measure, they include potential measurement error, which might inflate standard errors when assessing how they affect depressive symptoms.

Control Variables

Because I employ fixed-effects regression models, all time-invariant features of MSAs and respondents are controlled. I further include several time-varying individual-level control variables that are possible confounders of the relationship between total household assets and depressive symptoms. This helps rule out spuriousness and supports causal interpretations of my results by specifically targeting potential mediator-outcome confounding.

A set of control variables address respondents' life circumstances. I control whether a respondent was married/cohabiting (reference: not married/cohabiting) and whether a respondent was working for pay (reference: not working for pay). I also control for residential relocation within one's wave 1 MSA between the two waves (reference: did not relocate).

Four control variables pertain to respondents' physical health. I include self-rated physical health, ranging from (1) poor to (5) excellent (reference: poor health). I developed an index of functional difficulty based on mean scores pertaining to daily living activities (walking across a room, walking one block, bathing, dressing, getting in or out of bed, eating, and using toilet). Answers ranged from (0) no difficulty to (3) unable to do. At both waves, this index's Cronbach alpha is over 0.80. I employ a count of six possible chronic illnesses: stroke, cancer (excluding skin cancer), diabetes, heart disease, dementia, and arthritis. Respondents also reported whether they had ever been smokers (reference: was never a smoker).

Two control variables are based on social support. Support from family is assessed with two questions: "How often can you open up to members of your family if you need to talk about your worries?" and "How often can you rely on family for help if you have a problem?". Possible responses were (1) hardly ever, rarely, or never, (2) some of the time, and (3) often. Answers to these two questions were averaged. At both waves, this index's Cronbach alpha is over 0.62. A measure of support from friends was developed through answers to these two questions based instead on friends. At both waves, this index's Cronbach alpha is over 0.64.

Analysis

The purpose of my analysis is to estimate how changes in MSA-level foreclosure rates and median home prices through the Great Recession affected changes in depressive symptoms, as well as the possible mediating role of changes in total household assets. To accomplish this, I employ fixed-effects linear regression models, which control for all time-invariant characteristics, as well as characteristics from wave 1. Because my analytical sample did not change MSAs, the individual-level fixed effects include the time-invariant and wave 1 characteristics of MSAs (including climatic characteristics, healthcare and educational infrastructure, general culture, and population composition). This is required since cities' differing population compositions could influence their susceptibility to the Great Recession (Arias et al. 2016; Florida 2016; Gray and Scardamalia 2014).

The first four models show how changes in MSA-level foreclosure rates and median home prices affect changes in total household assets, which are necessary preliminary steps for my

mediation analyses. Only if changes in MSA-level foreclosure rates and median home prices cause changes in total household assets can the latter be a mediator of the central relationships I study. These models also test the proliferation of economic stressors from the MSA to the individual level. The first two models assess how changes in MSA-level total foreclosure rates (%) were associated with changes in logged total household assets. While the first model assesses this bivariate relationship, the second model adds the complete set of control variables. The third and fourth models repeat these analyses with logged MSA-level median home prices as the central independent variable.

The fifth through twelfth models study how MSA-level foreclosure rates and median home prices affect depressive symptoms; these are the central mediation analyses. Models 5 through 8 assess how changes in MSA-level total foreclosure rates (%) are associated with changes in depressive symptoms. Model 5 assesses this bivariate relationship. Model 6 adds logged total household assets. While model 7 includes the complete set of control variables, model 8 further includes logged total household assets. Models 9 through 12 repeat these analyses with logged MSA-level median home prices as the central independent variable. In assessing the possible mediating role of total household assets, I focused on changes in the coefficients for the MSA-level measures when total household assets were added into the models.

In addition to foreclosure rates and home prices, prior scholars investigating the effects of the Great Recession have focused on unemployment rates and household incomes (e.g., Chatterjee and Eyigungor 2015; Katz, Wallace, and Hedberg 2013; Zivin, Paczkowski, and Galea 2011). Because these are two additional central dimensions of economic decline through this recession, I include them within supplementary analyses. MSA-level unemployment rates (%) were obtained from the U.S. Bureau of Labor Statistics – Local Area Unemployment Statistics (2017), while MSA-level median household incomes were obtained from the U.S. Census Bureau – American Factfinder (2017). MSA-level median household incomes at wave 1 were multiplied by 1.11652 to adjust for inflation. Just as with median home prices and total household assets, I computed the natural logarithm of median household incomes. The results of these additional analyses can be viewed within the supplementary appendix.

This appendix further includes models in which all four MSA-level variables simultaneously predict changes in total household assets and in depressive symptoms. These analyses address whether any of the four MSA-level variables have unique effects upon assets and depressive symptoms that exist net of the effects of the other variables.

Supporting causal interpretations of my mediation analyses requires that some assumptions concerning possible confounding are met. Accordingly, my fixed-effects modelling strategy and control variables adjust for confounders between changes in MSA-level foreclosure rates/median home prices and changes in depressive symptoms, changes in MSA-level foreclosure rates/median home prices and changes in total household assets, and changes in total household assets and changes in depressive symptoms (see VanderWeele 2015). For example, controlling for all stable individual-level traits nets out features of respondents, such as levels of education and race/ethnicity, that might affect placement into declining cities and susceptibility to asset losses and depressive symptoms. My control variables further net out individual-level changes that might affect both asset losses and increases in depressive symptoms.

To prevent bias based on which types of respondents were more likely to have remained within the sample, I adopted the inverse probability weighting technique recommended by Hawkley et al. (2014). Causes for attrition include death, institutionalization, inability to locate a respondent, as well as relocation to a new MSA. An array of health and demographic variables from wave 1 were used to predict inclusion in wave 2. Inverse predicted probability scores from this logistic regression model were multiplied by the NSHAP's standard weights before being applied within the regression models. Those least likely to have been included in the analytical sample were thereby weighted more heavily. Still, sample attrition could result in underestimation of how city-level economic declines impact depressive symptoms, especially if those most susceptible to depressive symptoms were the least likely to remain within the sample.

Missing data were dealt with through multiple imputation using chained equations. Only total household assets had ten percent or more of the sample missing.[1] Ten imputed data sets were created. My central dependent variable, depressive symptoms, was used in the imputation process. However, cases originally missing on depressive symptoms were not included in the final analyses (von Hippel 2007), removing one respondent from the final sample. Standard errors were adjusted for MSA-level clustering with the Stata 15 statistical software package.

Results

Table 2.1 presents the descriptive statistics for the present study's variables at both waves. The levels of significance of differences between the two waves are presented within the 'Mean/Proportion (%)' column of wave 2. For continuous variables, these levels of significance are determined through two-tailed mean-comparison t tests. Significant differences for categorical variables are determined through chi-square tests of independence. As my index of

depressive symptoms is based on items standardized within each wave, it holds a mean of zero at both waves 1 and 2. While MSA-level foreclosure and unemployment rates undergo significant increases over time, MSA-level median home prices and household incomes undergo significant decreases through time. Individual-level total household assets show significant declines between the two waves. At wave 2, significantly fewer respondents are married/cohabiting and working for pay. There are significant overall declines in physical health and increases in functional difficulties through time. Significantly more respondents had ever been smokers by wave 2. Extent of social support from friends is significantly lower at wave 2. Just under one fifth of respondents changed residences within their initial MSA between the two waves.

I studied three correlations between total household assets and depressive symptoms, one at each wave, and one based on changes over time. At both waves, logged total household assets are significantly negatively correlated with depressive symptoms (wave 1: corr.: -0.205, $p<0.001$; wave 2: corr.: -0.173, $p<0.001$). The correlation between changes in logged total household assets and changes in depressive symptoms is not significant (corr.: -0.027, $p=0.382$).

Table 2.2 shows that with and without the inclusion of control variables, both changes in MSA-level total foreclosure rates (%) (model 1, without control variables: coeff.: -2.195, $p<0.001$; model 2, with control variables: coeff.: -1.214, $p<0.05$) and changes in logged MSA-level median home prices (model 3, without control variables: coeff.: 2.332, $p<0.001$; model 4, with control variables: coeff.: 1.400, $p<0.05$) are significantly associated with changes in logged total household assets, in the expected directions. The MSA-level coefficient from model 2 implies that a linear 0.53% increase in MSA-level foreclosure rate (90th percentile of increase) is associated with a proportional drop of 47.45% in total household assets. The MSA-level coefficient from model 4 suggests that a 24.17% proportional reduction in MSA-level median home price (90th percentile of decrease) is associated with a 32.12% proportional decrease in total household assets.[2] Both are sizeable effects that show economic stressors proliferating from cities to people. Table 2.2 also shows that household assets rise among those transitioning into paid work, while declining among those changing residences within the same city.

Table 2.3 presents the mediation analysis pertaining to MSA-level total foreclosure rates (%). All models show that MSA-level foreclosure rates are significantly associated with depressive symptoms. The coefficients substantially drop between the first two (model 5: coeff.: 0.366, $p<0.001$; model 6: coeff.: 0.359, $p<0.001$) and latter two (model 7: coeff.: 0.272, $p<0.01$; model 8: coeff.: 0.271, $p<0.01$) models. However, in neither model 6 nor 8 does the inclusion of

total household assets substantially change the coefficients for MSA-level total foreclosure rates from models 5 and 7, respectively. Table 2.4, which presents the mediation analysis pertaining to logged MSA-level median home prices, reveals similar patterns. Coefficients for MSA-level median home prices substantially differ only between the former two (model 9: coeff.: -0.405, $p<0.01$; model 10: coeff.: -0.392, $p<0.01$) and latter two (model 11: coeff.: -0.278, $p<0.05$; model 12: coeff.: -0.276, $p<0.05$) models. Tables 2.3 and 2.4 also show that logged total household assets are not significantly associated with depressive symptoms, while higher physical and functional health are associated with fewer depressive symptoms.

Since the standard deviation for depressive symptoms is 0.56 at wave 1 and 0.57 at wave 2, the MSA-level coefficient from model 8 implies that a linear 0.53% increase in foreclosure rate is associated with just over a quarter of a standard deviation linear rise in depressive symptoms. The MSA-level coefficient from model 12 suggests that a proportional drop of 24.17% in MSA-level median home price is associated with approximately 13.52% of a standard deviation linear rise in depressive symptoms.

Supplementary Results

To achieve a more complete analysis of how economic declines through the recession affected depressive symptoms, I also studied changes in MSA-level median household incomes and unemployment rates. With and without the control variables included in the models, logged MSA-level median household incomes were not significantly associated with logged total household assets. Both with and without the control variables included, higher MSA-level unemployment rates (%) were significantly associated with lower logged total household assets. These results are presented in Table 2.A-1 of the appendix.

Both supplementary MSA-level variables were significantly associated with depressive symptoms only without the inclusion of control variables. In no case did the addition of logged total household assets substantially change the coefficients for the supplementary MSA-level economic measures. These results are presented in Tables 2.A-2 and 2.A-3 of the appendix.

I also studied models predicting total household assets and depressive symptoms that included all four MSA-level variables (foreclosure rates, logged median home prices, logged median household incomes, and unemployment rates). While only MSA-level unemployment rates (%) remained significantly associated with logged total household assets (see Table 2.A-1 of the appendix), only MSA-level foreclosure rates (%) were still significantly associated with depressive symptoms (see Table 2.A-4 of the appendix). This suggests uniqueness in how

unemployment rates impact total household assets and foreclosure rates affect depressive symptoms. These impacts exist net of the effects of the other dimensions of economic decline.

As a robustness check, I also investigated MSA-level families below the poverty threshold in the previous 12 months (%), obtained from the U.S. Census Bureau – American Factfinder (2017). This variable is studied only as a robustness check because changes in this measure are substantially correlated in the expected directions with changes in the other four city-level measures (see Table 2.A-5 of the appendix). The redundancy with logged MSA-level median household incomes is especially strong (Pearson correlation coefficients: wave 1 = -0.728 ($p<0.001$); wave 2 = -0.698 ($p<0.001$); change over the two waves = -0.713 ($p<0.001$)).[3] As expected, the results pertaining to MSA-level family poverty rates (%) are similar to those pertaining to the other four city-level variables. While increased rates of family poverty are not significantly associated with decreases in total household assets (with and without control variables included), they are significantly associated with worsened depressive symptoms, even after adjustment for the control variables. The latter findings do not appreciably change when further adjustments are made for total household assets.

Discussion

Most studies of how economic shocks impact quality of life emphasize personal financial losses (e.g., Boen and Yang 2016; McInerney, Mellor, and Nicholas 2013; Wilkinson 2016; Yilmazer et al. 2015). The present study extends this research by showing that changes in MSA-level foreclosure rates and home prices through the Great Recession significantly affect older residents' depressive symptoms above and beyond the effects of their own asset losses. While my hypothesis concerning mediated effects of MSA-level economic declines is not supported, my expectation that these effects significantly occur through other pathways is supported.

This study thus contributes to scholarship on how cities impact residents. It concurs with scholars emphasizing how the physical, demographic, housing, social, economic, and political features of cities are consequential for residents' quality of life (Chernick et al. 2011; Galea et al. 2005; Hollander 2011; Peck 2012). This study also supports the ecological stress process model's claim that contextual stressors significantly impact mental health (Aneshensel 2010; Gilster 2014, 2016; Mohammad et al. 2015; Parker et al. 2004), as well as its tenet that stressors can proliferate from more macro to more micro levels.

My analyses reveal that the two measures of MSA-level economic decline most closely associated with the housing market (home foreclosure rates and median home prices) were the

two most directly associated with personal financial losses and depressive symptoms. This is not surprising, given the centrality of the housing market to the Great Recession. The other two MSA-level economic measures (considered in supplementary analyses), unemployment rates and median household incomes, were only significantly associated with depressive symptoms without the inclusion of control variables. This suggests that these latter two MSA-level economic measures impact older residents' depressive symptoms mainly through the types of individual-level changes that are operationalized by this study's control variables. MSA-level foreclosure rates and home prices, on the other hand, might significantly impact older residents' depressive symptoms through changes to features of contexts that are not captured by the control variables. This corresponds with studies that link rising foreclosure rates and decreasing home prices with negative externalities at the level of the urban neighbourhood that can be damaging to physical and mental health (Leonard and Murdoch 2009; Lerman and Zhang 2012).

The impacts of changes in MSA-level foreclosure rates and median home prices upon depressive symptoms are modest in magnitude. This is not unexpected, given that I am assessing the effects of macro-contextual economic changes over a relatively small interval of time while keeping constant all time-invariant city- and individual-level characteristics.

The comparable results found for the five MSA-level economic measures considered in this study (including family poverty rates (%)), as well as the high intercorrelations found between them, suggest that diverse dimensions of city-level decline through economic shocks tend to operate in tandem. Furthermore, when I placed multiple measures of MSA-level economic decline (foreclosure rates, median home prices, unemployment rates, and median household incomes) in the same models, predicting either logged total household assets or depressive symptoms, multicollinearity prevented these measures from reaching statistical significance (with the exceptions of unemployment rates as predictors of logged total household assets and foreclosure rates as predictors of depressive symptoms). This suggests that these various city-level measures are capturing different dimensions of the same overall phenomenon of worsening city-level circumstances. The total of five MSA-level economic measures here considered provide an exhaustive account of city-level economic declines.

In contrast to these city-level measures, my results do not reveal significant effects of assets declines upon depressive symptoms. The timing of wave 2 of the NSHAP (2010-2011) might help explain these null findings. As the spike of the Great Recession was in 2008, many people's financial circumstances improved to some extent by 2010-2011, leading to rising optimism and

fewer depressive symptoms. While personal finances might change and adjust more quickly through time, changes within cities occur more gradually, such that worsened city conditions might have persisted by 2010-2011, and thus continued to affect depressive symptoms.

This explanation for the null findings pertaining to total household assets as predictors of depressive symptoms are concordant with the present study's central claim that features of contexts undergoing economic declines affect residents' depressive symptoms above and beyond the effects of their own personal financial losses. My results thus suggest that to help older persons cultivate the resources and protections that make them resilient through economic declines, focus should be placed on maintaining cities' and city neighbourhoods' quality, in addition to helping older persons safeguard their personal wealth.

Limitations and Paths for Future Research

Most studies of how economic shocks affect well-being focus on personal financial losses. Within the context of the Great Recession, my results suggest that this focus is limited. Features of declining cities, including compromised infrastructure, institutions (Kazembe and Nickanor 2017; Leventhal and Brooks-Gunn 2003; Tendler 1982), and societal cohesion and collective efficacy (McDaniel, Gazso, and Um 2013; Weffer et al. 2014), might also potently affect older adults. As such, future research on the effects of economic shocks should focus more on contextual changes such as these.

The present study is focused on depressive symptoms which can change in the short term in response to changed life circumstances (Burgard and Kalousova 2015). The appropriate span of time for studying the health impacts of economic shocks varies according to the measure of health chosen (Burgard and Kalousova 2015). Burgard and Kalousova (2015) explain that increased incidence of suicide and of acute distress were evident in many affluent countries immediately following the occurrence of the Great Recession. They thus suggest that short spans of time are adequate for assessing how economic shocks affect mental health. As such, the approximately five-year span of time employed in the present study is sufficient and effective for assessing how city-level economic declines through the recession affected depressive symptoms. However, for contextual economic declines to 'get under the skin' and impact physical health might require a longer time span (Burgard and Kalousova 2015). Accordingly, the present study should be replicated using a longer span of time to assess impacts on physical health.

This study should also be repeated with younger adults. Younger adults experiencing the Great Recession might have been more concerned with difficulties buying a home, detriments to

their paid work trajectories, as well as their families' economic futures. The relevant topics of study might differ when analyzing a younger sample.

While effective as units of analysis for the present study, MSAs can encompass both urban and suburban areas that are likely to substantially differ socially and economically. Future research might study counties or census tracts as more fine-grained levels of analysis. In fact, numerous theories of contextual effects, including social capital (e.g., Putnam 2001) and social disorganization perspectives (e.g., Bursik 1988; Sampson and Groves 1989), suggest that neighbourhood economic and social changes potently affect well-being. Future research might also study how features of neighbourhoods mediate and/or moderate the effects of city declines.

Notes

1. Results in models 1 through 4 (in which total household assets were the dependent variable) were substantively the same when I excluded any respondents missing data in total household assets before the multiple imputation process, as well as when I employed listwise deletion.
2. Linear changes in MSA-level foreclosure rates range from -0.065% to +0.665%. While the strongest drop in MSA-level median home prices is a proportional decrease of 42%, the strongest rise is a proportional gain of 45.5%.
3. It is notable that changes in all five measures of MSA-level economic circumstances here discussed (foreclosure rates, logged median home prices, logged median household incomes, unemployment rates, and family poverty rates) are considerably intercorrelated (according to Pearson correlations coefficients) in the expected directions (see the full correlation matrices within Table 2.A-5 of the appendix).

References

Allen, Ryan. 2013. "The Distribution and Evolution of Physical Neighborhood Problems during the Great Recession." *City and Community* 12(3):260–79.

Aneshensel, Carol S. 2010. "Neighborhood as a Social Context of the Stress Process." Pp. 35-52 in *Advances in the Conceptualization of the Stress Process: Essays in Honor of Leonard I. Pearlin*, edited by Avison, W. R., Aneshensel, C. S., Schieman, S., Wheaton, B. New York: Springer.

Aneshensel, Carol S., Michelle J. Ko, Joshua Chodosh, and Richard G. Wight. 2011. "The Urban Neighborhood and Cognitive Functioning in Late Middle Age." *Journal of health and social behavior* 52(2):163–79.

Arias, Maria A., Charles S. Gascon, and David E. Rapach. 2016. "Metro Business Cycles." *Research Division, Federal Reserve Bank of St. Louis, Working Paper Series*:1-35.

Bastiampillai, Tarun, Stephen Allison, and Sherry Chan. 2013. "Is Depression Contagious? The Importance of Social Networks and the Implications of Contagion Theory." *Australian and New Zealand Journal of Psychiatry* 47(4):299–303.

Baumer, Eric P., Kevin T. Wolff, and Ashley N. Arnio. 2012. "A Multicity Neighborhood Analysis of Foreclosure and Crime." *Social Science Quarterly* 93(3):577–601.

Blazer, D. G. 2003. "Depression in Late Life: Review and Commentary." *The Journals of Gerontology Series: Biological Sciences and Medical Sciences* 58(3):M249–65.

Boen, Courtney and Y. Claire Yang. 2016. "The Physiological Impacts of Wealth Shocks in Late Life: Evidence from the Great Recession." *Social Science and Medicine* 150:221–30.

Bricker, Jesse, Arthur B. Kennickell, Kevin B. Moore, and John Sabelhaus. 2012. "Changes in U.S. Family Finances from 2007 to 2010: Evidence from the Survey of Consumer Finances." *Federal Reserve Bulletin* 98(2):1–80.

Bronfenbrenner, Urie. 1979. *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.

Brown, Robert L. 2011. "Economic Security in an Aging Canadian Population." *Canadian Journal on Aging* 30(3):391-399.

Bucks, Brian K., Arthur B. Kennickell, Traci L. Mach, and Kevin B. Moore. 2009. "Changes in U.S. Family Finances from 2004 to 2007: Evidence from the Survey of Consumer Finances." *Federal Reserve Bulletin* 95(February):1–56.

Burgard, Sarah A., Jennie E. Brand, and James S. House. 2007. "Toward a Better Estimation of the Effect of Job Loss on Health." *Journal of health and social behavior* 48(4):369–84.

Burgard, Sarah A. and Lucie Kalousova. 2015. "Effects of the Great Recession: Health and Well-Being." *Annual Review of Sociology* 41:181–201.

Burgard, Sarah A., Kristin S. Seefeldt, and Sarah W. Johnson. 2011. "Housing Instability and Health: Findings from the Michigan Recession and Recovery Study." *National Poverty Center Working Paper Series* #11-23:1-37.

Bursik, Robert J. 1988. "Social Disorganization and Theories of Crime and Delinquency: Problems and Prospects." *Criminology* 26(4):519-552.

Cagney, Kathleen A., Christopher R. Browning, James Iveniuk, and Ned English. 2014. "The Onset of Depression during the Great Recession: Foreclosure and Older Adult Mental Health." *American Journal of Public Health* 104(3):498–505.

Chatterjee, Satyajit and Burcu Eyigungor. 2015. "A Quantitative Analysis of the U.S. Housing and Mortgage Markets and the Foreclosure Crisis." *Review of Economic Dynamics* 18(2):165–84.

Chernick, Howard, Adam Langley, and Andrew Reschovsky. 2011. “The Impact of the Great Recession and the Housing Crisis on the Financing of America’s Largest Cities.” *Regional Science and Urban Economics* 41(4):372–81.

Christakis, Nicholas A. and James H. Fowler. 2013. “Social Contagion Theory: Examining Dynamic Social Networks and Human Behavior.” *Statistics in Medicine* 32(4):556–77.

Cooke, Martin. 2006. “Policy Changes and the Labour Force Participation of Older Workers: Evidence from Six Countries.” *Canadian Journal on Aging* 25(4):387-400.

Davidson, Jacob. “The Most and Least Recession-Recovered Cities.” *Time,* July 30, 2014. Available at http://time.com/money/3048731/5-cities-recession-recovery-most-least/.

De Nardi, Mariacristina, Eric French, and David Benson. 2012. “Consumption and the Great Recession” Economic Perspectives. *Federal Reserve Bank of Chicago,* issue Q I, pages 1-16.

Dill, Kathryn. “Study Reveals U.S. Cities Most And Least Recovered Since The Recession.” *Forbes,* June 23, 2014. Available at https://www.forbes.com/sites/kathryndill/2014/06/23/study-reveals-u-s-cities-most-and-least-recovered-since-the-recession/#11fb9cfc1422.

Dooley, David, Jonathan Fielding, and Lennart Levi. 1996. "Health and Unemployment." *Annual Review of Public Health* 17(1):449-465.

Drentea, Patricia and John R. Reynolds. 2015. “Where Does Debt Fit in the Stress Process Model?” *Society and Mental Health* 5(1):16–32.

Fiske, Amy, Jl Wetherell, and Margaret Gatz. 2009. “Depression in Older Adults.” *Annual Review of Clinical Psychology* 5:363–89.

Florida, Richard. “Which U.S. Cities Suffer the Most During a Recession?” *The Atlantic*: *Citylab*, June 9, 2016. Available at https://www.citylab.com/equity/2016/06/which-us-metros-suffer-the-most-during-a-recession/486263/

Galea, Sandro, Nicholas Freudenberg, and David Vlahov. 2005. “Cities and Population Health.” *Social Science and Medicine* 60(5):1017–33.

Gilster, Megan E. 2014. “Neighborhood Stressors, Mastery, and Depressive Symptoms: Racial and Ethnic Differences in an Ecological Model of the Stress Process in Chicago.” *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91(4):690-706.

Gilster, Megan E. 2016. “Racial and Ethnic Differences in the Neighborhood Context of Mastery.” *Journal of community psychology* 91(1):38-50.

Gray, Tom and Robert Scardamalia. 2014. “America’s Top Metros: Who’s Leading the Recovery, and Why.” *Civic Report* 89:1-41.

Hajat, Anjum, Jay S. Kaufman, Kathryn M. Rose, Arjumand Siddiqi, and James C. Thomas. 2010. “Do the Wealthy Have a Health Advantage? Cardiovascular Disease Risk Factors and Wealth.” *Social Science & Medicine* 71:1935–42.

Hajat, Anjum, Jay S. Kaufman, Kathryn M. Rose, Arjumand Siddiqi, and James C. Thomas. 2011. “Long-Term Effects of Wealth on Mortality and Self-Rated Health Status.” *American Journal of Epidemiology* 173(2):192-200.

Hawkley, Louise C., Masha Kocherginsky, Jaclyn Wong, Juyeon Kim, and Kathleen A. Cagney. 2014. “Missing Data in Wave 2 of NSHAP: Prevalence, Predictors, and Recommended Treatment.” *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 69:S38–50.

Hollander, Justin B. 2011. *Sunburnt Cities: The Great Recession, Depopulation and Urban Planning in the American Sunbelt*. Oxford, UK: Routledge.

Houle, Jason N. 2014. “Mental Health in the Foreclosure Crisis.” *Social Science and Medicine* 118(C):1–8.

Houle, Jason N. and Michael T. Light. 2014. “The Home Foreclosure Crisis and Rising Suicide Rates, 2005 to 2010.” *American Journal of Public Health* 104(6):1073–79.

Houle, Jason N. and Michael T. Light. 2017. “The Harder They Fall? Sex and Race/ethnic Specific Suicide Rates in the U.S. Foreclosure Crisis.” *Social Science and Medicine* 180:114 24.

Huo, Zhen, and José-Víctor Ríos-Rull. 2015. "The Great Recession and financial shocks." University of Pennsylvania, mimeo (http://www.sas.upenn.edu/ßvr0j/papers/epppf.pdf).

Iceland, John, Daniel H. Weinberg, and Erika Steinmetz. 2002. *Racial and Ethnic Residential Segregation in the United States: 1980-2000 US Census Bureau, Series CENSR-3*. Washington, DC: US Government Printing Office.

Katz, Charles M., Danielle Wallace, and E. C. Hedberg. 2013. “A Longitudinal Assessment of the Impact of Foreclosure on Neighborhood Crime.” *Journal of Research in Crime and Delinquency* 50(3):359–89.

Kazembe, Lawrence N. and Ndeyapo M. Nickanor. 2017. “Spatial Modelling of the Relationship Between Socio- Economic Disadvantage and Child Health in Namibia.” *Spatial Demography* 5(1):1-24.

Kim, Joongbaeck. 2010. “Neighborhood Disadvantage and Mental Health: The Role of Neighborhood Disorder and Social Relationships.” *Social Science Research* 39(2):260–71.

Lawton, M.P. and Lucille Nahemow. 1973. *Ecology and the aging process*. Washington, DC, US: American Psychological Association.

Leonard, Tammy and James C. Murdoch. 2009. “The Neighborhood Effects of Foreclosure.”

Journal of Geographical Systems 11(4):317–32.

Lerman, Robert I. and Sisi Zhang. 2012 "Coping with the Great Recession: Disparate Impacts on Economic Well-Being in Poor Neighborhoods." *The Urban Institute*:1-20.

Leventhal, Tama and Jeanne Brooks-Gunn. 2003. "Moving to Opportunity: An Experimental Study of Neighborhood Effects on Mental Health." *American Journal of Public Health* 9393(9):1576–82.

Marans, Robert W. and Robert Stimson. 2011. "An Overview of Quality of Urban Life." In *Investigating Quality of Urban Life,* edited by Robert W. Marans and Robert J. Stimson, pg.1-29. New York: Springer.

McDaniel, Susan A., Amber Gazso, and Seonggee Um. 2013. "Generationing relations in challenging times: Americans and Canadians in mid-life in the Great Recession." *Current Sociology* 61(3):301-321.

McDaniel, Susan A. and Julie Rozanova. 2011. "*Canada's Aging Population* (1986) Redux." *Canadian Journal on Aging* 30(3):511-521.

McDonald, Lynn and Peter Donahue. 2011. "Retirement Lost?" *Canadian Journal on Aging* 30(3):401-422.

McInerney, Melissa, Jennifer M. Mellor, and Lauren Hersch Nicholas. 2013. "Recession Depression: Mental Health Effects of the 2008 Stock Market Crash." *Journal of Health Economics* 32(6):1090–1104.

Meltzer, Joshua, David Steven, and Claire Langley. 2013. "The United States after the Great Recession: The Challenge of Sustainable Growth." *Global Economy and Development at Brookings*:1-58.

Modrek, Sepideh, David Stuckler, Martin Mckee, and Mark R. Cullen. 2013. "A Review of Health Consequences of Recessions Internationally and a Synthesis of the US Response during the Great Recession." *Public Health Reviews* 35(1):1–33.

Mohammad, Esror T., Ester R. Shapiro, Laurel D. Wainwright, and Alice S. Carter. 2015. "Impacts of Family and Community Violence Exposure on Child Coping and Mental Health." *Journal of Abnormal Child Psychology* 43(2):203-215.

Munnell, Alicia H., and Matthew S. Rutledge. 2013. "The effects of the Great Recession on the retirement security of older workers." *The Annals of the American Academy of Political and Social Science* 650(1):124-142.

National Social Life, Health and Aging Project (NSHAP) Release 2.2 (2013). Chicago, IL: NORC, University of Chicago.

NBC News. 2012. "Cities with the most homes in foreclosure." Retrieved Oct. 16th, 2018 (https://www.nbcnews.com/businessmain/cities-most-homes-foreclosure-794509).

O'Muircheartaigh, Colm, Stephanie Eckman, and Stephen Smith. 2009. "Statistical Design and Estimation for the National Social Life, Health, and Aging Project." *Journal of Gerontology: Social Sciences* 64B(S1):i12–19.

Parker, Edith A., Grant T. Baldwin, Barbara Israel, and Maria A. Salinas. 2004. "Application of Health Promotion Theories and Models for Environmental Health." *Health Education & Behavior* 31(4):491-509.

Payne, Carolyn, E. C. Hedberg, Michael Kozloski, William Dale, and Martha K. McClintock. 2014. "Using and Interpreting Mental Health Measures in the National Social Life, Health, and Aging Project." *The journals of gerontology. Series B, Psychological sciences and social sciences* 69 Suppl 2:S99–116.

Pearlin, Leonard I. 1989. "The Sociological Study of Stress." *Journal of Health and Social Behavior* 30(3):241-256.

Pearlin, Leonard I., Carol S. Aneshensel, and Allen J. LeBlanc. 1997. "The Forms and Mechanisms of Stress Proliferation: The Case of AIDS Caregivers." *Journal of Health and Social Behavior* 38(3):223–36.

Pearlin, Leonard I., Elizabeth G. Menaghan, Morton A. Lieberman, and Joseph T Mullan. 1981. "The Stress Process." *Journal of Health and Social Behavior* 22(4):337-356.

Peck, Jamie. 2012. "Austerity Urbanism: American Cities under Extreme Economy." *City* 16(6):626–55.

Petev, Ivaylo, Luigi Pistaferri, and I. Saporta. 2012. "Consumption in the great recession." *The Russell Sage Foundation and the Stanford Center on Poverty and Inequality*:2-3.

Phillips, Julie A., and Colleen N. Nugent. 2014. "Suicide and the Great Recession of 2007–2009: the role of economic factors in the 50 US states." *Social Science & Medicine* 116:22-31.

Pool, Lindsay R., Belinda L. Needham, Sarah A. Burgard, Michael R. Elliott, and Carlos F. Mende de Leon. 2017. "Negative Wealth Shock and Short-Term Changes in Depressive Symptoms and Medication Adherence among Late Middle-Aged Adults." *Journal of Epidemiology and Community Health* 71(8):758–63.

Putnam, Robert D. 2001. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Ríos-Rull, José-Víctor, and Zhen Huo. 2016. *Financial Frictions, Asset Prices, and the Great Recession* No. 526. Federal Reserve Bank of Minneapolis.

Robert, Stephanie and James S. House. 1996. "SES Differentials in Health by Age and Alternative Indicators of SES." *Journal of Aging and Health* 8(3):359-388.

Ross, Catherine E., John Mirowsky, and Shana Pribesh. 2001. "Powerlessness and the

amplification of threat: Neighborhood disadvantage, disorder, and mistrust." *American sociological review* 66(4):568-591.

Sampson, Robert J. and W. Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94(4):774-802.

Simon, G. E., D. P. Goldberg, M. Von Korff, and T. B. Ustün. 2002. "Understanding Cross-National Differences in Depression Prevalence." *Psychological Medicine* 32(4):585–94.

Sperling, Bert and Peter Sander. 2007. *Cities Ranked & Rated*. 2nd ed. Hoboken, NJ: Wiley Publishing, Inc.

Suzman, Richard. 2009. "The National Social Life, Health, and Aging Project: An Introduction." *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 64(1):i5-11.

Tefft, Nathan. 2011. "Insights on Unemployment, Unemployment Insurance, and Mental Health." *Journal of Health Economics* 30(2):258-264.

Tendler, Judith. 1982. *Rural Projects through Urban Eyes: An Interpretation of the World Bank's New Style Development Projects*, Staff Working Paper 532 (Washington: World Bank).

Thiede, Brian C. and Shannon M. Monnat. 2016. "The Great Recession and America's Geography of Unemployment." *Demographic Research* 35:891-928.

Trawinski, Lori A. 2012. *Nightmare on main street: older Americans and the mortgage market crisis*. AARP Public Policy Institute.

Turcotte, Martin and Grant Schellenberg. 2007. *A portrait of seniors in Canada, 2006*. Statistics Canada, Social and Aboriginal Statistics Division.

United States Bureau of Labor Statistics. "CPI Inflation Calculator." Retrieved July 11th, 2017 (https://data.bls.gov/cgi-bin/cpicalc.pl).

United States Bureau of Labor Statistics. "Local Area Unemployment Statistics." Retrieved July 15th, 2017 (https://data.bls.gov/cgi-bin/dsrv?la).

United States Census Bureau. "American FactFinder." Retrieved July 9th, 2017 (https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml).

United States Census Bureau. 2016. "Metropolitan and Micropolitan." Retrieved Jan. 7th, 2018 (https://www.census.gov/programs-surveys/metro-micro/about/glossary.html).

Vanderhorst, R. K. and Suzanne McLaren. 2005. "Social Relationships as Predictors of Depression and Suicidal Ideation in Older Adults." *Aging and Mental Health* 9(6):517–25.

Vanderweele, Tyler J. 2015. *Explanation in Causal Inference: Methods for Mediation and Interaction*. New York: Oxford University Press.

Van de Velde, Sarah, Piet Bracke, and Katia Levecque. 2010. “Gender Differences in Depression in 23 European Countries. Cross-National Variation in the Gender Gap in Depression.” *Social Science and Medicine* 71(2):305–13.

Von Hippel, Paul T. 2007. “Regression with Missing Ys: An Improved Strategy for Analyzing Multiply Imputed Data.” *Sociological Methodology* 37(1):83-117.

Wang, Kyungsoon and Dan Immergluck. 2018. “The Geography of Vacant Housing and Neighborhood Health Disparities After the U.S. Foreclosure Crisis.” *Cityscape* 20(2):145–70.

Weffer, Simón E., Dari Sylvestor, James Mullooly, Marcia Hernandez, Alex L. Parnell, Rafael Maravilla, and Nicholas Lau. 2014. “The Impacts of Foreclosure on Collective Efficacy and Civic Engagement: Findings from Two Central California Communities.” *Social Justice* 40(3):48–64.

Wilkinson, Lindsay R. 2016. “Financial Strain and Mental Health Among Older Adults During The Great Recession.” *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 71(4):745–54.

Willson, Andrea E., Kim H. Shuey, and Glen H. Elder, Jr. 2007. “Cumulative Advantage Processes as Mechanisms of Inequality in Life Course Health.” *American Journal of Sociology* 112(6):1886-1924.

Yilmazer, Tansel, Patryk Babiarz, and Fen Liu. 2015. “The Impact of Diminished Housing Wealth on Health in the United States: Evidence from the Great Recession.” *Social Science and Medicine* 130:234–41.

Zivin, Kara, Madgalena Paczkowski, and Sandro Galea. 2011. “Economic Downturns and Population Mental Health: Research Findings, Gaps, Challenges and Priorities.” *Psychological Medicine* 41(7):1343–48.

Acknowledgements

I acknowledge support from the Canadian Social Sciences and Humanities Research Council (Insight Development Grant #231615) and from the Ontario Ministry of Research and Innovation Early Researcher Award. Data were made available by the Interuniversity Consortium for Political and Social Research, Ann Arbor, MI. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

This research was supported by the Social Sciences and Humanities Research Council of Canada. I also acknowledge support from the Ontario Student Assistance Program.

The National Social Life, Health and Aging Project is supported by the National Institute on Aging of the National Institutes of Health (R37AG030481; R01AG033903). Within the National Institutes of Health, the National Social Life, Health and Aging Project is also supported by the Office of Women's Health Research, the Office of AIDS Research, and the Office of Behavioral and Social Sciences Research (R01AG021487).

The author acknowledges the National Opinion Research Center Data Enclave for providing researcher support and access to the data used in this research.

The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health nor the National Opinion Research Center.

Foreclosure data were obtained from ATTOM Data Solutions.

I also acknowledge two anonymous reviewers for their very helpful feedback on earlier drafts of this study.

An earlier version of this paper was presented as a poster at the Population Association of America 2018 Annual Meeting in Denver, Colorado, United States.

Tables

Table 2.1. Descriptive Statistics (Number of Respondents = 1,342)

Variables	**Wave 1 (2005-2006)**		**Wave 2 (2010-2011)**	
Dependent Variable	**Mean/Proportion (%)**	**Standard Deviation**	**Mean/Proportion (%)**	**Standard Deviation**
Index of Depressive Mood	0.00	0.56	0.00	0.57
MSA-Level Independent Variables				
MSA-Level Total Foreclosure Rate (%)	0.07	0.05	0.24***	0.18
MSA-Level Logged Median Home Price[a]	12.24	0.52	12.18***	0.42
MSA -Level Median Home Price[a]	237,331.4	134,471.1	213,701.9***	100,278.7
MSA-Level Unemployment Rate (%)	5.28	1.30	9.77***	2.18
MSA-Level Logged Median Household Income[a]	10.86	0.20	10.83***	0.18
MSA-Level Median Household Income[a]	53122.01	9781.12	51288.38***	9242.58
Mediating Variable				
Logged Total Household Assets[a]	11.97	2.30	11.38***	3.63
Total Household Assets[a]	614,678	1,735,755	508,102.4†	1,231,377
Control Variables				
Is Married or Cohabiting	66.02%		60.51%***	
Is not Married or Cohabiting	33.98%		39.49%	
Is Working for Pay	38.23%		22.40%***	
Is not Working for Pay	61.77%		77.60%	
Poor Physical Health	4.40%		4.84%***	
Fair	18.88%		21.83%	
Good	30.45%		33.38%	
Very Good	33.28%		28.17%	
Excellent	12.99%		11.77%	
Functional Health Problems	0.13	0.29	0.18***	0.36
Chronic Diseases	1.03	0.96	1.09	1.02
Has Smoked	57.57%		59.69%***	
Has Never Smoked	42.43%		40.31%	
Support from Family	2.45	0.60	2.41	0.63
Support from Friends	2.16	0.62	2.04***	0.69
Did not Move between the Two Waves			80.69%	
Moved between the Two Waves			19.31%	

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[a] Note: Values at wave 1 were adjusted for inflation between waves 1 and 2 by multiplying them by 1.11652. This adjustment preceded all log transformations.

Table 2.2. Fixed-Effects Linear Regression Analyses of Logged Total Household Assets[b]

VARIABLES	Model 1	Model 2	Model 3	Model 4
Total Foreclosure Rate (%)	-2.195***	-1.214*		
	(0.456)	(0.498)		
Logged Median Home Price			2.332***	1.400*
			(0.576)	(0.531)
Married or Cohabiting		0.123		0.142
		(0.327)		(0.322)
Working		0.532*		0.586*
		(0.216)		(0.221)
Physical Health (ref. poor)				
Fair		0.076		0.068
		(0.497)		(0.479)
Good		-0.006		-0.015
		(0.477)		(0.457)
Very Good		-0.050		-0.054
		(0.530)		(0.515)
Excellent		0.248		0.231
		(0.566)		(0.555)
Functional Health Problems		-0.225		-0.196
		(0.478)		(0.470)
Changed Residences		-0.767*		-0.945**
		(0.296)		(0.292)
Constant	12.262***	12.585***	-16.531*	-4.782
	(0.073)	(0.691)	(7.028)	(6.349)
Observations	2,644	2,644	2,680	2,679
Number of Respondents	1,322	1,322	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[b] Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Table 2.3. Fixed-Effects Linear Regression Analyses of how Total Foreclosure Rates Affect Depressive Symptoms[c]

VARIABLES	Model 5	Model 6	Model 7	Model 8
Total Foreclosure Rate (%)	0.366***	0.359***	0.272**	0.271**
	(0.085)	(0.085)	(0.091)	(0.091)
Logged Total Household Assets		-0.004		-0.001
		(0.007)		(0.007)
Married or Cohabiting			-0.100	-0.100
			(0.068)	(0.068)
Working			-0.048	-0.047
			(0.039)	(0.039)
Physical Health (ref. poor)				
Fair			-0.173*	-0.174*
			(0.068)	(0.068)
Good			-0.311***	-0.312***
			(0.071)	(0.071)
Very Good			-0.336***	-0.336***
			(0.077)	(0.077)
Excellent			-0.421***	-0.421***
			(0.079)	(0.079)
Functional Health Problems			0.233**	0.233**
			(0.070)	(0.070)
Changed Residences			-0.004	-0.005
			(0.034)	(0.035)
Constant	-0.068***	-0.024	0.365**	0.384*
	(0.013)	(0.081)	(0.127)	(0.162)
Observations	2,644	2,644	2,644	2,644
Number of Respondents	1,322	1,322	1,322	1,322

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[c] Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Table 2.4. Fixed-Effects Linear Regression Analyses of how Median Home Prices Affect Depressive Symptoms[d]

VARIABLES	Model 9	Model 10	Model 11	Model 12
Logged Median Home Price	-0.405**	-0.392**	-0.278*	-0.276*
	(0.141)	(0.140)	(0.127)	(0.127)
Logged Total Household Assets		-0.005		-0.002
		(0.006)		(0.007)
Married or Cohabiting			-0.122†	-0.120†
			(0.067)	(0.067)
Working			-0.071†	-0.070†
			(0.038)	(0.038)
Physical Health (ref. poor)				
Fair			-0.135†	-0.136†
			(0.072)	(0.072)
Good			-0.268***	-0.268***
			(0.076)	(0.076)
Very Good			-0.294***	-0.294***
			(0.082)	(0.082)
Excellent			-0.378***	-0.379***
			(0.084)	(0.084)
Functional Health Problems			0.254***	0.253***
			(0.066)	(0.066)
Changed Residences			0.027	0.025
			(0.032)	(0.033)
Constant	4.934**	4.843**	3.765*	3.766*
	(1.721)	(1.711)	(1.528)	(1.525)
Observations	2,682	2,680	2,681	2,679
Number of Respondents	1,341	1,341	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[d]Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Supplementary Appendix

Table 2.A-1. Fixed-Effects Linear Regression Analyses of Logged Total Household Assets[a]

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Unemployment Rate (%)	-0.122***	-0.071*			-0.118***	-0.081*
	(0.025)	(0.029)			(0.031)	(0.034)
Logged Median Household Income			3.082	0.903	-2.579	-2.436
			(2.891)	(2.083)	(1.780)	(1.709)
Total Foreclosure Rate (%)					-0.157	0.214
					(0.692)	(0.725)
Logged Median Home Price					1.007	1.166†
					(0.679)	(0.654)
Married or Cohabiting		0.053		0.181		0.063
		(0.331)		(0.328)		(0.330)
Working		0.460*		0.640**		0.451*
		(0.216)		(0.222)		(0.217)
Physical Health (ref. poor)						
Fair		0.136		0.0294		0.140
		(0.485)		(0.482)		(0.498)
Good		0.042		-0.057		0.048
		(0.461)		(0.463)		(0.485)
Very Good		-0.010		-0.080		-0.008
		(0.517)		(0.526)		(0.544)
Excellent		0.317		0.246		0.318
		(0.551)		(0.565)		(0.581)
Functional Health Problems		-0.137		-0.208		-0.238
		(0.460)		(0.464)		(0.471)
Changed Residences		-0.743*		-1.013***		-0.670*
		(0.310)		(0.291)		(0.303)
Constant	12.819***	12.922***	-21.505	2.553	28.498	25.258
	(0.183)	(0.727)	(31.353)	(22.448)	(18.160)	(17.598)
Observations	2,680	2,679	2,680	2,679	2,644	2,644
Number of Respondents	1,341	1,341	1,341	1,341	1,322	1,322

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[a] Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Table 2.A-2. Fixed-Effects Linear Regression Analyses of how Unemployment Rates Affect Depressive Symptoms[b]

VARIABLES	Model 7	Model 8	Model 9	Model 10
Unemployment Rate (%)	0.014**	0.014**	0.006	0.006
	(0.005)	(0.005)	(0.005)	(0.005)
Logged Total Household Assets		-0.004		-0.002
		(0.007)		(0.007)
Married or Cohabiting			-0.120†	-0.118†
			(0.067)	(0.068)
Working			-0.067†	-0.067†
			(0.039)	(0.039)
Physical Health (ref. poor)				
Fair			-0.138†	-0.139†
			(0.072)	(0.072)
Good			-0.270***	-0.270***
			(0.076)	(0.076)
Very Good			-0.297***	-0.297***
			(0.082)	(0.082)
Excellent			-0.390***	-0.391***
			(0.084)	(0.084)
Functional Health Problems			0.253***	0.252***
			(0.070)	(0.070)
Changed Residences			0.019	0.017
			(0.035)	(0.036)
Constant	-0.112**	-0.060	0.317*	0.345*
	(0.034)	(0.090)	(0.136)	(0.167)
Observations	2,682	2,680	2,681	2,679
Number of Respondents	1,341	1,341	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[b] Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Table 2.A-3. Fixed-Effects Linear Regression Analyses of how Median Household Incomes Affect Depressive Symptoms[c]

VARIABLES	Model 11	Model 12	Model 13	Model 14
Logged Median Household Income	-0.895**	-0.873**	-0.499	-0.498
	(0.314)	(0.318)	(0.329)	(0.330)
Logged Total Household Assets		-0.007		-0.003
		(0.006)		(0.007)
Married or Cohabiting			-0.125†	-0.122†
			(0.067)	(0.067)
Working			-0.077*	-0.075*
			(0.037)	(0.037)
Physical Health (ref. poor)				
Fair			-0.124†	-0.125†
			(0.073)	(0.073)
Good			-0.255**	-0.256**
			(0.076)	(0.076)
Very Good			-0.282**	-0.283**
			(0.082)	(0.082)
Excellent			-0.370***	-0.371***
			(0.082)	(0.082)
Functional Health Problems			0.250***	0.248***
			(0.067)	(0.067)
Changed Residences			0.032	0.030
			(0.033)	(0.034)
Constant	9.696**	9.538**	5.786	5.805
	(3.404)	(3.445)	(3.568)	(3.580)
Observations	2,682	2,680	2,681	2,679
Number of Respondents	1,341	1,341	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[c] Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant.

Table 2.A-4. Fixed-Effects Linear Regression Analyses of Depressive Symptoms[d]

VARIABLES	Model 15	Model 16	Model 17	Model 18
Unemployment Rate (%)	-0.006	-0.006	-0.012†	-0.012†
	(0.007)	(0.007)	(0.007)	(0.007)
Logged Median Household Income	-0.394	-0.405	-0.243	-0.249
	(0.506)	(0.510)	(0.459)	(0.460)
Total Foreclosure Rate (%)	0.406*	0.406*	0.414**	0.414**
	(0.162)	(0.162)	(0.138)	(0.138)
Logged Median Home Price	0.023	0.028	0.018	0.021
	(0.164)	(0.164)	(0.147)	(0.146)
Logged Total Household Assets		-0.004		-0.002
		(0.007)		(0.007)
Married or Cohabiting			-0.110	-0.110
			(0.066)	(0.066)
Working			-0.062	-0.061
			(0.039)	(0.040)
Physical Health (ref. poor)				
Fair			-0.164*	-0.164*
			(0.068)	(0.067)
Good			-0.303***	-0.304***
			(0.069)	(0.069)
Very Good			-0.329***	-0.330***
			(0.075)	(0.075)
Excellent			-0.409***	-0.408***
			(0.079)	(0.079)
Functional Health Problems			0.235**	0.234**
			(0.068)	(0.068)
Changed Residences			0.015	0.014
			(0.038)	(0.039)
Constant	3.958	4.082	2.862	2.917
	(5.714)	(5.782)	(5.190)	(5.209)
Observations	2,644	2,644	2,644	2,644
Number of Respondents	1,322	1,322	1,322	1,322

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

[d]Note: Number of chronic diseases, whether one has ever been a smoker, social support from family, and social support from friends were all controlled but not significant

Table 2.A-5. Matrices with Pearson Correlations Coefficients for Five City-Level Economic Measures: Wave 1, Wave 2, and Changes between Waves 1 and 2

Wave 1					
	Total Foreclosure Rate (%)	Logged Median Home Price	Unemployment Rate (%)	Logged Median Household Income	Family Poverty Rate (%)
Total Foreclosure Rate (%)	-				
Logged Median Home Price	-0.105	-			
Unemployment Rate (%)	0.091	-0.243†	-		
Logged Median Household Income	0.013	0.782***	-0.322*	-	
Family Poverty Rate (%)	0.019	-0.423**	0.525***	-0.728***	-
Wave 2					
	Total Foreclosure Rate (%)	Logged Median Home Price	Unemployment Rate (%)	Logged Median Household Income	Family Poverty Rate (%)
Total Foreclosure Rate (%)	-				
Logged Median Home Price	0.139	-			
Unemployment Rate (%)	0.636***	-0.067	-		
Logged Median Household Income	0.046	0.808***	-0.275*	-	
Family Poverty Rate (%)	0.188	-0.474***	0.475***	-0.698***	-
Changes between Waves 1 and 2					
	Total Foreclosure Rate (%)	Logged Median Home Price	Unemployment Rate (%)	Logged Median Household Income	Family Poverty Rate (%)
Total Foreclosure Rate (%)	-				
Logged Median Home Price	-0.702***	--			
Unemployment Rate (%)	0.599***	-0.576***	-		
Logged Median Household Income	-0.293*	0.400**	-0.339**	-	
Family Poverty Rate (%)	0.319*	-0.254†	0.312*	-0.713***	-

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Chapter 3

Compound Disadvantage between Economic Declines at the City and Neighbourhood Levels for Older Americans' Depressive Symptoms

Abstract

American cities and neighbourhoods vary substantially in the typical levels of mental health of their residents. Despite scholarship emphasizing that city and neighbourhood problems cannot be thoroughly understood without investigating how they are intertwined, there is limited research examining how city and neighbourhood effects interact as they impact health. I investigate these interactions through a study of the effects of the Great Recession of 2007-2009. Using waves 1 (2005-2006) and 2 (2010-2011) of the National Social Life, Health, and Aging Project survey (N = 1,341), and in accordance with the compound disadvantage model, I find through fixed-effects linear regression models that city- and neighbourhood-level economic declines combine multiplicatively as they impact older Americans' depressive symptoms. My results show that the effects of city-level changes cannot be fully understood without also considering neighbourhood-level changes.

Introduction

Scholarship has shown how the social, cultural, demographic, economic, and political features of cities impact the health and well-being of their residents (Galea, Freudenberg, and Vlahov 2005). This scholarship has also argued that the effects of cities upon their residents' physical and mental health are significantly based on features of their neighbourhoods (Galea et al. 2005), including social cohesiveness (Cramm, van Dijk, and Nieboer 2013; Feldman and Oberlink 2003), prevalent health practices (Dragano et al. 2007), extent of urbanization, degree of segregation based on marital status, age, and ethnicity (van Hooijdonk et al. 2007), as well as extent of disadvantage, disorder, and disorganization (Bursik 1988; Sampson and Groves 1989). Nonetheless, neighbourhoods within the same city can vary extensively in their physical, demographic, social, economic, and political features (e.g. Pearce, Witten, and Bartie 2006; Rundle et al. 2007).

This research highlights the value of studying how both city and neighbourhood contexts impact residents. While much research has studied cities and neighbourhoods as independent influences upon health and well-being, scholars have argued that in addressing population health and social issues, research must build bridges between the numerous levels of analysis (Kaplan, Everson, and Lynch 2000; van Kempen, Bolt, and van Ham 2016). Accordingly, van Kempen et al. (2016) emphasize that neighbourhood problems and their solutions can only be understood by examining how neighbourhoods are intricately linked with their cities' policies, processes, and circumstances, all of which strongly impact neighbourhoods' social and economic conditions (Kaplan et al. 2000; van Kempen et al. 2016). Nonetheless, relatively few scholars have investigated how city- and neighbourhood-level variables interact as they affect residents' health (e.g. Acevedo-Garcia et al. 2003; Diez Roux 2001; Galea et al. 2005; Pemberton and Humphris 2016). The present study is unique as it focuses on how city-level economic declines through an economic shock, the Great Recession of 2007-2009, interact with declining neighbourhood conditions in influencing the depressive symptoms of older residents.

Present-day demographic trends motivate the study of how cities and their neighbourhoods impact older persons. Caused by declining rates of fertility and rising life expectancies, population aging is an important demographic trend across the industrialized world (Brown 2011; Cooke 2006; McDaniel and Rozanova 2011; McDonald and Donahue 2011; Turcotte and Schellenberg 2007). Furthermore, these aging populations are increasingly living within cities, making aging an important urban phenomenon.

The Great Recession was a difficult experience for many older Americans (Boen and Yang 2016; Cagney et al. 2014). Between 2007 and 2011, over 1.5 million older Americans underwent home foreclosure (Trawinski 2012). While any individual older person's absolute risk of home foreclosure might have remained relatively low, apprehension caused by increased risk of home foreclosure within one's immediate environment can be consequential for well-being (Cagney et al. 2014). Between 2007 and 2010, the median family net worth of heads of households from 55 to 64 years of age dropped by almost one third, while that of those from 65 to 74 years of age dropped by about 18 percent (Ackerman, Fries, and Windle 2012). Almost one out of every four adults over the age of 50 stated that they had depleted their savings to endure the difficulties of the recession (Rix 2011).

Background

Theoretical Perspectives

I use the compound disadvantage model as an orienting framework. In its most abstract formulation, this model proposes that "The effects of separate sources of disadvantage of the same type combine multiplicatively…" (Wheaton and Clarke 2003:695). While this model has mostly been applied to disadvantaged people within disadvantaged neighbourhoods (Gilster 2014; Wheaton and Clarke 2003; Wodtke, Elwert, and Harding 2016), the concept of multiplicative effects of diverse sources of the same type of disadvantage is applicable to neighbourhood conditions within cities. I examine interactions between measures of economic health and stability at the city and neighbourhood levels, thereby presenting an ecological compound disadvantage model.

Disadvantaged city and neighbourhood conditions can affect residents' depressive symptoms through numerous pathways. Declining cities often show higher rates of home foreclosures, producing externalities at the neighbourhood level that decrease the upkeep, maintenance, and values of homes while increasing levels of crime and disorder (Leonard and Murdoch 2009). Urban neighbourhoods in decline show high levels of vandalism, delinquent activity, and unrestrained young persons, all of which are stressful and cause fear. These stressors lead residents to avoid leaving their homes, to avoid involvement in community activities, and to restrict their interactions to close family members and friends (Aneshensel 2010; Aneshensel et al. 2011). These constraints are damaging to mental health (Aneshensel 2010). Moreover, city- and neighbourhood-level economic declines lead to the erosion of personal wealth (Boen and Yang 2016; Meltzer, Steven, and Langley 2013), creating financial

strains and stressors that damage health (Boen and Yang, 2016; Hajat et al. 2010, 2011; Pool et al. 2017; Robert and House 1996). As such, declining circumstances within cities and within their neighbourhoods might affect depressive symptoms in an additive fashion; each one might impact mental health net of the other.

Beyond additive effects, an ecological compound disadvantage model postulates that city- and neighbourhood-level economic declines will combine multiplicatively as they impact residents' mental health. A possible mechanism for a multiplicative combination of city- and neighbourhood-level effects is presented by Baumer, Wolff, and Arnio (2012), who discussed disadvantaged neighbourhoods within "vulnerable" cities of high socioeconomic disadvantage. In their analysis of the Great Recession, they stated that declining neighbourhoods embedded within larger political contexts in which resources are sparse are less able to obtain needed resources, such as for foreclosure mitigation and for the maintenance and repurchasing of abandoned buildings. Likewise, Allen (2013) discussed how declining property values and incomes through the recession reduced cities' tax revenues, impairing cities' provision of services to neighbourhoods, including for the upkeep of streets and abandoned buildings. Accordingly, the negative effects of residing within a city with weakening resources might be accentuated within neighbourhoods undergoing increasing disadvantage and need for additional resources.

In examining these contextual effects, I focus on depressive symptoms. Depression is a central psychological outcome of stressful circumstances, as well as an all-round indicator of stress (Pearlin 1989; Pearlin, Aneshensel, and Leblanc 1997; Pearlin et al. 1981). Among older adults, depression might be the most prevalent form of emotional suffering (Blazer 2003). In later life, depression is a strong predictor of suicide (Blazer 2003; Fiske, Wetherell, and Gatz 2009; Vanderhorst and McLaren 2005), and is linked to higher morbidity, detriments to cognitive, social, and physical functioning, and more self-neglect, all of which are associated with higher mortality (Blazer 2003; Fiske et al. 2009).

The Great Recession of 2007-2009

I study the interactive effects of declining city and neighbourhood conditions within the context of the Great Recession of 2007-2009, which was the most extensive global economic crisis since the 1930s' Great Depression (Meltzer et al. 2013). This economic shock involved the collapse of the property market, leading to immense losses within the financial sector and culminating in a pronounced recession during which the typical American family lost

approximately 40% of its net worth. Furthermore, the United States underwent its greatest declines in gross domestic product and levels of employment since the Great Depression (Meltzer et al. 2013). Economic challenges through this recession, including increased rates of home foreclosures, have been associated with lower well-being (Cagney et al. 2014; Houle 2014) and higher rates of suicide (Houle and Light 2014). Likewise, declining incomes (Burgard, Seefeldt, and Zelner 2012) and rising levels of unemployment (Phillips and Nugent 2014) through this recession harmed physical and mental health. Additionally, those who lost substantial amounts of their housing wealth through this recession underwent high levels of stress (Yilmazer, Babiarz, and Liu 2015).

Despite the scope of the recession, American cities substantially varied in how hard they were hit. While some cities underwent a rapid and successful recovery (e.g., San Jose and San Francisco), other cities remain in troubled circumstances (e.g., Tampa and Orlando) (Arias, Gascon, and Rapach 2016; Davidson 2014; Dill 2014; Gray and Scardamalia 2014). Traits of cities that fared better through the recession include the possession of larger and more educated populations as well as economies less dependent on real estate (Arias et al. 2016; Florida 2016; Gray and Scardamalia 2014). While cities within the South and West census regions fared the worst economically through the recession, those in the Midwest underwent less potent economic declines, and those in the Northeast fared the best (Hacker et al. 2012). These regional variations are linked with differences in racial/ethnic composition, percentages of heads of households who hold high school diplomas and college degrees, and employment rates (Hacker et al. 2012).

Cities most impacted by the recession underwent substantial decreases in the prices of homes (Arias et al. 2016; Chatterjee and Eyigungor 2015; Gray and Scardamalia 2014) and overall levels of income (Chatterjee and Eyigungor 2015; Katz, Wallace, and Hedberg 2013; Zivin, Paczkowski, Galea 2011). Both median home prices (see Chatterjee and Eyigungor 2015; Diamond 2017; Kahn 2017) and median household incomes (see Brasier et al. 2011; Chatterjee and Eyigungor 2015; Jha 2017; Maher and Deller 2011) are central determinants of tax revenues, affecting the resources that a city can channel into needy neighbourhoods and dedicate to city-wide public goods and services. As such, city-level median home prices and median household incomes are highly pertinent to the present study.

There is also substantial evidence of the recession having affected people's well-being through their neighbourhoods. Neighbourhood-level home foreclosure rates were linked with significant depressive symptoms (Cagney et al. 2014). Neighbourhoods undergoing housing

instability showed high levels of stress, homelessness, and residential crowding, as well as higher risks of illness due to abandoned buildings that accumulated insects and other disease carriers (Burgard and Kalousova 2015).

While most American urban neighbourhoods were economically affected by the recession (Owens and Sampson 2013; van Kempen et al. 2016; Zwiers et al. 2016), there was considerable variability within cities. Neighbourhoods that were disadvantaged pre-recession tended to be more heavily impacted (Grusky, Western, and Wimer 2011; Owens and Sampson 2013; van Kempen et al. 2016; Williams, Galster, and Verma 2013), as were communities in which minority racial groups and immigrants were concentrated (Downing 2016; Owens and Sampson 2013; Williams et al. 2013). Larger cities contain neighbourhoods that are more economically and racially segregated (David 2018; Florida 2015; Florida and Mellander 2015; Kent and Frohlich 2015; Nodjimbadem 2017; Wilson 2017). As such, their neighbourhoods showed higher variability in how they fared through the recession. Cities of higher affluence and with more high-tech and knowledge-based economies also show greater neighbourhood economic segregation (Florida 2015; Florida and Mellander 2015). This increases intra-city variability in their neighbourhoods' economic fortunes during and after the recession.

Accordingly, neighbourhood disadvantage shifted systematically through the Great Recession, in varied ways across cities, supporting the study of disadvantage across neighbourhoods and cities. Each city neighbourhood potentially presents a unique configuration of city- and neighbourhood-level economic changes, yielding a unique effect upon residents' well-being. This presents the possibility that there are multiplicative effects between city- and neighbourhood-level economic changes that would be obscured by a merely additive analysis.

Research Question and Hypothesis

In the present study, I investigate whether increased neighbourhood-level need accentuated the impact of declining city-level resources through the Great Recession upon residents. Based on the compound disadvantage model, I hypothesize that declining resources at the city level interact with declining neighbourhood conditions in influencing older residents' depressive symptoms.

Data and Methods

Dataset and Sample

I use the National Social Life, Health, and Aging Project (NSHAP) as a source of individual-level variables. The NSHAP follows a representative sample of older Americans through time, and its variables are focused on social relationships, health, and well-being. At wave 1 (2005-2006), 3,005 respondents between the ages of 57 and 85 years were interviewed. The wave 1 response rate was 75.5%, and 75.2% of wave 1 respondents were re-interviewed at wave 2 (2010-2011). I linked respondents with their metropolitan statistical areas (MSAs) and census tracts using protected geodata I obtained from the National Opinion Research Center through special contractual arrangements. My sample includes 58 MSAs that substantially vary in their fortunes during and after the Great Recession. The number of respondents per MSA ranges from 1 to 61, the average being 23.14. The rate of retention between waves 1 and 2 was similar for NSHAP respondents initially residing within MSAs (76.0%). This dataset is especially useful since the timing of the first two waves allows me to study the effects of the Great Recession of 2007-2009.

The NSHAP employs a complex multi-stage area probability sample. MSAs and non-MSA counties were the primary sampling units (PSUs), selected through probability proportional to size (PPS). Census blocks and block groups were the second-stage sampling units (SSUs), selected through probability proportional to how many housing units existed within each area in 1990. The equal probability selection of housing units within the SSUs was the third stage of sampling, accomplished through "the standard multi-stage sampling technique of setting the sampling rate for selected housing units within SSUs to be inversely proportional to the PPS probabilities used to select the PSU and the SSU" (Heeringa and Connor 1995:19).

Since I am investigating how economic changes within cities through the recession interacted with declining neighbourhood conditions in affecting older residents' depressive symptoms, I study only those NSHAP respondents who remained within the same MSA across the two waves. 2,073 of the 3,005 NSHAP respondents at wave 1 resided within MSAs. By wave 2, a total of 731 respondents had either dropped out of the NSHAP sample or relocated to a new MSA (16.1% of the sample living in MSAs at wave 1 relocated out of their initial MSAs). The analytical sample includes 1,342 respondents.

In some regards, respondents living in MSAs at wave 1 (n = 2,073) were similar to those not initially residing within MSAs (n = 932). These two groups did not differ statistically according to gender, general mental health, depression, and stress. However, those dwelling in MSAs at wave 1 tended to reside in neighbourhoods of lower concentrated disadvantage, tended

to be younger, were of greater racial/ethnic diversity, were generally wealthier, tended to be in better physical health, were more highly educated, were more likely to be in a serious relationship and working for pay, and were more likely to view themselves as being of higher social status.

Respondents dwelling in MSAs at wave 1 who remained within the analytical sample at wave 2 (n = 1,342) did not differ in some respects from respondents who left the analytical sample (n = 731), including according to gender, race/ethnicity, total household assets, and subjective social class. Those who remained in the sample tended to be younger, were generally more educated, were generally of higher physical and mental health, generally experienced less stress, and were more likely to be in a serious relationship and employed for pay. Respondents who remained within the analytical sample (n = 1,342) were also more likely to be living in MSAs that at wave 1 had lower median household incomes, lower median home prices, and lower rates of home foreclosure. Furthermore, retained respondents tended to be initially residing within census tracts with higher levels of concentrated disadvantage.

Dependent Variable

I study depressive symptoms through an index that combines eleven symptoms of depression with a rating of general happiness. In a study utilizing the NSHAP, Payne et al. (2014) show how among older adults, these twelve items constitute a single cluster of mental health, and thus may be part of the same dimension of mental health. General happiness is assessed through the question: “If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole?” Respondents answered on an ordinal scale spanning from (1) unhappy usually to (5) extremely happy. I reverse coded this measure to fit with the direction of the other eleven measures.

The other measures are based on an eleven-item short-form version of the twenty-item Center for Epidemiologic Studies Depression Scale (CES-D). Respondents reported on the extent to which they felt everything was an effort, they felt depressed, their sleep was restless, they felt lonely, they enjoyed life, etc., over the past week. They responded to each question on an ordinal scale spanning from (1) rarely or none of the time to (4) most of the time. I reverse coded two of these eleven measures so that all items indicate increasing levels of depression.

Exploratory factor analyses (EFAs) showed that these twelve measures fit into one factor at both waves (according to the Kaiser criterion). To create this factor, I averaged standardized scores on all twelve measures, separately at waves 1 and 2 (see Payne et al., 2014). At both

waves, this index of depressive symptoms has high internal reliability (Cronbach alpha scores > 0.70). The standardized measure of general happiness I use is highly correlated at both waves with the eleven standardized measures of depression from the CES-D. Results were substantively the same when I used an index of depressive symptoms based only on the 11 CES-D measures.

Independent Variables

MSA-Level

At the city level, I study MSAs. This is effective since MSAs approximate housing markets (Houle and Light 2017; Iceland, Weinberg, and Steinmetz 2002). Furthermore, their social and economic integration (United States Census Bureau 2016) implies that they approximate labour markets. An MSA is defined as

> the county or counties (or equivalent entities) associated with at least one urbanized area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties. (United States Census Bureau 2016)

My focus is on an index of resources based on median home prices and median household incomes. Data for these two measures were obtained from the United States Census Bureau – American FactFinder (2017), which accumulated this information through the American Community Survey (ACS) (wave 1: 2005 ACS; wave 2: 2010 ACS). Both measures at wave 1 were adjusted for inflation to ensure the accuracy of comparisons with amounts at wave 2. Based on the United States Bureau of Labor Statistics – CPI Inflation Calculator (Consumer Price Index Inflation Calculator) (2017), 2005 monetary amounts were multiplied by 1.11652. To correct the right skew of both variables, I log transformed them at both waves. Beyond normalizing their distributions, log transforming these variables allowed me to study non-linear associations with depressive symptoms; the natural logarithm of a continuous variable allows that variable to be analyzed in terms of ratios rather than absolute differences.

I constructed an index of MSA-level resources based on logged MSA-level median home prices and logged MSA-level median household incomes, developed through averaging standardized scores on each variable. The Cronbach alpha for this index is over 0.80 at both waves. This index is my focal MSA-level independent variable.

I study two additional measures of MSA-level economic circumstances: percentage unemployed and percentage of homes foreclosed. Increases in rates of unemployment (Meltzer et al. 2013; Zivin et al. 2011) and rising rates of home foreclosures (Chatterjee and Eyigungor 2015; NBC News 2012; Wang and Immergluck 2018) are two other important dimensions of

economic decline through the Great Recession. Because these two variables are less direct measures of MSA-level resources, they are supplementary to the central analysis and included within an appendix. Unemployment data were obtained from the United States Bureau of Labor Statistics – Local Area Unemployment Statistics (2017). Foreclosure data pertaining to 57 of the 58 MSAs I investigate were obtained from ATTOM Data Solutions. It was not possible to obtain foreclosure information for one of these 58 MSAs. For this reason, analyses involving rates of home foreclosure are based on 19 fewer respondents. Percentage of homes foreclosed includes homes in any phases of the foreclosure process (pre-foreclosure, auction, and bank owned (REO)).

Census Tract-Level

> At the neighbourhood level, I study census tracts, which are defined as:
>
> small, relatively permanent statistical subdivisions of a county or equivalent entity…. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement…. Census tract boundaries generally follow visible and identifiable features. (United States Census Bureau 2012)

Census tracts have often been employed as good approximations for neighbourhoods (e.g., Estabrooks, Lee, and Gyurcsik 2003; LaVeist and Wallace Jr. 2000; Morland et al. 2002). For wave 1, I used data from the 2000 Decennial Census. For wave 2, I used data from the 2006-2010 American Community Survey. Concerning the latter, data from 2006 to 2010 were averaged because there were not enough respondents per census tract in each individual year.

I study an index of census tract-level concentrated disadvantage, developed by Sampson, Raudenbush, and Earls (1997). This index is used to operationalize neighbourhood-level need, and it is based on percentage of the population below the poverty line, of households on public assistance, of female-headed households, of individuals unemployed, of individuals less than 18 years of age, and of individuals who are non-white. At wave 1, this index had a Cronbach alpha of 0.91, while at wave 2, the Cronbach alpha was 0.84. EFAs revealed that at both waves, these six items were best combined into one factor (according to the Kaiser criterion), and further provided factor loadings for each of these six items at each wave. A confirmatory factor analysis revealed that the factor structure of these six items significantly differed across the two waves; a factor structure refers to the correlational relationships among a set of variables used to construct a latent variable. However, results where substantively the same regardless of whether I employed the first or second wave factor loadings. For this reason, I only report results based on

the wave 1 factor loadings. Separately at each wave, this index was created by standardizing each of the six variables, multiplying each of the six standardized variables by its factor loading from wave 1, and then averaging these six scores.

Because I operationalize neighbourhood-level need through this index of concentrated disadvantage, my analyses employ this variable at the census tract level. I utilize different measures at the city and neighbourhood levels because at the city level, I am interested in extent of monetary resources, while at the neighbourhood level, I am interested in overall deprivation and need for resources and investment.

Analysis

I use fixed-effects linear regression models to study how changes in census tract-level concentrated disadvantage moderate how changes in MSA-level resources affect older residents' depressive symptoms. Since my analysis is restricted to NSHAP respondents who did not change MSAs between the two waves, the individual-level fixed effects include the time-constant features of respondents' MSAs (including health care and educational infrastructure, climatic characteristics, general culture, and population composition). Therefore, the fixed-effects modelling strategy allows me to study the effects of this interaction net of all time-invariant features of MSAs and individuals. This is important since cities' differing population compositions could affect their vulnerability to the effects of the Great Recession (Arias et al. 2016; Florida 2016; Gray and Scardamalia 2014).

Furthermore, individual-level characteristics might confound the central relationship I investigate, as they can affect one's placement in cities and one's vulnerability to depressive symptoms. However, it is likely that these potentially confounding characteristics are stable features of older individuals, such as levels of education and race/ethnicity. My fixed-effects modelling strategy automatically controls for these stable individual-level potential confounders.

I include no individual-level control variables because individual-level changes are possible mediators between city- and neighbourhood-level changes and depressive symptoms. To control for individual-level changes would potentially block some of the pathways between contextual changes and depressive symptoms.

My first and central analysis is based on my index of MSA-level resources. It includes two models aimed at achieving a thorough understanding of how MSA-level resources and census tract-level concentrated disadvantage, both additively and in interaction, affect depressive symptoms. The first model studies that main effects of MSA-level resources and census tract-

level concentrated disadvantage. The second model further studies how the interaction between MSA-level resources and census tract-level concentrated disadvantage affects depressive symptoms.

I used the inverse probability weighting technique recommended by Hawkley et al. (2014) to minimize bias based on characteristics of respondents who were more likely to have remained in the NSHAP sample between waves 1 and 2 while remaining within the same MSA. The sources of attrition include death, institutionalization, inability to locate a respondent, and relocation to new MSAs. A host of health and demographic variables from the first wave were employed to predict inclusion in the second wave. Furthermore, I studied wave 1 MSA-level logged median home prices, logged median household incomes, unemployment rates (%), and foreclosure rates (%), as well as wave 1 census tract-level concentrated disadvantage, as predictors of inclusion in wave 2. Inverse predicted probability scores developed through that logistic regression model were then multiplied by the NSHAP's standard weights and applied in the fixed-effects regression analyses. Those respondents who had the lowest likelihood of being part of the analytical sample were thus accorded a higher weight. Despite the use of this weighting strategy, attrition between waves 1 and 2 could result in underestimation of how contextual economic declines impact depressive symptoms, especially if those at greatest risk of becoming depressed were the least likely to remain a part of the sample.

I adjusted standard errors for clustering at the level of the MSA. Since the only variable I use that has missing data is my index of depressive symptoms dependent variable, which has missing data for only one respondent, I did not use multiple imputation. All analyses were performed with the Stata 15 statistical software package.

Results

Table 3.1 presents descriptive statistics at both waves for all variables in this study. Since my index of depressive symptoms is built from component variables that were standardized within each wave, its mean is zero at both waves 1 and 2. MSA-level median home prices, median household incomes, and overall resources are higher at wave 1 than at wave 2. MSA-level unemployment rates increase substantially between waves 1 (5.28%) and 2 (9.77%), as do home foreclosure rates (wave 1: 0.07%; wave 2: 0.24%). For the same reason as with my index of depressive symptoms, census tract-level concentrated disadvantage has a mean of zero at both waves.

Model 1 of Table 3.2 shows that when my index of MSA-level resources is included along with the index of census tract-level concentrated disadvantage, MSA-level resources are significantly associated with lower depressive symptoms (coeff.: -0.222, $p < 0.01$), while the coefficient of census tract-level concentrated disadvantage does not reach statistical significance.

The central results are based on Model 2 within Table 3.2. Model 2 shows that when census tract-level concentrated disadvantage remains constant over the two waves, an increase in MSA-level resources implies a significant decrease in depressive symptoms (coeff.: -0.210, $p < 0.01$). When MSA-level resources stay constant over the two waves, a change in census tract-level concentrated disadvantage does not result in a statistically significant change in depressive symptoms. The interaction term between MSA-level resources and census tract-level concentrated disadvantage achieves statistical significance (coeff.: -0.067, $p < 0.05$). This implies that when census tract-level concentrated disadvantage increases, increases in resources at the MSA level become more important for reducing depressive symptoms.

Figure 3.1 graphically displays the fixed-effects significant interaction within Model 2 of Table 3.2. On the x-axis is the index of MSA-level resources, while on the y-axis is the index of depressive symptoms. The three lines denote one standard deviation below the mean, the mean, and one standard deviation above the mean in census tract-level concentrated disadvantage. This figure shows that the negative slope between MSA-level resources and depressive symptoms is steeper for those undergoing greater census tract-level concentrated disadvantage.

Supplementary Analyses

My central analysis leaves open the question of whether MSA-level median home prices or median household incomes are the main drivers behind my results. It also leaves uncertain whether changes in MSA-level resources in specific, or MSA-level economic declines more generally, interact with changes in census tract-level concentrated disadvantage in affecting older residents' depressive symptoms. Accordingly, my second through fifth analyses closely mirror my first analysis, focused instead on MSA-level median home prices, median household incomes, unemployment rates (%), and foreclosure rates (%). The results of these supplementary analyses are included in an appendix.

Tables 3.A-1 and 3.A-2 in the Appendix reveal that my findings within Model 2 of Table 3.2 are driven primarily by MSA-level median household incomes. Table 3.A-1 shows that the interaction term between logged MSA-level median home prices and census tract-level concentrated disadvantage achieves only marginal statistical significance (coeff.: -0.134, $p <$

0.10). Table 3.A-2 shows that logged MSA-level median household incomes interact with census tract-level concentrated disadvantage in much the same way as my index of MSA-level resources (coeff.: -0.330, $p < 0.05$).

Tables 3.A-3 and 3.A-4 in the Appendix reveal that MSA-level unemployment rates (%) and home foreclosure rates (%) are significantly associated with increases in depressive symptoms. However, neither of these two MSA-level variables significantly interacts with census tract-level concentrated disadvantage.

Discussion

I found that declining resources at the city level interact with increased disadvantage at the neighbourhood level in impacting older residents' depressive symptoms. My results within Table 3.2 show that when neighbourhood-level concentrated disadvantage stays constant, rises in city-level resources decrease depressive symptoms among older persons. On the other hand, when resources at the city level stay constant, changes in neighbourhood-level concentrated disadvantage do not significantly cause changes in older residents' depressive symptoms.

My central finding is that when neighbourhood-level concentrated disadvantage increases, rising city-level resources more potently decrease depressive symptoms. During economic recessions, fewer city resources imply less provision of services to needy neighbourhoods, including the maintenance of streets (Allen 2013), foreclosure mitigation, and the maintenance and repurchasing of vacated abandoned buildings (Baumer et al. 2012). More home foreclosures and abandoned buildings create neighbourhood-level externalities that reduce home values while raising levels of disorder and criminal activity (Leonard and Murdoch 2009). Greater extents of disorder and crime lead to stress and fear, which potently impact mental health. This implies that fewer city funds to repair and improve neighbourhoods are especially damaging to mental health within neighbourhoods undergoing increased deprivation and need.

This discussion of how city- and neighbourhood-level changes interact in affecting residents' depressive symptoms fits the compound disadvantage model's claim that separate sources of similar types of disadvantages combine in a multiplicative manner as they affect physical and mental health (Wheaton and Clarke 2003). I have identified the multiplicative effects of negative socioeconomic changes at the city and neighbourhood levels.

Of the various city-level conditions considered, those pertaining most directly to tax revenues and resource availability showed the strongest interactive effects with census tract-level concentrated disadvantage. Both MSA-level median home prices (see Chatterjee and Eyigungor

2015; Diamond 2017; Kahn 2017) and median household incomes (see Brasier et al. 2011; Chatterjee and Eyigungor 2015; Jha 2017; Maher and Deller 2011) are important determinants of cities' tax revenues, and thus of the availability of city resources for neighbourhoods in need, as well as for spending on city-wide public goods and services. The Appendix shows that the significant interaction between MSA-level resources and census tract-level concentrated disadvantage is based mostly on MSA-level median household incomes; the interaction term between MSA-level median home prices and census tract-level concentrated disadvantage only achieves marginal statistical significance. MSA-level unemployment rates and extent of homes foreclosed do not significantly interact with census tract-level concentrated disadvantage, possibly because they are less direct determinants of the resources available within the larger city than home prices and household incomes.

Policy Implications

The finding that changes in city-level resources interact with changes in neighbourhood-level deprivation and need in affecting depressive symptoms holds implications for the allocation of resources during economic shocks. Research shows that the most disadvantaged neighbourhoods before the Great Recession were the most negatively affected by this economic shock (Grusky et al. 2011; Owens and Sampson 2013; van Kempen et al. 2016; Williams et al. 2013). If depressive symptoms among neighbourhood residents can be averted through satisfying neighbourhoods' need for additional resources, then policies and programs should allocate resources to those neighbourhoods undergoing the greatest increases in need.

Limitations and Paths for Future Research

Future research should replicate this study with measures of actual policy decisions that channel resources at the city level into city neighbourhoods. While it is broadly accurate that cities showing less declines in resources will be more likely to meet the increased needs of their declining neighbourhoods, cities undergoing similar economic declines through the Great Recession are likely to have differed in their policy responses, including austerity measures and stimulus spending. This implies different extents of unmet needs within their declining neighbourhoods.

In this study, I focus on depressive symptoms, which are a measure of mental health that can vary in the short term as one's life situation changes, including economic changes within one's city and neighbourhood (Burgard and Kalousova 2015). As such, they are an effective dependent variable for the present study focused on the short-term impacts of economic

downturns. An interesting follow-up project might repeat this analysis with a longer span of time to study effects upon measures of physical health, which might take more than five years to substantially change. Burgard and Kalousova (2015) argue that studies of different health outcomes are associated with different appropriate spans of time. Studying how contextual economic changes impact measures of physical health is especially valuable within older samples because health declines accompany the process of aging.

Another fruitful path for future research is to replicate this study with a younger sample. Because of the biological vulnerabilities and cognitive declines that accompany the aging process, older persons might be more dependent than younger persons on the services, social programs, amenities, institutions, and infrastructure within their cities and neighbourhoods. Therefore, the depressive symptoms of younger adults might be less affected by city-level resources and neighbourhood-level need. On the other hand, younger adults might be more concerned with their paid work trajectories and providing for their families. If declines in cities' resources cause less stimulus spending and less creation of job opportunities within city neighbourhoods, many younger adults might experience depressive symptoms as they struggle with underemployment and unemployment.

References

Acevedo-Garcia, Dolores, Kimberly A. Lochner, Theresa L. Osypuk, and S. V. Subramanian. 2003. "Future Directions in Residential Segregation and Health Research: A Multilevel Approach." *American Journal of Public Health* 93(2):215–21.

Ackerman, Robert A., Gerhard Fries, and Richard A. Windle. 2012. "Changes in US family finances from 2007 to 2010: evidence from the survey of consumer finances." *Fed. Reserve Bull* 100:1-80.

Allen, Ryan. 2013. "The Distribution and Evolution of Physical Neighborhood Problems during the Great Recession." *City and Community* 12(3):260–79.

Aneshensel, Carol S. 2010. "Neighborhood as a Social Context of the Stress Process." Pp. 35-52 in *Advances in the Conceptualization of the Stress Process: Essays in Honor of Leonard I. Pearlin*, edited by Avison, W. R., Aneshensel, C. S., Schieman, S., Wheaton, B. New York: Springer.

Aneshensel, Carol S., Michelle J. Ko, Joshua Chodosh, and Richard G. Wight. 2011. "The Urban Neighborhood and Cognitive Functioning in Late Middle Age." *Journal of health and social behavior* 52(2):163–79.

Arias, Maria A., Charles S. Gascon, and David E. Rapach. 2016. "Metro Business Cycles." *Research Division, Federal Reserve Bank of St. Louis, Working Paper Series*:1-35.

Baumer, Eric P., Kevin T. Wolff, and Ashley N. Arnio. 2012. “A Multicity Neighborhood Analysis of Foreclosure and Crime.” *Social Science Quarterly* 93(3):577–601.

Blazer, Dan G. 2003. “Depression in Late Life: Review and Commentary.” *The Journals of Gerontology Series: Biological Sciences and Medical Sciences* 58(3):M249–65.

Boen, Courtney and Yang Claire Yang. 2016. “The Physiological Impacts of Wealth Shocks in Late Life: Evidence from the Great Recession.” *Social Science and Medicine* 150:221–30. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2015.12.029).

Brasier, Kathryn J., Matthew R. Filteau, Diane K. McLaughlin, Jeffrey Jacquet, Richard C. Stedman, Timothy W. Kelsey, and Stephan J. Goetz. 2011. “Residents’ Perceptions of Community and Environmental Impacts from Development of Natural Gas in the Marcellus Shale: A Comparison of Pennsylvania and New York Cases.” *Journal of Rural Social Sciences* 26(1):32–61.

Brown, Robert L. 2011. “Economic Security in an Aging Canadian Population.” *Canadian Journal on Aging* 30(3):391-399.

Burgard, Sarah A. and Lucie Kalousova. 2015. “Effects of the Great Recession: Health and Well-Being.” *Annual Review of Sociology* 41:181–201.

Burgard, Sarah A., Kristin S. Seefeldt, and Sarah Zelner. 2012. "Housing Instability and Health: Findings from the Michigan Recession and Recovery Study." *Social Science & Medicine* 75(12): 2215-2224.

Bursik, Robert J. 1988. “Social Disorganization and Theories of Crime and Delinquency: Problems and Prospects.” *Criminology* 26(4):519-552.

Cagney, Kathleen A., Christopher R. Browning, James Iveniuk, and Ned English. 2014. “The Onset of Depression during the Great Recession: Foreclosure and Older Adult Mental Health.” *American Journal of Public Health* 104(3):498–505.

Chatterjee, Satyajit and Burcu Eyigungor. 2015. “A Quantitative Analysis of the U.S. Housing and Mortgage Markets and the Foreclosure Crisis.” *Review of Economic Dynamics* 18(2):165–84. Retrieved (http://dx.doi.org/10.1016/j.red.2015.02.004).

Cooke, Martin. 2006. “Policy Changes and the Labour Force Participation of Older Workers: Evidence from Six Countries.” *Canadian Journal on Aging* 25(4):387-400.

Cramm, Jane M., Hanna M. van Dijk, and Anna P. Nieboer. 2013. “The Importance of Neighborhood Social Cohesion and Social Capital for the Well Being of Older Adults in the Community.” *Gerontologist* 53(1):142–50.

David, Javier E. 2018. “Big metropolitan cities are seeing high levels of residential segregation, study finds.” Retrieved Oct. 1, 2018 (https://www.cnbc.com/2018/05/23/metropolitan-housing-markets-like-new-york-chicago-are-highly-segregated.html).

Davidson, Jacob. “The Most and Least Recession-Recovered Cities.” *Time,* July 30, 2014. Retrieved Oct. 2, 2018 (http://time.com/money/3048731/5-cities-recession-recovery-most-least/).

Diamond, Rebecca. 2017. “Housing Supply Elasticity and Rent Extraction by State and Local Governments.” *American Economic Journal: Economic Policy* 9(1):74–111.

Diez Roux, Ana V. 2001. “Investigating Neighbourhood and Area Effects on Health.” *Am J Public Health* 91(11):1783–89. Retrieved (http://www.ncbi.nlm.nih.gov/pubmed/11684601).

Dill, Kathryn. “Study Reveals U.S. Cities Most And Least Recovered Since The Recession.” *Forbes,* June 23, 2014. Retrieved Sept. 30, 2018 (https://www.forbes.com/sites/kathryndill/2014/06/23/study-reveals-u-s-cities-most-and-least-recovered-since-the-recession/#11fb9cfc1422).

Downing, Janelle. 2016. “The Health Effects of the Foreclosure Crisis and Unaffordable Housing: A Systematic Review and Explanation of Evidence.” *Social Science and Medicine* 162:88–96. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2016.06.014).

Dragano, Nico, Martin Bobak, Natalia Wege, Anne Peasey, Pablo E Verde, Ruzena Kubinova, Simone Weyers, Susanne Moebus, Stefan Möhlenkamp, Andreas Stang, Raimund Erbel, Karl-Heinz Jöckel, Johannes Siegrist, and Hynek Pikha. 2007. “Neighbourhood Socioeconomic Status and Cardiovascular Risk Factors: A Multilevel Analysis of Nine Cities in the Czech Republic and Germany.” *BMC Public Health* 7:255.

Estabrooks, Paul A., Rebecca E. Lee, and Nancy C. Gyurcsik. 2003. “Resources for Physical Activity Participation: Does Availability and Accessibility Differ by Neighborhood Socioeconomic Status?” *Annals of Behavioral Medicine* 25(2):100–104.

Feldman, Penny Hollander and Mia R. Oberlink. 2003. “The AdvantAge Initiative Developing Community Indicators to Promote the Health and Well-Being of Older People.” *Family Community Health* 26(4):268–74.

Fiske, Amy, Julie L. Wetherell, and Margaret Gatz. 2009. “Depression in Older Adults.” *Annual Review of Clinical Psychology* 5:363–89. Retrieved (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2852580/).

Florida, Richard. “America's Most Economically Segregated Cities.” *The Atlantic: Citylab,* February 23, 2015. Retrieved Sept. 28, 2018 (https://www.citylab.com/life/2015/02/americas-most-economically-segregated-cities/385709/).

Florida, Richard. “Which U.S. Cities Suffer the Most During a Recession?” *The Atlantic: Citylab,* June 9, 2016. Retrieved Sept. 26, 2018 (https://www.citylab.com/equity/2016/06/which-us-metros-suffer-the-most-during-a-recession/486263/).

Florida, Richard, and Charlotta Mellander. 2015. *Segregated city: The geography of economic segregation in America's metros*. Martin Prosperity Institute.

Galea, Sandro, Nicholas Freudenberg, and David Vlahov. 2005. "Cities and Population Health." *Social Science and Medicine* 60(5):1017–33.

Gilster, Megan E. 2014. "Neighborhood Stressors, Mastery, and Depressive Symptoms: Racial and Ethnic Differences in an Ecological Model of the Stress Process in Chicago." *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91(4):690-706.

Gray, Tom and Robert Scardamalia. 2014. "America's Top Metros: Who's Leading the Recovery, and Why." *Civic Report* 89:1-41.

Grusky, David B., Bruce Western, and Christopher Wimer. 2011. "The Consequences of the Great Recession." Pp. 3–20 in *The Great Recession*, edited by David B. Grusky, Bruce Western, and Christopher Wimer. New York: Russell Sage Foundation.

Hacker, Jacob S., Gregory A. Huber, Austin Nichols, Philipp Rehm, and Stuart Craig. 2012. *Economic Insecurity Across the American States: New State Estimates from the Economic Security Index*. Technical report, The Rockefeller Foundation.

Hajat, Anjum, Jay S. Kaufman, Kathryn M. Rose, Arjumand Siddiqi, and James C. Thomas. 2010. "Do the Wealthy Have a Health Advantage? Cardiovascular Disease Risk Factors and Wealth." *Social Science & Medicine* 71:1935–42.

Hajat, Anjum, Jay S. Kaufman, Kathryn M. Rose, Arjumand Siddiqi, and James C. Thomas. 2011. "Long-Term Effects of Wealth on Mortality and Self-Rated Health Status." *American Journal of Epidemiology* 173(2):192–200.

Hawkley, Louise C., Masha Kocherginsky, Jaclyn Wong, Juyeon Kim, and Kathleen A. Cagney. 2014. "Missing Data in Wave 2 of NSHAP: Prevalence, Predictors, and Recommended Treatment." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 69:S38–50.

Heeringa, Steven G. and Judith H. Connor. 1995. "Technical Description of the Health and Retirement Study Sample Design." *Ann Arbor: University of Michigan*.

Houle, Jason N. 2014. "Mental Health in the Foreclosure Crisis." *Social Science and Medicine* 118(C):1–8. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2014.07.054).

Houle, Jason N. and Michael T. Light. 2014. "The Home Foreclosure Crisis and Rising Suicide Rates, 2005 to 2010." *American Journal of Public Health* 104(6):1073–79.

Houle, Jason N. and Michael T. Light. 2017. "The Harder They Fall? Sex and Race/ethnic Specific Suicide Rates in the U.S. Foreclosure Crisis." *Social Science and Medicine* 180:114–24. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2017.03.033).

Iceland, John, Daniel H. Weinberg, and Erika Steinmetz. 2002. *Racial and Ethnic Residential Segregation in the United States: 1980-2000 US Census Bureau, Series CENSR-3*. Washington, DC: US Government Printing Office.

Jha, Nandan K. 2017. "Is There An Association Between Fiscal Decentralization And Declining Role Of State Governments In Highway Finance In The US*?" Global Journal of Economics and Finance* 1(1):1–14.

Kahn, Matthew E. 2017. "Is Local Public Sector Rent Extraction Higher in Progressive Cities or High Amenity Cities?" *NBER WORKING PAPER SERIES*: Working Paper 23201:1-30. Retrieved (http://www.nber.org/papers/w23201).

Kaplan, George A., Susan A. Everson, and John W. Lynch. 2000. "The contribution of social and behavioral research to an understanding of the distribution of disease: a multilevel approach." *Promoting Health*:37-80.

Katz, Charles M., Danielle Wallace, and Eric C. Hedberg. 2013. "A Longitudinal Assessment of the Impact of Foreclosure on Neighborhood Crime." *Journal of Research in Crime and Delinquency* 50(3):359–89.

Kent, Alexander, and Thomas C. Frohlich. 2015. "The 9 Most Segregated Cities In America." Retrieved Oct. 2, 2018 (https://www.huffingtonpost.com/entry/the-9-most-segregated-cities-in-america_us_55df53e9e4b0e7117ba92d7f).

Laveist, Thomas A. and John M. Wallace Jr. 2000. "Health Risk and Inequitable Distribution of Liquor Stores in African American Neighborhood." *Social Science and Medicine* 51(4):613–17.

Leonard, Tammy and James C. Murdoch. 2009. "The Neighborhood Effects of Foreclosure." *Journal of Geographical Systems* 11(4):317–32.

Maher, Craig S. and Steven C. Deller. 2011. "Measuring Municipal Fiscal Condition: Do Objective Measures of Fiscal Health Relate to Subjective Measures?" *Journal of Public Budgeting, Accounting and Financial Management* 23(3):427–50.

McDaniel, Susan A. and Julie Rozanova. 2011. "*Canada's Aging Population* (1986) Redux." *Canadian Journal on Aging* 30(3):511-521.

McDonald, Lynn and Peter Donahue. 2011. "Retirement Lost?" *Canadian Journal on Aging* 30(3):401-422.

Meltzer, Joshua, David Steven, and Claire Langley. 2013. "The United States after the Great Recession: The Challenge of Sustainable Growth." *Global Economy and Development at Brookings*.

Morland, Kimberly, Steve Wing, Ana Diez Roux, and Charles Poole. 2002. "Neighborhood Characteristics Associated with the Location of Food Stores and Food Service Places." *American Journal of Preventive Medicine* 22(1):23–29.

NBC News. 2012. “Cities with the most homes in foreclosure.” Retrieved Oct. 16, 2018 (https://www.nbcnews.com/businessmain/cities-most-homes-foreclosure-794509).

Nodjimbadem, Katie. 2017. “The Racial Segregation of American Cities Was Anything But Accidental.” Retrieved Oct. 1, 2018 (https://www.smithsonianmag.com/history/how-federal-government-intentionally-racially-segregated-american-cities-180963494/).

Owens, Ann and Robert J. Sampson. 2013. “Community Well-Being and the Great Recession.” *Pathways* (Spring):3–7.

Payne, Carolyn, Eric C. Hedberg, Michael Kozloski, William Dale, and Martha K. McClintock. 2014. “Using and Interpreting Mental Health Measures in the National Social Life, Health, and Aging Project.” *The journals of gerontology. Series B, Psychological sciences and social sciences* 69 Suppl 2:S99–116. Retrieved (http://www.ncbi.nlm.nih.gov/pubmed/25360028).

Pearce, Jamie, Karen Witten, and Phil Bartie. 2006. “Neighbourhoods and Health: A GIS Approach to Measuring Community Resource Accessibility.” *Journal of Epidemiology and Community Health* 60(5):389–95.

Pearlin, Leonard I. 1989. "The Sociological Study of Stress." *Journal of Health and Social Behavior* 30(3):241-256.

Pearlin, Leonard I., Carol S. Aneshensel, and Allen J. LeBlanc. 1997. “The Forms and Mechanisms of Stress Proliferation: The Case of AIDS Caregivers.” *Journal of Health and Social Behavior* 38(3):223–36.

Pearlin, Leonard I., Elizabeth G. Menaghan, Morton A. Lieberman, and Joseph T Mullan. 1981. “The Stress Process.” *Journal of Health and Social Behavior* 22(4):337-356.

Pemberton, Simon and Rachel Humphris. 2016. “Locality, Neighbourhood and Health: A Literature Review.” *IRiS Working Paper Series No. 13/2016:*1-19. Retrieved (www.birmingham.ac.uk/iris).

Phillips, Julie A., and Colleen N. Nugent. 2014. "Suicide and the Great Recession of 2007–2009: the role of economic factors in the 50 US states." *Social Science & Medicine* 116:22-31.

Pool, Lindsay R., Belinda L. Needham, Sarah A. Burgard, Michael R. Elliott, and Carlos F. Mendes de Leon. 2017. “Negative Wealth Shock and Short-Term Changes in Depressive Symptoms and Medication Adherence among Late Middle-Aged Adults.” *Journal of Epidemiology and Community Health* 71(8):758–63.

Rix, Sara E. 2011. “Recovering from the Great Recession: Long Struggle Ahead for Older Americans.” *AARP Policy Institute*.

Robert, Stephanie and James S. House. 1996. "SES differentials in health by age and alternative indicators of SES." *Journal of aging and health* 8(3): 359-388.

Rundle, Andrew, Ana V. Diez Roux, Lance M. Freeman, Douglas Miller, Kathryn M. Neckerman, and Christopher C. Weiss. 2007. "The Urban Built Environment and Obesity in New York City: A Multilevel Analysis." *American Journal of Health Promotion* 21(4_suppl):326-334.

Sampson, Robert J. and W. Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American Journal of Sociology* 94(4):774-802.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277(5328):918–24.

Trawinski, Lori A., 2012. "Nightmare on Main Street: Older Americans and the Mortgage Market Crisis." *AARP Public Policy Institute*.

Turcotte, Martin and Grant Schellenberg. 2007. *A portrait of seniors in Canada, 2006*. Statistics Canada, Social and Aboriginal Statistics Division.

United States Bureau of Labor Statistics. "CPI Inflation Calculator." Retrieved July 11, 2017 (https://data.bls.gov/cgi-bin/cpicalc.pl).

United States Bureau of Labor Statistics. "Local Area Unemployment Statistics." Retrieved July 15, 2017 (https://data.bls.gov/cgi-bin/dsrv?la).

United States Census Bureau. 2012. "Geographic Terms and Concepts – Census Tract." Retrieved June 19, 2018 (https://www.census.gov/geo/reference/gtc/gtc_ct.html).

United States Census Bureau. 2016. "Metropolitan and Micropolitan." Retrieved Jan. 7, 2018 (https://www.census.gov/programs-surveys/metro-micro/about/glossary.html).

United States Census Bureau. "American FactFinder." Retrieved July 9, 2017 (https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml).

Vanderhorst, R. K. and Suzanne McLaren. 2005. "Social Relationships as Predictors of Depression and Suicidal Ideation in Older Adults." *Aging and Mental Health* 9(6):517–25.

van Hooijdonk, Carolien, Mariël Droomers, Jeanne A. M. van Loon, Fons van der Lucht, and Anton E. Kunst. 2007. "Exceptions to the Rule: Healthy Deprived Areas and Unhealthy Wealthy Areas." *Social Science and Medicine* 64(6):1326–42.

van Kempen, Ronald, Gideon Bolt, and Maarten van Ham. 2016. "Neighborhood Decline and the Economic Crisis: An Introduction." *Urban Geography* 37(5):655–63. Retrieved (http://dx.doi.org/10.1080/02723638.2015.1096123).

Waite, Linda J., Kathleen Cagney, William Dale, Elbert Huang, Edward O. Laumann, Martha McClintock, Colm A. O'Muircheartaigh, L. Phillip Schumm, and Benjamin Cornwell. National Social Life, Health, and Aging Project (NSHAP): Wave 2 and Partner Data

Collection. ICPSR34921-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014-04-29. https://doi.org/10.3886/ICPSR34921.v1extlink

Waite, Linda J., Edward O. Laumann, Wendy Levinson, Stacy Tessler Lindau, and Colm A. O'Muircheartaigh. National Social Life, Health, and Aging Project (NSHAP): Wave 1. ICPSR20541-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2014-04-30. https://doi.org/10.3886/ICPSR20541.v6

Wang, Kyungsoon and Dan Immergluck. 2018. "The Geography of Vacant Housing and Neighborhood Health Disparities After the U.S. Foreclosure Crisis." *Cityscape* 20(2):145–70.

Wheaton, Blair, and Philippa Clarke. 2003. "Space Meets Time: Integrating Temporal and Contextual Influences on Mental Health in Early Adulthood." *American Sociological Review* 68(5):680-706.

Williams, Sonya, George Galster, and Nandita Verma. 2013. "The Disparate Neighborhood Impacts of the Great Recession: Evidence from Chicago." *Urban Geography* 34(6):737–63.

Wilson, Chris. 2017. "These Are the Most Economically Segregated Cities in America." Retrieved Oct. 2, 2018 (http://time.com/4744296/economic-segregation-cities-america/).

Wodtke, Geoffrey T., Felix Elwert, and David J. Harding. 2016. "Neighborhood effect heterogeneity by family income and developmental period." *American Journal of Sociology* 121(4):1168-1222.

Yilmazer, Tansel, Patryk Babiarz, and Fen Liu. 2015. "The Impact of Diminished Housing Wealth on Health in the United States: Evidence from the Great Recession." *Social Science and Medicine* 130:234–41. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2015.02.028).

Zivin, Kara, Madgalena Paczkowski, and Sandro Galea. 2011. "Economic Downturns and Population Mental Health: Research Findings, Gaps, Challenges and Priorities." *Psychological Medicine* 41(7):1343–48.

Zwiers, Merle, Gideon Bolt, Maarten Van Ham, and Ronald Van Kempen. 2016. "The Global Financial Crisis and Neighborhood Decline." *Urban Geography* 37(5):664–84. Retrieved (http://dx.doi.org/10.1080/02723638.2015.1101251).

Acknowledgements

I acknowledge support from the Canadian Social Sciences and Humanities Research Council (Insight Development Grant #231615) and from the Ontario Ministry of Research and Innovation Early Researcher Award. Data were made available by the Interuniversity Consortium for Political and Social Research, Ann Arbor, MI. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

This research was supported by the Social Sciences and Humanities Research Council of Canada. I also acknowledge support from the Ontario Student Assistance Program.

The National Social Life, Health and Aging Project is supported by the National Institute on Aging of the National Institutes of Health (R37AG030481; R01AG033903). Within the National Institutes of Health, the National Social Life, Health and Aging Project is also supported by the Office of Women's Health Research, the Office of AIDS Research, and the Office of Behavioral and Social Sciences Research (R01AG021487).

The author acknowledges the National Opinion Research Center Data Enclave for providing researcher support and access to the data used in this research.

The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health nor the National Opinion Research Center.

Foreclosure data were obtained from ATTOM Data Solutions.

Tables

Table 3.1. Descriptive Statistics (N = 1,341)

Variables	**Wave 1 (2005-2006)**		**Wave 2 (2010-2011)**	
Dependent Variable	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**
Index of Depressive Symptoms	0.00	0.56	0.00	0.57
MSA–Level Independent Variables				
Logged Median Home Price[a]	12.24	0.52	12.18	0.42
Logged Median Household Income[a]	10.86	0.20	10.83	0.18
Index of Resources[a]	0.07	1.01	-0.07	0.87
Unemployment Rate (%)	5.28	1.30	9.77	2.18
Home Foreclosure Rate (%)	0.07	0.05	0.24	0.18
Census Tract–Level Independent Variable				
Index of Concentrated Disadvantage	0.00	0.66	0.00	0.62

[a] Note: Values at wave 1 were adjusted for inflation between waves 1 and 2 by multiplying them by 1.11652 before they were log transformed.

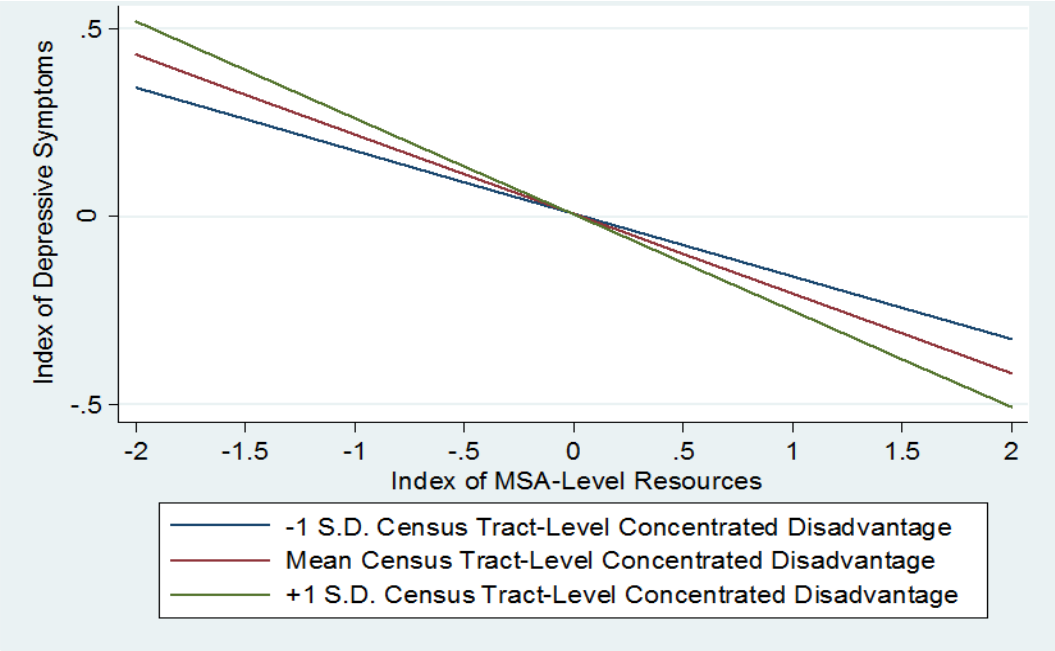
Table 3.2. Fixed-Effects Linear Regression Analyses of the Impact of an Index of City-Level Resources upon Depressive Symptoms

VARIABLES	Model 1	Model 2
Index of MSA-Level Resources	-0.222**	-0.210**
	(0.073)	(0.073)
Index of Census Tract-Level Concentrated Disadvantage	-0.010	-0.002
	(0.060)	(0.060)
Index of MSA-Level Resources *		-0.067*
Index of Census Tract-Level Concentrated Disadvantage		(0.033)
Constant	0.010	0.007
	(0.007)	(0.006)
Observations	2,681	2,681
R-squared	0.019	0.022
Number of Respondents	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

Figures

Figure 3.1. Graph Displaying how the Index of Depressive Symptoms is Affected by the Interaction between an Index of MSA-Level Resources and Census Tract-Level Concentrated Disadvantage



Supplementary Appendix

Table 3.A-1. Fixed-Effects Linear Regression Analyses of the Impact of City-Level Median Home Prices upon Depressive Symptoms

VARIABLES	Model 1	Model 2
Logged Median Home Price – MSA	-0.368**	-0.365**
	(0.132)	(0.128)
Index of Census Tract-Level Concentrated Disadvantage	0.017	1.673^
	(0.058)	(0.943)
Logged Median Home Price – MSA *		-0.134^
Index of Census Tract-Level Concentrated Disadvantage		(0.074)
Constant	4.508**	4.468**
	(1.615)	(1.564)
Observations	2,681	2,681
R-squared	0.016	0.020
Number of Respondents	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

Table 3.A-2. Fixed-Effects Linear Regression Analyses of the Impact of City-Level Median Household Incomes upon Depressive Symptoms

VARIABLES	Model 3	Model 4
Logged Median Household Income – MSA	-0.817*	-0.743*
	(0.322)	(0.321)
Index of Census Tract-Level Concentrated Disadvantage	-0.011	3.572*
	(0.063)	(1.729)
Logged Median Household Income – MSA *		-0.330*
Index of Census Tract-Level Concentrated Disadvantage		(0.157)
Constant	8.865*	8.055*
	(3.496)	(3.481)
Observations	2,681	2,681
R-squared	0.012	0.015
Number of Respondents	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

Table 3.A-3. Fixed-Effects Linear Regression Analyses of the Impact of City-Level Unemployment Rates (%) upon Depressive Symptoms

VARIABLES	Model 5	Model 6
Unemployment Rate (%) – MSA	0.014**	0.014**
	(0.005)	(0.005)
Index of Census Tract-Level Concentrated Disadvantage	-0.002	0.028
	(0.064)	(0.081)
Unemployment Rate (%) – MSA *		-0.004
Index of Census Tract-Level Concentrated Disadvantage		(0.006)
Constant	-0.106**	-0.103*
	(0.039)	(0.041)
Observations	2,681	2,681
R-squared	0.017	0.018
Number of Respondents	1,341	1,341

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

Table 3.A-4. Fixed-Effects Linear Regression Analyses of the Impact of City-Level Foreclosure Rates (%) upon Depressive Symptoms

VARIABLES	Model 7	Model 8
Percentage of Homes Foreclosed – MSA	0.352***	0.347***
	(0.083)	(0.086)
Index of Census Tract-Level Concentrated Disadvantage	-0.008	0.003
	(0.058)	(0.061)
Percentage of Homes Foreclosed – MSA *		-0.071
Index of Census Tract-Level Concentrated Disadvantage		(0.112)
Constant	-0.061***	-0.060**
	(0.017)	(0.017)
Observations	2,643	2,643
R-squared	0.029	0.029
Number of Respondents	1,322	1,322

Robust standard errors in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

Chapter 4

Changes in Neighbourhood-Level Concentrated Disadvantage and Social Networks among Older Americans

Abstract

Social networks provide older persons with many of the resources that allow them to remain healthy and happy. Networks also constitute the pathways through which supports are provided. Scholars have shown how social networks are characterized by instability and undergo substantial change over time. However, there is a dearth of research investigating how changing social contexts lead to changes in social network size and to social network turnover. Using the first two waves of the National Social Life, Health, and Aging Project survey (N = 1,776), I study how changing levels of neighbourhood concentrated disadvantage through the Great Recession of 2007-2009 affected turnover in older Americans' social networks. I find that rise in neighbourhood-level concentrated disadvantage is associated with smaller networks of close social ties among older residents. Furthermore, this finding is largely based on less acquisition of new close social ties.

Introduction

The past few decades of social scientific research have shown that social networks are highly consequential for individual people as well as for their communities (Coleman 1988; Wellman 1983). Through social network ties, people gain access to resources and useful information, profit from informal social control over behaviour, and can collectively act upon and alleviate community problems (e.g. Granovetter 1973; Sampson and Groves 1989; Wellman and Wortley 1990). It is not surprising, therefore, that social scientific research has shown social network richness to be predictive of many important outcomes, including socioeconomic achievement, acquisition of needed instrumental and emotional support, life satisfaction, as well as health and mortality (Ajrouch, Blandon, and Antonucci 2005; Cornwell 2015; Cornwell and Behler 2015; Cornwell and Waite 2009; Lin 1999; Wellman and Wortley 1990).

Older adults are no exception to this pattern. Since rich social networks prevent cognitive decline (Barnes et al. 2004) and protect physical and mental health (Cornwell and Waite 2009), scholars have placed social networks at the center of "successful aging" (Rowe and Kahn 1997).

Beyond revealing their importance, scholars have shown how social networks are characterized by instability and undergo substantial change over time (Cornwell 2015; Degenne and Lebeaux 2005; McPherson, Smith-Lovin, and Brashears 2006; Perry and Pescosolido 2012; Wellman et al. 1997), including turnover resulting from the loss and addition of network ties. This realization has led to increased focus on the causes and consequences of social network turnover and change (Snijders and Doreian 2010; Wellman et al. 1997). Social network turnover can potently affect well-being when it leads to a reconfiguration of the norms, expectations, and social influences to which one is regularly exposed (Cornwell 2015), potentially causing a subjective state of alienation and malintegration within one's social environment (Deflem 1989). Furthermore, network turnover can disrupt one's usual routines and hamper one's access to distinct types of emotional and instrumental support (Pescosolido 1992). Additionally, loss of valued social relationships and bonds can cause emotional suffering (Steger and Kashdan 2009). Scholarship has shown how social networks change as a consequence of life course transitions (Degenne and Lebeaux 2005), including important events common in later life such as retirement (Cornwell and Laumann 2011), residential relocation (Stacey-Konnert and Pynoos 1992; Walters and Bartlett 2009), health decline (Cornwell 2009; Perry and Pescosolido 2012), and the death of one's spouse (Cornwell, Laumann, and Schumm 2008; Hatch and Bulcroft 1992).

Of further relevance to the importance of social network turnover are the notable benefits of acquiring new close social ties. For older adults especially, new strong social ties facilitate desirable levels of physical, social, and mental activity (Li 2007; Tan et al. 2009), as well as promote feelings of social embeddedness (Kemp et al. 2012; Street and Burge 2012). Furthermore, new close social ties increase the scope of the social support, resources, and information one can access (Cornwell and Laumann 2015).

Among the factors that can produce change in people's networks, little attention has been given to the role of socio-spatial circumstances. Though some studies show that socioeconomically disadvantaged community contexts are associated with smaller social networks characterized by weaker ties and less provision of support (e.g., Cornwell and Behler 2015; Haines, Beggs, and Hurlbert 2011; Van Eijk 2010), this research has seldom examined community in a dynamic context. A few case studies of specific gentrifying neighbourhoods have shown that community change is consequential for networks (e.g., Chaskin and Joseph 2013; DeSena 2006; Newman and Wyly 2006). This research suggests that gentrifying communities fragment as poorer residents and newcomers avoid establishing close social ties (DeSena 2006), compounding the breakdown of local cultures and neighbourhood social cohesion caused by the dislocation of residents (Newman and Wyly 2006). More optimistically, other scholars have argued that neighbourhood redevelopment provides lower-income residents the benefits of more varied network ties with wealthier individuals (Chaskin and Joseph 2013). However, our knowledge of these processes is limited by a lack of research examining how neighbourhood changes are associated with social network turnover using representative and comprehensive data based on many neighbourhoods. The present study helps fill this research gap through a systematic, nation-wide investigation of how changing neighbourhood-level disadvantage through the Great Recession of 2007-2009 affected the social network turnover of older residents.

Theoretical Perspectives

The present study uses social disorganization theory as an orienting framework. Social disorganization theory suggests that neighbourhood contexts play an important role in the effects of economic shocks upon the quality of life and social lives of older persons. According to this theory, unfavourable economic circumstances lead to the decline of the neighbourhood institutions and informal social networks that control community members' behaviour and that

enhance a community's ability to act in its common interests and solve its shared problems (Ansari 2013; Bursik 1988; Sampson and Groves 1989).

It has been suggested that weakened control over neighbourhood residents might increase criminal and delinquent behaviour as the costs of deviance are reduced (Bursik 1988). This can cause fear and apprehension, leading residents to remain within their homes, to limit their socializing to their strongest network ties, and to avoid engagement in community groups and activities (Aneshensel 2010; Aneshensel et al. 2011). It also creates environments marked by generalized distrust of both neighbourhood residents and non-residents (Ross, Mirowsky, and Pribesh 2001). Since older persons' high levels of fear of violence and other forms of crime can result in less physical activity and social engagement (Fried and Barron 2005; Piro, Nœss, and Claussen 2006), these effects might serve as obstacles against them acquiring new social ties and maintaining old ones. Additionally, these effects reduce the attractiveness of neighbourhoods to potential in-migrants. This might reduce the pool of new persons with whom neighbourhood residents could potentially form strong social ties.

Furthermore, residents of declining neighbourhoods face daily strains resulting from mistrust of their neighbours and fears for their own safety, as well as reduced accessibility of economic, social, and institutional resources, all of which cause stress and depression (Kim 2010). This can compromise residents' ability and motivation to develop, maintain, and strengthen close social ties, both within and outside of their neighbourhoods (Cornwell and Behler 2015). Additionally, depression is associated with unattractive behaviour that can compromise a person's social desirability (Schaefer, Kornienko, and Fox 2011) to both neighbours and non-neighbours.

Moreover, as local institutions and gathering places, including recreational venues, churches, and senior centers, weaken within declining neighbourhoods (Sampson 2012; Wilson 1987), residents lose important opportunities for the development and maintenance of social ties, as well as for the provision and acquisition of social support (Desmond 2012; Glass and Balfour 2003; Klinenberg 2002; Small 2009). As well as drawing in neighbourhood residents, these local institutions attract non-residents (Van Eijk 2010). Their decline can therefore compromise the development and maintenance of both local and nonlocal social ties among residents (Van Eijk 2010).

The importance of these potential neighbourhood effects for older residents is further accentuated by the increased spatial confinement that comes with aging (Glass and Balfour 2003). Whether this confinement is due to retirement, reduced functionality, or other developments over the life course, older adults disproportionately spend their time near their own homes (Krantz-Kent and Stewart 2007). This might make older individuals more dependent on their immediate environments for remaining socially engaged and active, and thus more vulnerable to reduced neighbourhood quality and social cohesion (Lawton and Nahemow 1973).

In discussing potential neighbourhood effects, it is also important to distinguish between stable and changing neighbourhood circumstances. It is conceivable that under stable circumstances of neighbourhood disadvantage, older residents have adjusted to their immediate environments and will show limited changes in their social networks through time. On the other hand, exposure to worsened neighbourhood circumstances to which one has not yet adapted might reduce older residents' development, maintenance, and cultivation of social ties with both neighbourhood residents and non-residents. Existing research offers some insight on how older residents often struggle to adapt to neighbourhood change. Gentrifying neighbourhoods cause anxiety and depression among both older persons of higher levels of income and among those who are socioeconomically disadvantaged (Smith, Lehning, and Kim 2018). While the former might especially fear rising housing costs, the substitution of previous services and earlier businesses, as well as potential displacement, the latter might be more affected by feelings of exclusion from their changing communities (Smith et al. 2018). Exclusion of older adults within gentrifying neighbourhoods is significantly based on the shutdown of community amenities dedicated to the social well-being and integration of older residents (Burns, Lavoie, and Rose 2012). More generally, older people within changing neighbourhoods often feel that they fit in less well with their social surroundings, leading to sentiments of uneasiness and lack of security (Yen et al. 2012).

Neighbourhood Change through the Great Recession of 2007-2009

The present study investigates neighbourhood changes in the context of the Great Recession of 2007-2009, which was the most extensive global economic shock since the 1930s' Great Depression (Meltzer, Steven, and Langley 2013). This economic shock involved the

collapse of the property market, which caused severe losses within the financial sector and an acute recession during which the median American family faced a 40% reduction in its net worth. From 2007 to 2009, America's unemployment rate rose from 4.6% to 9.3%, while its real GDP decreased by 3.1% and its real personal income per capita dropped by 8.3% (Meltzer et al. 2013).

Through this recession, American neighbourhoods underwent an average of a 4 percentage point rise in rates of unemployment, a 1 percentage point increase in rates of abandoned and vacant homes, and a 2 percentage point rise in rates of poverty (Owens and Sampson 2013). While most American neighbourhoods were economically impacted by this recession (Owens and Sampson 2013; Van Kempen, Bolt, and Van Ham 2016; Zwiers et al. 2016), there was substantial variation in how they were affected. Neighbourhoods that were already disadvantaged pre-recession tended to be more potently impacted (Grusky, Western, and Wimer 2011; Owens and Sampson 2013; Van Kempen et al. 2016; Williams, Galster, and Verma 2013). Communities with high concentrations of racial minorities and immigrants also fared worse (Downing 2016; Owens and Sampson 2013; Williams et al. 2013). If increased rates of poverty through the recession had been equally spread across American census tracts (a commonly used proxy for American neighbourhoods, see below), only about 800 neighbourhoods would have reached a poverty rate of 40% and thus become newly categorized as an area of extreme poverty (Kneebone and Holmes 2016). However, 2,700 census tracts crossed that threshold because of the Great Recession (Kneebone and Holmes 2016). This fits the fact that wealthier neighbourhoods, whose residents have more resources and power, have more relative capability to protect themselves from economic shocks (Solari 2012), while poorer communities are less able to collectively resist undesired changes and are more likely to endure continued, accelerated decline (Kirk and Laub 2010).

The effects of the Great Recession upon American communities can be traced to some important neighbourhood-level processes. Higher rates of home foreclosures (Chatterjee and Eyigungor 2015; NBC News 2012; Wang and Immergluck 2018) and decreasing home values (Arias, Gascon, and Rapach 2016; Chatterjee and Eyigungor 2015; Gray and Scardamalia 2014) through the recession were associated with neighbourhood-level externalities that hamper social cohesion (Lerman and Zhang 2012), decrease the maintenance and upkeep of neighbourhood homes and properties, and increase levels of crime (Leonard and Murdoch 2009; Lerman and

Zhang 2012). Furthermore, this recession reduced to various extents the affluent circumstances of many prosperous neighbourhoods (Solari 2012).

Scholars have identified numerous links between neighbourhood decline through the Great Recession and residents' health and quality of life. For example, rising neighbourhood-level foreclosure rates have been associated with significant depressive symptomatology (Cagney et al. 2014). Furthermore, neighbourhoods undergoing substantial housing instability were marked by heightened levels of stress, residential crowding, and homelessness (Burgard and Kalousova 2015). These neighbourhoods also had higher risks of illness since abandoned foreclosed buildings accumulated disease-carrying insects and rodents (Burgard and Kalousova 2015). To this scholarship, the present study adds two other important components of residents' quality of life: the size of and turnover within their networks of close confidants.

Variation by Urban/Rural Context

There are reasons to believe that the mechanisms through which recession-era neighbourhood declines impact social network turnover might differ between urban and rural settings. Concerning general social life within urban communities, foundational works emphasized that overstimulation and exposure to stressors leads to a lack of trust, to fear, to the erosion of strong social bonds, and to the limiting of social interactions to impersonal, instrumental, and transitory exchanges (Milgram 1970; Simmel 1971); however, some scholars have casted doubt on the broad accuracy and generalizability of these claims (Fischer 1981; Wellman and Leighton 1979). Sparser rural neighbourhoods, on the other hand, tend to include strong and dense social networks of people holding similar values and following a common way of life, and are relatively isolated and self-contained (Wuthnow 2018). As regards differences in economic declines through the recession, unemployment rates rose more in urban than in rural settings (Mattingly, Smith, and Bean 2011; Thiede and Monnat 2016), at least partly because rural communities' older and less educated populations faced labour market problems pre-recession, resulting in less room for further labour market decline (Thiede and Monnat 2016). However, recovery from the recession has been slower in rural areas, in large part because their sparser opportunities for paid work, their shrinking population sizes, their weak infrastructure, and the insufficiency of the public investment they receive hinder their economic strength (Heinrich 2017). As urban areas declined through the recession, their higher population densities implied rising disadvantage that was especially geographically concentrated, resulting in more

threatening, dangerous, insecure, and unstable environments in which violence and other social problems were accentuated (see Peterson and Krivo 1999). Within urban areas, increasing disadvantage through the recession might thus have primarily affected social network turnover through the accentuation of fear, threat, and insecurity. On the other hand, the isolation and self-containment of rural communities (Wuthnow 2018) imply that residents lacked new places and alternatives to turn to when neighbourhood institutions, infrastructure, and employment opportunities declined. This may have limited their options for the cultivation of new social ties as the locales and activities that would have otherwise sustained earlier social connections were compromised.

Gender Variation

Gender is also important to consider in studies of social network change within changing neighbourhoods. Within disadvantaged neighbourhoods, and during times of distress more generally, women tend to actively provide support to neighbourhood residents (Fischer and Beresford 2015; Schieman 2005). This is especially true among older women (Newman 2003). Rather than restricting their social activity, women facing declining neighbourhood conditions might increase their community engagement and acquire new strong social ties. Women also tend to have large social networks with higher levels of closeness and frequency of social contact (Fischer and Beresford 2015; Liebler and Sandefur 2002). The strength of women's social bonds might make them less likely to lose close ties when neighbourhood circumstances worsen.

Research Questions and Hypotheses

I ask whether and how changing neighbourhood conditions through the Great Recession affected the size of older residents' networks of close confidants, as well as turnover within those networks. Based on social disorganization theory, I hypothesize that rising neighbourhood-level concentrated disadvantage will be associated with smaller networks of close confidants, lower likelihoods of acquiring new close social ties, and higher probabilities of losing earlier close social ties.

I further hypothesize an interaction effect between change in neighbourhood-level concentrated disadvantage and urban/rural location. Although fear might be accentuated within urban neighbourhoods as concentrated disadvantage rises, and although this increased fear might be consequential for residents' social lives, I expect that many urbanites have already to some

extent adapted to the general apprehensiveness, suspicion, and fear, as well as other constraints on social engagement commonplace within many urban environments. As such, I hypothesize that among urban residents, increasing neighbourhood disadvantage will be less consequential for social network size and turnover. On the other hand, I expect especially strong effects of increasing neighbourhood disadvantage upon social networks within rural communities, because of the lack of alternatives for rural dwellers when neighbourhood institutions, locales, activities, infrastructure, and employment opportunities decline. I thus hypothesize that rising neighbourhood disadvantage will do more to shrink social networks, impede the development of new ties, and harm earlier strong social ties within rural settings.

I also hypothesize an interaction effect based on women's stronger social networks characterized by higher frequencies of social contact and extents of closeness. I expect that women's social networks will be less affected by increasing neighbourhood-level concentrated disadvantage relative to men.

Data and Methods

Sample

I employed the National Social Life, Health, and Aging Project (NSHAP) as my source of variables at the individual level. This dataset is a longitudinal panel study of a representative sample of older Americans with a focus on health, quality of life, and social relationships. The NSHAP's complex multi-stage area probability sampling design is discussed in Suzman (2009) and O'Muircheartaigh, Eckman, and Smith (2009). At wave 1 (2005-2006), 3,005 respondents from 57 to 85 years of age were interviewed. The response rate at wave 1 was 75.5%. Among wave 1 respondents, 75.2% also took part in the second wave of data collection (2010-2011). As the peak of the Great Recession occurred between the first two waves of data collection, this dataset is highly effective for the present study.

Since I am interested in how changes within census tracts through the Great Recession affected older adults' social networks, I study respondents who did not change their census tracts between the two waves (n = 1,788). Additionally, excluding respondents who changed their census tracts helps rule out the prospect that some respondents in the present study experienced pronounced social network turnover only because they moved into new neighbourhoods. Therefore, while 2,261 NSHAP respondents were re-interviewed at wave 2, my analytical

sample includes 1,788 respondents. In accordance with other scholars (e.g., Estabrooks, Lee, and Gyurcsik 2003; LaVeist and Wallace Jr. 2000; Morland et al. 2002), I used census tracts as approximations for neighbourhoods. Census tracts are defined as:

> small, relatively permanent statistical subdivisions of a county or equivalent entity…. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement…. Census tract boundaries generally follow visible and identifiable features. (United States Census Bureau 2012)

I linked respondents with characteristics of their census tracts through protected geodata obtained from the National Opinion Research Center via special contractual arrangements. My analytical sample includes 387 census tracts. On average, there are 4.59 respondents per census tract. The minimum number of respondents per census tract is 1, while the maximum is 24.

All census tract-level wave 1 variables were obtained from the 2000 Decennial Census. The 2006-2010 American Community Survey was the source of all wave 2 variables at the census tract level. With regards to the latter, 2006 to 2010 data were averaged since each individual year included too few respondents per census tract.

Respondents who remained within my analytical sample at wave 2 tended to have more close social ties, tended to be younger, were more likely to be married, were less likely to be separated/divorced/widowed/never married, had been residing in their neighbourhood longer, tended to be more educated, were more likely working for pay, had more household assets, were of higher physical and functional health, had less depression, and had higher rates of religious attendance compared to those who moved or were not successfully re-interviewed. On all else, including census tract-level concentrated disadvantage at wave 1, there were no significant differences.

Dependent Variables

I employ several outcomes based on social network size and turnover between the two waves (Cornwell 2015). At each wave, survey respondents were asked, “Looking back over the last 12 months, who are the people with whom you most often discussed things that were important to you?” Respondents could list up to five discussion partners. If one’s partner was left off the list, this partner could serve as a sixth network member. Respondents were then asked if there was anyone else with whom they were close whom they had not yet mentioned. This

individual served as a seventh possible network member. As such, respondents' social network size spans from zero to seven. The variables I use denoting features of personal networks are based on the social networks developed through this name generator technique.

At wave 2, respondents were asked for every network member identified if this person was included within their wave 1 social network. I thereby built a variable for number of new network ties based on the number of network members in wave 2 who were not included in wave 1. Furthermore, respondents reported for each network member at wave 1 whether this person was included within their wave 2 social network. This allowed me to construct a variable for number of network ties lost based on the number of network members in wave 1 who were no longer network members in wave 2. These two variables serve as measures of network turnover between the two waves.

Central Independent Variable

I employ the index of census tract-level concentrated disadvantage developed by Sampson, Raudenbush, and Earls (1997), based on percentage of the population below the poverty line, percentage of households on public assistance, percentage of female-headed households, percentage of individuals unemployed, percentage of individuals less than 18 years of age, and percentage of individuals who are non-white. This index has high internal reliability (wave 1 Cronbach alpha: 0.91, wave 2 Cronbach alpha: 0.84). Exploratory factor analyses (EFAs) show that across both waves, these six items fit into one factor (according to the Kaiser criterion). The EFAs further provide factor loadings for each of the six component measures at both waves of the NSHAP. According to a confirmatory factor analysis, the factor structure of these six items is significantly different across waves 1 and 2; a factor structure presents the correlational relationships between a group of variables used to develop a latent variable. Nonetheless, my results were substantively the same employing the first and second wave factor loadings. Therefore, all results I report and discuss are based on the wave 1 factor loadings. I created this index of concentrated disadvantage by standardizing all six component measures, multiplying each standardized component measure by its wave 1 factor loading, and then computing the average of these six scores, separately at each wave. I then created a variable for change in concentrated disadvantage by subtracting wave 2 scores by wave 1 scores. While all models I employ control for concentrated disadvantage at wave 1, my focus is on change in concentrated disadvantage between the two waves.

Control Variables

At the census tract level, I controlled for population density at wave 1 (persons per square mile). Because this variable is right skewed, I computed its natural logarithm. I further controlled for whether a census tract is in a metropolitan statistical area (MSA). I also included a control variable for census tract-level residential instability at wave 1. This variable denotes the proportion of the residents of each census tract that lived in a different home in the year 2000 than in the year 1995.

I control for an assortment of sociodemographic measures. These include gender (reference category = male), age at wave 1 (divided by ten to develop more substantial incidence-rate ratios), race/ethnicity (white (ref.), African American, Latino, other), highest level of education (no high school diploma (ref.), high school diploma but no university degree, university degree), and total household assets at wave 1 (I computed the natural logarithm to reduce the right skew). I also included a control variable for number of years of residence in one's local area at wave 1 since this might affect the breadth and strength of social ties developed with nearby residents (Kasarda and Janowitz 1974).

I employed two multinomial categorical variables based on paid work and marital status at wave 1. This is in recognition of the fact that paid employment and marital status can potently affect social networks (Börsch-Supan and Schuth 2013; Chipperfield and Havens 2001; Cornwell 2009; Cornwell et al. 2008; Mor-Barak et al. 1992; Ward, Logan, and Spitze 1992). The categories for paid work are: working for pay (ref.), retired, and not working for pay for reasons other than retirement. The categories for marital status are: married (ref.), living with a partner, separated, divorced, widowed, and never married.

I controlled for several health-related variables at wave 1. Self-rated physical health was assessed on a continuous scale from (1) poor to (5) excellent. I developed a continuous index of functional health problems based on average scores on seven activities of daily living (walking across a room, walking one block, bathing, dressing, getting in or out of bed, eating, and using toilet). Answers for each activity ranged from (0) no difficulty to (3) unable to do. I also employed an index of depressive symptoms based on ten items from the eleven-item short form version of the Center for Epidemiologic Studies Depression Scale (CES-D). I excluded an item based on having felt lonely over the past week since loneliness is closely linked with interactions within one's social network, and thus conceptually overlaps with this study's dependent

variables. Among the ten CES-D items are measures such as the extent to which respondents felt depressed, had restless sleep, enjoyed life, did not feel like eating, could not get going, etc., over the last week. Respondents answered each question on an ordinal scale from (1) rarely or none of the time to (4) most of the time. Two of these ten items were reverse coded so that all items indicated more depression. An EFA revealed that these ten items fit into one factor (based on the Kaiser criterion). This factor was developed through averaging standardized scores on all ten measures at wave 1. The internal reliability of this index is high (Cronbach alpha greater than 0.70).

I also controlled for numerous social connectedness variables at wave 1. For each close network member identified, respondents were asked to report their frequency of contact, on an ordinal scale ranging from (1) less than once a year to (8) every day. These scores were averaged across all network members, creating an average frequency of contact score for each respondent. Respondents were also asked to report on closeness with each network member, on an ordinal scale from (1) not very close to (4) extremely close. For each respondent, I computed the average of these scores across all network members. The proportion of each respondent's network of close confidants that were family members was also calculated. I further controlled for attendance at religious services at wave 1 on the following ordinal scale: (0) once or more per week (chosen as the reference category because it has the highest cell size), (1) about once per month, (2) less than once per year to several times per year, and (3) never. I controlled these wave 1 measures because they represent important baseline aspects of respondents' social lives likely to affect social network size and turnover at later points in time.

Analysis

The first model regresses number of close network ties at wave 2 upon number of close network ties at wave 1 (studied as a set of dummy variable categories), change in census tract-level concentrated disadvantage, census tract-level concentrated disadvantage at wave 1, and the full set of control variables. Through controlling for the dependent variable at wave 1, I am employing the lagged dependent variable technique. This type of model is also sometimes referred to as a 'conditional change panel model' (Finkel 1995). This strategy allows estimation of how an independent variable is associated with an outcome at the second wave for fixed values of this outcome at the first wave (Finkel 1995; Kessler and Greenberg 1981; Plewis 1985). This modelling technique reduces concerns that selection effects are driving the central

results. The second model repeats the first analysis with new close ties developed as the dependent variable. The third model repeats the first analysis with close ties lost as the dependent variable. Because the maximum number of close ties that can be lost is the number of close ties at wave 1, I included the size of the close network at wave 1 as an exposure term (thereby controlling for effects based on the size of the social network). Because there is little indication that close network size at wave 2, new ties developed, or ties lost are overdispersed, Poisson regressions were employed.

I used the inverse probability weighting technique recommended by Hawkley et al. (2014) to help minimize bias based on features of respondents more likely to have remained within the sample. Causes for respondents leaving the sample between waves 1 and 2 include death, institutionalization, incapability to locate an interviewee, as well as relocation to a new census tract. An array of health and demographic variables from wave 1, as well as census tract-level concentrated disadvantage at wave 1, were employed to predict inclusion in the sample at wave 2. The inverse predicted probability scores obtained through this logistic regression model were multiplied by the standard weights provided in the NSHAP before being applied within this study's central analyses. I thereby weighted more heavily those who were the least likely to have remained within the sample. Nonetheless, sample attrition might lead to underestimation of how neighbourhood-level declines affect social network turnover, especially if those most vulnerable to neighbourhood-level declines are the least likely to have remained within the sample.

Standard errors were adjusted for clustering at the level of the census tract. Missing data were dealt with through multiple imputation using chained equations. Ten imputed data sets were created. The only variables with 10 percent or more missing data were household assets and length of residence in community. While values of my dependent variables were employed in the multiple imputation process, cases originally missing on these dependent variables were not included in my final analyses (von Hippel 2007), removing twelve respondents. Analyses were conducted with the Stata 15 statistical software package.

Results

The descriptive statistics for this study's variables are displayed in Table 4.1. The average number of close social network ties is slightly higher at wave 2 (4.41) than at wave 1 (4.27). The average number of new ties gained (1.80) is almost the same as the average number of previous ties lost (1.85).

Since the index of neighbourhood-level concentrated disadvantage is based on variables that were standardized within each wave, the wave 1, the wave 2, and the change scores in this variable hold means of zero. At wave 1, the standard deviation (SD) of neighbourhood-level concentrated disadvantage is about two-thirds of that of any of the six standardized component variables. At wave 2, the SD of this variable is slightly lower (0.61). The change score in neighbourhood-level concentrated disadvantage has a SD of 0.32, implying an appreciable amount of variability between sampled neighbourhoods in how they were affected by the Great Recession.

Almost 71% of respondents resided in a census tract within an MSA. On average, respondents resided within census tracts in which 43% of the population had lived in a different residence in the year 2000 than in the year 1995.

At wave 1, 69% of the average respondent's network of close ties was composed of family members. Furthermore, the average respondent reported relatively high average frequency of contact and average closeness with network members.

Table 4.2 displays the results of Poisson regressions that study how size of social network and social network turnover are associated with this study's independent and control variables. Model 1 shows that change towards higher census tract-level concentrated disadvantage is associated with fewer close network ties at wave 2 (incidence-rate ratio (irr): 0.906, $p < 0.01$). Women tend to have more close network ties at wave 2 (irr: 1.068, $p < 0.001$). Compared to those with no high school diploma, those with a high school diploma but no university degree have larger social networks at wave 2 (irr: 1.069, $p < 0.05$). In comparison with those working for pay at wave 1, those not working for pay for reasons other than retirement show smaller close social networks at the second wave (irr: 0.913, $p < 0.01$). A greater average frequency of contact with network members at wave 1 is associated with larger social networks at wave 2 (irr: 1.029, $p < 0.05$). Compared with those who attend religious services at least once per week at the first wave, those never attending religious services have smaller social networks at the second wave (irr: 0.925, $p < 0.01$).

I employed Stata's "margins" command within Model 1 to assess the magnitude of the effect based on the statistically significant focal independent variable: change in neighbourhood-level concentrated disadvantage. I predicted size of social network at wave 2 based on three levels of change in neighbourhood-level concentrated disadvantage: one SD below the mean (-

0.32), the mean (0.00), and one SD above the mean (0.32). All other variables were held at their means, including size of social network at wave 1 (mean = 4.27). A change in concentrated disadvantage of -1 SD predicts a social network size of 4.48 at wave 2. The corresponding prediction for a mean change in concentrated disadvantage is 4.34, and that for a change of +1 SD is 4.20. This implies that going from -1 SD to +1 SD in change in concentrated disadvantage is associated with a decrease in total network size of slightly over a quarter of a tie, which is about 18.1% of the SD of total network size at wave 2. These predictions suggest modest effect magnitudes.

The dependent variable for Model 2 within Table 4.2 is new close social ties gained. A change towards higher census tract-level concentrated disadvantage is associated with fewer new close network ties developed by wave 2 (irr: 0.826, $p < 0.01$). There is evidence that compared with whites, those of races other than white, African American, or Latino are more likely to gain new close social ties by wave 2 (irr: 1.273, $p < 0.05$). Compared with those working for pay at wave 1, those not in paid employment for reasons other than retirement show less gain of new close social ties by wave 2 (irr: 0.787, $p < 0.01$). Those with a higher proportion of close network ties at wave 1 who were family members are less likely to have developed new close social ties (irr: 0.536, $p < 0.001$). A higher extent of closeness with social network members at wave 1 is also associated with fewer new close social ties developed by wave 2 (irr: 0.890, $p < 0.05$). Less frequent attendance at religious services is also associated with fewer new close social ties developed at the second wave.

Since within Model 2, change in neighbourhood-level concentrated disadvantage is statistically significant, I conducted the same effect magnitude analysis using Stata's "margins" command that was employed within Model 1. While a change in concentrated disadvantage of -1 SD suggests 1.79 new ties at wave 2, a mean change in concentrated disadvantage implies 1.68 new ties gained at wave 2, and a change of +1 SD suggests 1.58 new ties acquired by wave 2. In this analysis as well, these predictions imply modest effect sizes.

Model 3 displays the results of a Poisson regression analysis in which close social ties lost between the two waves is the dependent variable. None of the census tract-level variables are significantly associated with close social ties lost. Higher age implies a higher likelihood of losing close social ties (irr: 1.054, $p < 0.05$). African Americans are more likely than whites to lose close social ties (irr: 1.153, $p < 0.05$). Higher levels of education are associated with less

loss of close network ties. In comparison with those working for pay at the first wave, those retired show less loss of close network ties (irr: 0.920, $p < 0.05$). A higher proportion of wave 1 close social network members who were family (irr: 0.624, $p < 0.001$), higher frequency of contact with wave 1 close social network members (irr: 0.891, $p < 0.001$), and greater closeness with wave 1 social network members (irr; 0.851, $p < 0.001$) are all associated with fewer close social ties lost. These is evidence that less attendance at religious services at wave 1 is associated with less loss of close network ties.

Interaction Analyses

The analyses within models 1, 2, and 3 were repeated with change in neighbourhood-level concentrated disadvantage studied in interaction with whether a census tract is located inside an MSA and gender (results not shown). In no case did an F-test indicate that any of these interaction terms made a significant contribution to model fit.

Discussion

The present study examined how changing levels of neighbourhood concentrated disadvantage are associated with changes in overall close social network size as well as social network turnover. I found that rising neighbourhood-level concentrated disadvantage over the two waves of this study is associated with smaller networks of close confidants, largely due to less acquisition of new close social ties rather than loss of close network members. My results thus reveal that the size of networks of close confidants and social network turnover are neglected pathways through which the economic declines of the Great Recession affected the quality of life of older Americans.

Beyond the health and quality of life benefits of social networks and connectedness more generally, the acquisition of new close social ties might yield specific benefits for the health and well-being of older persons. Cornwell and Laumann (2015) suggest that gain of new close ties expands variety within the influences to which one is exposed, the forms of social support one can access, as well as the social capital from which one might profit. Furthermore, supportive ties with new friends uphold older persons' self-regard, life satisfaction, and sense of social integration (Kemp et al. 2012; Street and Burge 2012). They also help older adults regulate negative emotions and maintain high levels of physical, cognitive, and social activity, all of which are associated with higher physical and mental health (Li 2007; Tan et al. 2009). For all

these reasons, older persons who fail to gain new close social network members over time might face some negative consequences for their health and well-being.

The present study's findings support my hypothesis based on social disorganization theory that worsening neighbourhood conditions serve as obstacles to older residents gaining new close social ties, and thereby lead to smaller close social networks over time. This effect might be partly based on heightened levels of apprehension and fear, and lower extents of trust that prevent many community residents from becoming involved in community activities, seeking out new close friends, and strengthening their earlier social ties (Aneshensel 2010; Aneshensel et al. 2011). These effects also lessen the appeal of neighbourhoods to potential in-migrants, reducing the supply of new persons with whom neighbourhood residents might develop strong social ties. Additionally, neighbourhood declines lead to detriments in local institutions that attract both neighbourhood residents and non-residents, blocking the development of non-local close social ties (Van Eijk 2010). Furthermore, the daily stresses and challenges, and the levels of depression caused by neighbourhood declines (Kim 2010) can sap older persons of the motivation and ability to develop new close social relationships with persons both within and outside of their communities (Cornwell and Behler 2015). Cornwell and Behler (2015) mention some additional mechanisms through which rising neighbourhood-level concentrated disadvantage can impede the development of new close social ties. These effects might be especially strong among older residents since advancing age is associated with spatial confinement (Glass and Balfour 2003; Krantz-Kent and Stewart 2007), making older persons more dependent upon their immediate contexts to maintain their social engagement and connectedness (Lawton and Nahemow 1973).

Contrary to my hypothesis, I did not find that rising neighbourhood-level concentrated disadvantage leads to greater loss of close network ties. It might be the case that when experiencing declining community conditions, older individuals make concerted efforts to safeguard their current valued and supportive close social ties, while losing the energy and motivation to seek out new close social ties.

Contrary to much scholarship suggesting that the effects of changing neighbourhood contexts upon social network turnover might differ based on one's gender and whether one's census tract is located within a city, neither interaction term made a significant contribution to

model fit. This suggests some uniformity in how rising neighbourhood-level disadvantage leads to smaller social networks and less acquisition of new close social ties among older residents.

Policy Implications

My study reveals a vicious cycle concerning neighbourhoods in decline. Increased neighbourhood-level disadvantage reduces strong social bonds, decreasing a community's capacity to collectively address common concerns in order to prevent further increases in disadvantage. In helping older persons and their communities remain strong during economic shocks, it is worthwhile to invest in community institutions and programs that will maintain the strength of community social capital and cohesion. Feld (1981) discussed the importance of the foci around which social ties and relationships develop. These include any physical or social entities or locales around which collaborative activities are organized. Individuals acting and interacting within these foci will tend to form an interpersonally-linked cluster (Feld 1981). My study suggests that during circumstances of neighbourhood decline through an economic shock, resources should be channeled into the development of such foci, which might include senior centers, exercise facilities and programs, lawn bowling clubs, hobby groups, and coffee shops.

Limitations and Paths for Future Research

One limitation of this study is the fact that I am examining changes over the relatively small span of time of five to six years. As neighbourhood changes happen gradually, a longer span of time might be required for the full effects of neighbourhood declines upon social networks to occur. Were this study to be conducted over a longer span of time, say ten years, we might find that rising neighbourhood-level concentrated disadvantage also causes loss of earlier close social ties. If older persons' distrust and fear reach very high levels, they might be reluctant to leave their homes even to meet with their earlier trusted close network ties. If their levels of stress and depression reach very high extents, they might lose the ability and desire to sustain even their earlier close social ties. As such, a promising path for future research would be to continue this study with a longer span of time.

Another limitation is that I am only studying respondents who remained within the same census tract across the two waves. While the inverse probability weighting technique lessens the impact of the potential bias based on this selectivity, it might be that case that those older individuals most affected by increasing disadvantage within their neighbourhoods are the ones

most likely to relocate into a new census tract. As such, my estimates might be conservative assessments of how increasing neighbourhood-level concentrated disadvantage affects social network turnover. Future research might analyze those who moved to a new census tract in response to increased neighbourhood-level disadvantage. This group of individuals might show unique patterns of change in their networks of close social ties.

Future research should also delve into how the quality of close social ties changes in response to neighbourhood-level economic declines. Interesting variables to consider include the frequency of contact with and closeness of social ties. The same mechanisms that might prevent older persons from developing new social ties might also prevent them from achieving and maintaining high frequencies of contact and levels of closeness with their social ties. On the other hand, the need for mutual support in circumstances of community decline might lead to a process of adaptation in which already strong social ties are further strengthened (Schafer, Shippee, and Ferraro 2009).

Another fruitful path for future research is to study connections specifically among neighbours, who confront the same changing neighbourhood environments. It would be interesting to know if social ties among neighbours erode under worsened neighbourhood conditions, or if troubling circumstances lead neighbours to band together and provide each other with needed instrumental and emotional support.

References

Ajrouch, Kristine. J., Alysia.Y. Blandon, and Toni C. Antonucci. 2005. "Social Networks among Men and Women: The Effects of Age and Socioeconomic Status." *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 60(6):S311-17.

Aneshensel, Carol S. 2010. “Neighborhood as a Social Context of the Stress Process.” Pp. 35-52 in *Advances in the Conceptualization of the Stress Process: Essays in Honor of Leonard I. Pearlin*, edited by Avison, W. R., Aneshensel, C. S., Schieman, S., Wheaton, B. New York: Springer.

Aneshensel, Carol S., Michelle J. Ko, Joshua Chodosh, and Richard G. Wight. 2011. “The Urban Neighborhood and Cognitive Functioning in Late Middle Age.” *Journal of health and social behavior* 52(2):163–79.

Ansari, Sami. 2013. “Social Capital and Collective Efficacy: Resource and Operating Tools of Community Social Control.” *Journal of Theoretical and Philosophical Criminology* 5(2):75–94.

Arias, Maria A., Charles S. Gascon, and David E. Rapach. 2016. “Metro Business Cycles.” *Research Division, Federal Reserve Bank of St. Louis, Working Paper Series*:1-35.

Barnes, Lisa L., C. F. Mendes De Leon, R. S. Wilson, J. L. Bienias, and D. A. Evans. 2004. “Social Resources and Cognitive Decline in a Population of Older African Americans and Whites.” *Neurology* 63(12):2322–26.

Börsch-Supan, Axel, and Morten Schuth. 2013. "29 Early retirement, mental health and social networks." *Active ageing and solidarity between generations in Europe: First results from SHARE after the economic crisis*:337-348.

Burgard, Sarah A. and Lucie Kalousova. 2015. “Effects of the Great Recession: Health and Well-Being.” *Annual Review of Sociology* 41:181–201.

Burns, Victoria F., Jean Pierre Lavoie, and Damaris Rose. 2012. “Revisiting the Role of Neighbourhood Change in Social Exclusion and Inclusion of Older People.” *Journal of Aging Research* 2012.

Bursik, Robert J. 1988. “Social Disorganization and Theories of Crime and Delinquency: Problems and Prospects.” *Criminology* 26(4):519-552.

Cagney, Kathleen A., Christopher R. Browning, James Iveniuk, and Ned English. 2014. “The Onset of Depression during the Great Recession: Foreclosure and Older Adult Mental Health.” *American Journal of Public Health* 104(3):498–505.

Chaskin, Robert J. and Mark L. Joseph. 2013. “‘Positive’ Gentrification, Social Control and the ‘Right to the City’ in Mixed-Income Communities: Uses and Expectations of Space and Place.” *International Journal of Urban and Regional Research* 37(2):480–502.

Chatterjee, Satyajit and Burcu Eyigungor. 2015. “A Quantitative Analysis of the U.S. Housing and Mortgage Markets and the Foreclosure Crisis.” *Review of Economic Dynamics* 18(2):165–84.

Chipperfield, Judith G., and Betty Havens. 2001. "Gender differences in the relationship between marital status transitions and life satisfaction in later life." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 56(3):P176-P186.

Coleman, James S. 1988. “Ecology of the Family as a Context for Human Development. Research Perspectives.” *Developmental Psychology* 22(6):723–42.

Cornwell, Benjamin. 2009. “Good Health and the Bridging of Structural Holes.” *Social Networks* 31(1):92–103.

Cornwell, Benjamin. 2015. “Social Disadvantage and Network Turnover.” *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 70(1):132–42.

Cornwell, Erin Y. and Rachel L. Behler. 2015. “Urbanism, Neighborhood Context, and Social Networks.” *City & Community* 14(3):311–35. Retrieved (http://doi.wiley.com/10.1111/cico.12124).

Cornwell, Benjamin and Edward O. Laumann. 2011. “Network Position and Sexual Dysfunction: Implications of Partner Betweenness for Men.” *American Journal of Sociology* 117(1):172–208.

Cornwell, Benjamin and Edward O. Laumann. 2015. “The Health Benefits of Network Growth: New Evidence from a National Survey of Older Adults.” *Social Science and Medicine* 125:94–106. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2013.09.011).

Cornwell, Benjamin, Edward O. Laumann, and L. Philip Schumm. 2008. "The Social Connectedness of Older Adults: A National Profile." *American Sociological Review* 73(2): 185-203.

Cornwell, Erin York and Linda J. Waite. 2009. “Measuring Social Isolation among Older Adults Using Multiple Indicators from the NSHAP Study.” *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 64 Suppl 1:i38–46.

Deflem, Mathieu. 1989. “From Anomie to Anomia and Anomic Depression: A Sociological Critique on the Use of Anomie in Psychiatric Research.” *Social Science and Medicine* 29(5):627–34.

Degenne, Alain and Marie Odile Lebeaux. 2005. “The Dynamics of Personal Networks at the Time of Entry into Adult Life.” *Social Networks* 27(4):337–58.

DeSena, Judith N. 2006. "“What’s a mother to do?” Gentrification, school selection, and the consequences for community cohesion." *American Behavioral Scientist* 50(2):241-257.

Desmond, Matthew. 2012. "Disposable Ties and the Urban Poor." *American Journal of Sociology* 117(5):1295-1335.

Downing, Janelle. 2016. “The Health Effects of the Foreclosure Crisis and Unaffordable Housing: A Systematic Review and Explanation of Evidence.” *Social Science and Medicine* 162:88–96. Retrieved (http://dx.doi.org/10.1016/j.socscimed.2016.06.014).

Estabrooks, Paul A., Rebecca E. Lee, and Nancy C. Gyurcsik. 2003. “Resources for Physical Activity Participation: Does Availability and Accessibility Differ by Neighborhood Socioeconomic Status?” *Annals of Behavioral Medicine* 25(2):100–104.

Feld, Scott L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86(5):1015-1035.

Finkel, Steven E. 1995. *Causal analysis with panel data (No. 105)*. Thousand Oaks, CA: Sage.

Fischer, Claude S. 1981. "The Public and Private Worlds of City Life." *American Sociological Review* 46(3):306-316.

Fischer, Claude S., and Lauren Beresford. 2015. "Changes in support networks in late middle age: The extension of gender and educational differences." *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 70(1):123-131.

Fried, Linda, and Jeremy Barron. 2005. "Older Adults: *Guardians of Our Cities*." Pp. 177-199 in *Handbook of Urban Health: Populations, Methods, and Practice,* edited by S. Galea and D. Vlahov. New York: Springer Science & Business Media.

Glass, Thomas A., and Jennifer L. Balfour. 2003. "Neighborhoods, Aging, and Functional Limitations." Pp. 303-334 in *Neighborhoods and Health,* edited by I. Kawachi, and L. Berkman. Oxford: Oxford University Press.

Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6):1360-1380.

Gray, Tom and Robert Scardamalia. 2014. "America's Top Metros: Who's Leading the Recovery, and Why." *Civic Report* 89:1-41.

Grusky, David B., Bruce Western, and Christopher Wimer. 2011. "The Consequences of the Great Recession." Pp. 3–20 in *The Great Recession,* edited by David B. Grusky, Bruce Western, and Christopher Wimer. New York: Russell Sage Foundation.

Haines, Valerie A., John J. Beggs, and Jeanne S. Hurlbert. 2011. "Neighborhood Disadvantage, Network Social Capital, and Depressive Symptoms." *Journal of Health and Social Behavior* 52(1):58–73.

Hatch, Laurie Russell, and Kris Bulcroft. 1992. "Contact with friends in later life: Disentangling the effects of gender and marital status." *Journal of Marriage and the Family* 54(1):222-232.

Hawkley, Louise C., Masha Kocherginsky, Jaclyn Wong, Juyeon Kim, and Kathleen A. Cagney. 2014. "Missing Data in Wave 2 of NSHAP: Prevalence, Predictors, and Recommended Treatment." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 69:S38–50.

Heinrich, Martin. 2017. "Understanding Economic Challenges in Rural America." *U.S. Congress Joint Economic Committee: Minority Staff Report (May).*

Kasarda, John D. and Morris Janowitz. 1974. "Community Attachment in Mass Society." *American Sociology Review* 39(3): 328-339.

Kemp, Candace L., Mary M. Ball, Carole Hollingsworth, and Molly M. Perkins. 2012. "Strangers and Friends: Residents' Social Careers in Assisted Living." *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 67 B(4):491–502.

Kessler, R. C., and D. F. Greenberg. 1981. *Linear panel analysis: Models of quantitative change*. New York, NY: Academic Press.

Kim, Joongbaeck. 2010. "Neighborhood Disadvantage and Mental Health: The Role of Neighborhood Disorder and Social Relationships." *Social Science Research* 39(2):260–71. Retrieved (http://dx.doi.org/10.1016/j.ssresearch.2009.08.007).

Kirk, David S. and John H. Laub. 2010. "Neighborhood Change and Crime in the Modern Metropolis." *Crime and Justice* 39(1):441–502. Retrieved (https://www.journals.uchicago.edu/doi/10.1086/652788).

Klinenberg, Eric. 2002. *Heat Wave: A Social Autopsy of Disaster in Chicago*. Chicago, IL: University of Chicago Press.

Kneebone, Elizabeth, and Natalie Holmes. 2016. "U.S. concentrated poverty in the wake of the Great Recession." *Brookings Institute*. Retrieved February 17, 2019 (https://www.brookings.edu/research/u-s-concentrated-poverty-in-the-wake-of-the-great-recession/).

Krantz-Kent, Rachel, and Jay Stewart. 2007. "How Do Older Americans Spend their Time?" *Monthly Labor Review* 130:8-26.

LaVeist, Thomas A. and John M. Wallace Jr. 2000. "Health Risk and Inequitable Distribution of Liquor Stores in African American Neighborhood." *Social Science and Medicine* 51(4):613–17.

Lawton, M.P. and Lucille Nahemow. 1973. *Ecology and the aging process*. Washington, DC, US: American Psychological Association.

Leonard, Tammy and James C. Murdoch. 2009. "The Neighborhood Effects of Foreclosure." *Journal of Geographical Systems* 11(4):317–32.

Lerman, Robert I. and Sisi Zhang. 2012 "Coping with the Great Recession: Disparate Impacts on Economic Well-Being in Poor Neighborhoods." *The Urban Institute*:1-20.

Li, Yunqing. 2007. "Recovering from Spousal Bereavement in Later Life: Does Volunteer Participation Play a Role?" *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 62(4):S257–66. Retrieved (http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed8&NEWS=N&AN=2007565924).

Liebler, Carolyn A. and Gary D. Sandefur. 2002. “Gender Differences in the Exchange of Social Support with Friends, Neighbors, and Co-Workers at Midlife.” *Social Science Research* 31(3):364–91.

Lin, Nan. 1999. “Social Networks and Status Attainment.” *Annual Review of Sociology* 25:467–87.

Mattingly, MJ, KE Smith, and JA Bean. 2011. “Single Parents and Men Hit Hard Unemployment in the Great Recession.” *Carsey Institute* (35).

McPherson, Miller, Lynn Smith-Lovin, and Matthew E. Brashears. 2006. "Social isolation in America: Changes in core discussion networks over two decades." *American Sociological Review* 71(3):353-375.

Meltzer, Joshua, David Steven, and Claire Langley. 2013. “The United States after the Great Recession: The Challenge of Sustainable Growth.” *Global Economy and Development at Brookings*:1-58.

Milgram, Stanley. 1970. “The Experience of Living in Cities.” *Science* 167:1461-1468.

Mor-Barak, Michal E., Andrew E. Scharlach, Lourdes Birba, and Jacque Sokolov. 1992. "Employment, social networks, and health in the retirement years." *The International Journal of Aging and Human Development* 35(2):145-159.

Morland, Kimberly, Steve Wing, Ana Diez Roux, and Charles Poole. 2002. “Neighborhood Characteristics Associated with the Location of Food Stores and Food Service Places.” *American Journal of Preventive Medicine* 22(1):23–29.

National Social Life, Health and Aging Project (NSHAP) Release 2.2 (2013). Chicago, IL: NORC, University of Chicago.

NBC News. 2012. “Cities with the most homes in foreclosure.” Retrieved Oct. 16th, 2018 (https://www.nbcnews.com/businessmain/cities-most-homes-foreclosure-794509).

Newman, Katherine S. 2003. *A Different Shade of Grey: Midlife and Beyond in the Inner City*. New York: The New Press.

Newman, Kathe and Elvin K. Wyly. 2006. “Gentrification and Displacement Revisited A Fresh Look at the New York City Experience.” *New York City Urban Studies* 43(1):23–57. Retrieved (www.urbancentre.utoronto.ca).

O’Muircheartaigh, Colm, Stephanie Eckman, and Stephen Smith. 2009. “Statistical Design and Estimation for the National Social Life, Health, and Aging Project.” *Journal of Gerontology: Social Sciences* 64B(S1):i12–19.

Owens, A. N. N. and Robert J. Sampson. 2013. “Community Well-Being and the Great Recession.” *Pathways* (Spring):3–7.

Perry, Brea L. and Bernice A. Pescosolido. 2012. “Social Network Dynamics and Biographical Disruption: The Case of ‘First-Timers’ with Mental Illness.” *American Journal of Sociology* 118(1):134–75. Retrieved (http://www.journals.uchicago.edu/doi/10.1086/666377).

Pescosolido, Bernice A. 1992. "Beyond rational choice: The social dynamics of how people seek help." *American journal of sociology* 97(4):1096-1138.

Peterson, Ruth D., and Lauren J. Krivo. 1999. "Racial segregation, the concentration of disadvantage, and black and white homicide victimization." *Sociological Forum* 14(3):465-493.

Piro, Fredrik Niclas, Øyvind Nœss, and Bjørgulf Claussen. 2006. “Physical Activity among Elderly People in a City Population: The Influence of Neighbourhood Level Violence and Self Perceived Safety.” *Journal of Epidemiology and Community Health* 60(7):626–32.

Plewis, Ian. 1985. *Analysing Change: Measurement and Explanation Using Longitudinal Data*. New York, NY: John Wiley & Sons.

Ross, Catherine E., John Mirowsky, and Shana Pribesh. 2001. "Powerlessness and the Amplification of Threat: Neighborhood Disadvantage, Disorder, and Mistrust." *American Sociological Review* 66(4):568-591.

Rowe, John W., and Robert L. Kahn. 1997. "Successful aging." *The Gerontologist* 37(4): 433-440.

Sampson, Robert J. 2012. *Great American City: Chicago and the Enduring Neighborhood Effect*. Chicago, IL: University of Chicago Press.

Sampson, Robert J., and Byron W. Groves. 1989. “Community Structure and Crime: Testing Social-Disorganization Theory.” *American Journal of Sociology* 94:774-802.

Sampson, R. J., S. W. Raudenbush, and F. Earls. 1997. “Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy.” *Science* 277(5328):918–24.

Schafer, Markus H., Tetyana Pylypiv Shippee, and Kenneth F. Ferraro. 2009. “When Does Disadvantage Not Accumulate? Toward a Sociological Conceptualization of Resilience.” *Schweizerische Zeitschrift Fur Soziologie* 35(2):231–51.

Schaefer, David R., Olga Kornienko, and Andrew M. Fox. 2011. “Misery Does Not Love Company: Network Selection Mechanisms and Depression Homophily.” *American Sociological Review* 76(5):764–85.

Schieman, Scott. 2005. “Residential Stability and the Social Impact of Neighborhood Disadvantage: A Study of Gender- and Race-Contingent Effects.” *Social Forces* 83(3):1031–64. Retrieved (http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=16832443&site=ehost-live).

Simmel, Georg. [1903] 1971. “Metropolis and Mental Life.” Pp. 324-339 in *On Individuality and Social Forms,* edited by Donald N. Levine. Chicago, IL: University of Chicago Press.

Small, Mario. 2009. *Unanticipated Gains: Origins of Network Inequality in Everyday Life*. New York: Oxford University Press.

Smith, Richard J., Amanda J. Lehning, and Kyeongmo Kim. 2018. “Aging in Place in Gentrifying Neighborhoods: Implications for Physical and Mental Health.” *Gerontologist* 58(1):26–35.

Snijders, Tom AB, and Patrick Doreian. 2010. "Introduction to the special issue on network dynamics." *Social Networks* 32(1):1-3.

Solari, Claudia D. 2012. "Affluent neighborhood persistence and change in US cities." *City & community* 11(4):370-388.

Stacey-Konnert, C. and J. Pynoos. 1992. “Friendship and Social Networks in a Continuing Care Retirement Community.” *Journal of Applied Gerontology* 11(3):298–313.

Steger, Michael F. and Todd B. Kashdan. 2009. “NIH Public Access.” *Journal of Consulting Psychology* 56(2):289–300. Retrieved (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2860146/pdf/nihms-182975.pdf).

Street, Debra and Stephanie Woodham Burge. 2012. “Residential Context, Social Relationships, and Subjective Well-Being in Assisted Living.” *Research on Aging* 34(3):365–94.

Suzman, Richard. 2009. “The National Social Life, Health, and Aging Project: An Introduction.” *Journal of Gerontology: Social Sciences* 64B(S1):i5–11. Retrieved (http://psychsocgerontology.oxfordjournals.org/content/64B/suppl_1/i5.short).

Tan, Erwin J., George W. Rebok, Qilu Yu, Constantine E. Frangakis, Michelle C. Carlson, Tao Wang, Michelle Ricks, Elizabeth K. Tanner, Sylvia McGill, and Linda P. Fried. 2009. “The Long-Term Relationship between High-Intensity Volunteering and Physical Activity in Older African American Women.” *Journals of Gerontology - Series B Psychological Sciences and Social Sciences* 64(2):304–11.

Thiede, Brian C. and Shannon M. Monnat. 2016. “The Great Recession and America’s Geography of Unemployment.” *Demographic Research* 35(1):891–928.

United States Census Bureau. 2012. “Geographic Terms and Concepts - Census Tract.”

Retrieved June 19th, 2018 (https://www.census.gov/geo/reference/gtc/gtc_ct.html).

Van Eijk, Gwen. 2010. “Does Living in a Poor Neighbourhood Result in Network Poverty? A Study on Local Networks, Locality-Based Relationships and Neighbourhood Settings.” *Journal of Housing and the Built Environment* 25(4):467–80.

Van Kempen, Ronald, Gideon Bolt, and Maarten Van Ham. 2016. “Neighborhood Decline and the Economic Crisis: An Introduction.” *Urban Geography* 37(5):655–63. Retrieved (http://dx.doi.org/10.1080/02723638.2015.1096123).

Von Hippel, Paul T. 2007. “Regression with Missing Ys: An Improved Strategy for Analyzing Multiply Imputed Data.” *Sociological Methodology* 37(1):83-117.

Walters, Peter, and Helen Bartlett. 2009. "Growing old in a new estate: establishing new social networks in retirement." *Ageing & Society* 29(2):217-236.

Wang, Kyungsoon and Dan Immergluck. 2018. “The Geography of Vacant Housing and Neighborhood Health Disparities After the U.S. Foreclosure Crisis.” *Cityscape* 20(2):145–70.

Ward, Russell, John Logan, and Glenna Spitze. 1992. "The influence of parent and child needs on coresidence in middle and later life." *Journal of Marriage and the Family* 54(1):209-221.

Wellman, Barry. 1983. "Network analysis: Some basic principles." *Sociological theory* 1 (1):155-200.

Wellman, Barry, and Barry Leighton. 1979. "Networks, neighborhoods, and communities: Approaches to the study of the community question." *Urban affairs quarterly* 14(3):363-390.

Wellman, Barry, Renita Yuk Lin Wong, David Tindall, and Nancy Nazer. 1997. “A Decade of Network Change: Turnover, Persistence and Stability in Personal Communities.” *Social Networks* 19(1):27–50.

Wellman, Barry and Scot Wortley. 1990. “Different Strokes from Different Folks: Community Ties and Social Support.” *American Journal of Sociology* 96(3):558–88. Retrieved (http://www.journals.uchicago.edu/doi/10.1086/229572).

Williams, Sonya, George Galster, and Nandita Verma. 2013. “The Disparate Neighborhood Impacts of the Great Recession: Evidence from Chicago.” *Urban Geography* 34(6):737–63.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago, IL: University of Chicago Press.

Wuthnow, Robert. 2018. *The Left Behind: Decline and Rage in Rural America*. Princeton, NJ: Princeton University Press.

Yen, Irene H., Janet K. Shim, Airin D. Martinez, and Judith C. Barker. 2012. "Older People and Social Connectedness: How Place and Activities Keep People Engaged." *Journal of Aging Research* 2012:1–10.

Zwiers, Merle, Gideon Bolt, Maarten Van Ham, and Ronald Van Kempen. 2016. "The Global Financial Crisis and Neighborhood Decline." *Urban Geography* 37(5):664–84. Retrieved (http://dx.doi.org/10.1080/02723638.2015.1101251).

Acknowledgements

I acknowledge support from the Canadian Social Sciences and Humanities Research Council (Insight Development Grant #231615) and from the Ontario Ministry of Research and Innovation Early Researcher Award. Data were made available by the Interuniversity Consortium for Political and Social Research, Ann Arbor, MI. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

This research was supported by the Social Sciences and Humanities Research Council of Canada. I also acknowledge support from the Ontario Student Assistance Program.

The National Social Life, Health and Aging Project is supported by the National Institute on Aging of the National Institutes of Health (R37AG030481; R01AG033903). Within the National Institutes of Health, the National Social Life, Health and Aging Project is also supported by the Office of Women's Health Research, the Office of AIDS Research, and the Office of Behavioral and Social Sciences Research (R01AG021487).

The author acknowledges the National Opinion Research Center Data Enclave for providing researcher support and access to the data used in this research.

The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health nor the National Opinion Research Center.

Tables

Table 4.1. Descriptive Statistics (n = 1,776)

Variables	Mean/Proportion (%)	Standard Deviation
Dependent Variables		
Number of Ties at W1	4.27	1.57
Number of Ties at W2	4.41	1.55
Ties Gained	1.80	1.50
Ties Lost	1.85	1.42
Independent and Control Variables		
Census Tract-Level		
Change in Concentrated Disadvantage	0.00	0.32
Concentrated Disadvantage at W1	0.00	0.66
Concentrated Disadvantage at W2	0.00	0.61
Located in an MSA	70.77%	
Logarithm of Population Density at W1 (persons per square mile)	7.02	1.99
Proportion of Residents having Changed Residences within the Previous 5 Years at W1	0.43	0.11
Individual-Level		
Female	51.31%	
Age/10 at W1	6.83	0.74
White	70.89%	
African American	16.49%	
Latino	10.32%	
Other Race/Ethnicity	2.30%	
Married at W1	65.01%	
Living with a Partner at W1	1.96%	
Separated at W1	1.29%	
Divorced at W1	10.01%	
Widowed at W1	18.73%	
Never Married at W1	3.02%	
Number of Years having Lived in Current Neighbourhood at W1	23.97	17.02
No High School Diploma	22.54%	
High School Diploma	53.24%	
University Degree	24.22%	
Working for Pay at W1	34.84%	
Retired at W1	53.30%	
Not Working at W1 for Reasons other than Retirement	11.86%	
Logarithm of Total Household Assets at W1	11.85	2.37
Higher Physical Health at W1 (1-5)	3.33	1.06
Functional Health Problems at W1 (0-3)	0.13	0.30
Index of Standardized Measures of Depression at W1	0.00	0.56

Table 4.1. Descriptive Statistics (n = 1,776), continued

Variables	Mean/Proportion (%)	Standard Deviation
Individual-Level		
Proportion of W1 Network Composed of Kin	0.69	0.29
Average Frequency of Contact with W1 Network (1-8)	6.82	0.80
Average Closeness with W1 Network (1-4)	3.14	0.48
Attends Religious Services Once or More per Week at W1	50.14%	
Attends Religious Services Once per Month at W1	9.76%	
Attends Religious Services Once or Several Times per Year at W1	23.61%	
Never Attends Religious Services at W1	16.49%	

Table 4.2. Poisson Regressions of Number of Close Network Ties and Network Turnover

VARIABLES	Model 1[a] Number of Ties	Model 2[a] New Ties	Model 3[b] Ties Lost
Change in Census Tract-Level Concentrated Disadvantage	0.906**	0.826**	1.052
	(0.030)	(0.057)	(0.060)
Census Tract-Level Concentrated Disadvantage at W1	0.968	0.949	1.011
	(0.025)	(0.053)	(0.044)
Census Tract is Located within a Metropolitan Statistical Area	1.005	0.989	0.979
	(0.023)	(0.063)	(0.040)
Logged Census Tract-Level Population Density at W1	0.999	0.991	0.995
	(0.006)	(0.017)	(0.010)
Census Tract-Level Residential Instability at W1	1.023	1.188	1.095
	(0.096)	(0.256)	(0.175)
Number of Years having Lived in Local Area at W1	1.000	0.998	0.999
	(0.001)	(0.001)	(0.001)
Woman (ref. man)	1.068***	1.087^	0.972
	(0.020)	(0.052)	(0.032)
Age at Wave 1 Divided by Ten	0.978	1.028	1.054*
	(0.014)	(0.035)	(0.023)
African American (ref. white)	0.977	1.139^	1.153*
	(0.036)	(0.082)	(0.065)
Latino	1.030	1.148	1.005
	(0.033)	(0.104)	(0.063)
Other Race/Ethnicity	1.040	1.273*	1.157
	(0.060)	(0.140)	(0.127)
Living with a Partner at W1 (ref. married at W1)	0.953	0.778	0.966
	(0.081)	(0.128)	(0.118)
Separated at W1	0.986	1.136	1.137
	(0.090)	(0.300)	(0.178)
Divorced at W1	0.960	1.010	1.099^
	(0.032)	(0.077)	(0.054)
Widowed at W1	0.971	0.936	1.020
	(0.024)	(0.055)	(0.043)
Never Married at W1	0.971	0.877	0.888
	(0.056)	(0.098)	(0.075)
High School Diploma but no University Degree (ref. no high school diploma)	1.069*	0.994	0.900**
	(0.030)	(0.063)	(0.031)
University Degree	1.040	0.874^	0.879**
	(0.034)	(0.066)	(0.038)

Robust standard errors (eform) in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

[a]Number of wave 1 close social ties was controlled as a set of dummy variable categories.
[b]Size of social network at wave 1 was included as the exposure term.

Table 4.2. Poisson Regressions of Number of Close Network Ties and Network Turnover, continued

VARIABLES	Model 1[a] Number of Ties	Model 2[a] New Ties	Model 3[b] Ties Lost
Retired at W1 (ref. working for pay at W1)	1.025	0.917^	0.920*
	(0.021)	(0.046)	(0.033)
Not Working at W1 for Reasons other than Retirement	0.913**	0.787**	1.035
	(0.031)	(0.062)	(0.053)
Logarithm of Total Household Assets at Wave 1	1.007	1.012	1.000
	(0.006)	(0.014)	(0.009)
Higher Extent of Physical Health at W1 (1 – 5)	1.005	0.993	0.987
	(0.011)	(0.024)	(0.015)
Higher Extent of Functional Difficulties at W1 (0 – 3)	1.024	1.008	0.978
	(0.043)	(0.094)	(0.069)
Depressive Symptoms at W1	1.000	1.022	1.041
	(0.025)	(0.062)	(0.038)
Proportion of Close Network Ties at Wave 1 who were Family Members	0.940^	0.536***	0.624***
	(0.033)	(0.043)	(0.037)
Average Frequency of Contact with Close Network Members at Wave 1 (1 – 8)	1.029*	0.947^	0.891***
	(0.013)	(0.027)	(0.019)
Average Closeness with Close Network Members at Wave 1 (1 – 4)	1.021	0.890*	0.851***
	(0.022)	(0.044)	(0.029)
Attends Religious Services about Once per Month (ref. once or more per week)	1.014	0.948	0.987
	(0.029)	(0.065)	(0.046)
Less than Once per Year to Several Times per Year	0.982	0.842**	0.895**
	(0.022)	(0.046)	(0.034)
Never	0.925**	0.770***	0.918^
	(0.027)	(0.053)	(0.044)
Constant	2.441***	3.347**	1.701^
	(0.474)	(1.492)	(0.496)
Number of Respondents	1,776	1,776	1,776

Robust standard errors (eform) in parentheses
Two-tailed tests *** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10

[a]Number of wave 1 close social ties was controlled as a set of dummy variable categories.
[b]Size of social network at wave 1 was included as the exposure term.

Chapter 5

Conclusion

Each of the three papers of this dissertation uniquely contributes to our understanding of the complexities, mechanisms, and contingencies that help determine whether and how environments undergoing economic declines impact older residents' quality of life. While most research on the effects of economic declines is focused on personal financial losses, Chapter 2 shows that city-level economic declines can impact depressive symptoms through contextual pathways independent of personal asset losses. It thus recommends that research on economic shocks extend beyond the current predominant focus on personal financial declines. Chapter 3 reveals that worsening neighbourhood-level circumstances can exacerbate the effects of city-level declines upon residents' depressive symptoms. This chapter thus encourages more complex analyses of contextual effects that include interaction terms that cross contextual levels of analysis. Chapter 4 fills a research gap as it shows using a large and representative set of American census tracts that declining neighbourhood-level socioeconomic circumstances lead to smaller social networks over time, largely through preventing residents from establishing new close social ties. While each of these three chapters stands alone as an independent study, the three of them together expand our understanding of the complex ways in which changing city- and neighbourhood-level conditions through economic shocks impact psychological and social dimensions of quality of life.

Can Contexts in Themselves Affect Depressive Symptoms?

In everyday life, as well as in social research, it is assumed that the main means through which economic shocks, such as the Great Recession of 2007-2009, impact individual-level outcomes is through the consequences they hold for personal financial situations. While not making the claim that personal financial declines are inconsequential for depressive symptoms, Chapter 2 shows that there are repercussions to city-level economic declines that operate independently of personal financial changes. This fact is revealed in how the addition of 'total household assets' into models predicting depressive symptoms minimally reduces the magnitudes of coefficients for city-level economic variables. While this study does not explicitly test possible contextual mediators of these city-level economic declines, it presents numerous possibilities. These include externalities that reduce the quality of city neighbourhoods and

increase their levels of crime and disorder, fewer city resources for the provision of public goods and services, as well as anxieties concerning home foreclosures and other dire economic circumstances based on increased threats within one's immediate environment. Research has inadequately studied pathways and mechanisms such as these. In discussing features of contexts that can impact depressive symptoms, this study employs the ecological stress process model as an orienting framework.

This study thus serves as a call for increased attention to features of contexts in studies of how economic shocks impact health and well-being. It also suggests some potential contextual mediators, such as neighbourhood-level variables, between broad measures of city-level economic declines and individual-level outcomes, such as depressive symptoms. A further contribution is that a total of five important city-level economic measures are considered throughout this study. Further research that also employs multiple and comprehensive measures of city-level economic declines can more confidently make statements concerning how declining cities affect their residents.

Neighbourhood-Level Moderation of City-Level Effects

Even among those studies that investigate how contextual variables affect individual-level outcomes during economic shocks, very few create bridges across contextual levels of analysis (e.g. Acevedo-Garcia et al. 2003; Diez Roux 2001; Galea, Freudenberg, and Vlahov 2005; Pemberton and Humphris 2016). This limitation in extant research exists despite the claims of scholars who have argued for the importance of such bridges (Kaplan, Everson, and Lynch 2000; van Kempen, Bolt, and van Ham 2016). Kaplan et al. (2000) argue that because health is impacted by causal mechanisms operating at a multitude of levels of analysis, comprehensive understandings of health inequalities require combining investigations of multiple contextual levels. Research that accomplishes this is consonant with Bronfenbrenner's (1979:3) suggestion that environments should be "conceived as a set of nested structures, each inside the next, like a set of Russian dolls." In finding that neighbourhood declines exacerbate the effects of city declines upon depressive symptoms, Chapter 3 concurs with van Kempen et al. (2016) who argue that neighbourhood troubles cannot be fully understood without considering features of the cities in which they are located. More specifically, my findings show that when neighbourhoods undergo increased disadvantage and greater need for support and investment, the impact of declines in city-level resources upon depressive symptoms is accentuated. In

discussing the importance of such moderation effects, I develop an ecological compound disadvantage model. This study encourages other scholars to seek out complex moderation effects such as this within their investigations of economic shocks.

Do Declining Neighbourhoods also Impact Residents' Social Lives?

While many studies have considered how social lives and networks adapt in response to important life course changes and transitions, there is a lack of research that comprehensively studies how social networks adjust in response to altered socio-spatial environments. Case studies of specific gentrifying neighbourhoods have shown how social networks are sensitive to contextual changes (e.g., Chaskin and Joseph 2013; DeSena 2006; Newman and Wyly 2006). Chapter 4 fills a gap in current research through a systematic investigation of how changing neighbourhood socioeconomic conditions affect social network size and turnover using comprehensive data based on a large and diverse set of census tracts. Results show that rising neighbourhood-level concentrated disadvantage is associated with smaller social networks, largely due to less development of new close social ties. These results suggest that when neighbourhood circumstances turn for the worse, older residents might make efforts to maintain the strength of their earlier close social ties, while losing the ability and motivation to seek out new close friends and strengthen earlier acquaintanceships. As such, Chapter 4 highlights a specific mechanism through which declining neighbourhoods affect sizes of close social networks. In this study, I draw upon social disorganization theory. Chapter 4 adds to Chapters 2 and 3 by showing that contextual declines through economic shocks also affect social dimensions of quality of life.

Limitations and Paths for Future Research

One limitation that spans all three papers of this dissertation is the exclusion of respondents who relocated out of their wave 1 cities (for Chapters 2 and 3) or neighbourhoods (for Chapter 4). I employed this restriction because I am interested in how older residents are impacted by changes within their cities or neighbourhoods of residence through time. Concerning Chapter 4, a further reason for this sample restriction is that my dependent variables denote social network size and turnover. Given the goals of this study, I opted to rule out the possibility that social network turnover might be occurring only because some respondents have

moved into new neighbourhoods. However, older persons most affected by declines within their cities or neighbourhoods might be the ones most likely to relocate into a new city or neighbourhood. There are other possible ways in which those who relocated to a new city or neighbourhood through the Great Recession might have systematically differed from those who did not. While the inverse probability weighting technique helps reduce any biases potentially caused by this selection effect, some bias might remain.

However, effective inclusion of those who moved to a new city or neighbourhood in this dissertation is complicated by the fact that the National Social Life, Health, and Aging Project (NSHAP) dataset does not identify the precise point in time of relocation. As such, it is unclear if a respondent relocated before or after the onset of the Great Recession. Among respondents who relocated to a new city or neighbourhood, it is also unclear how many months they spent in their new location before being interviewed for wave 2 of the NSHAP.

Future research should carefully examine the quality of life of those who relocate to new areas in response to economic shocks. This would make a valuable contribution to our understanding of contextual effects. In Chapters 2 and 3, 20% of my potential sample (resided in an MSA at wave 1 and took part in both waves of the NSHAP) is lost because of relocation out of wave 1 MSAs. In Chapter 4, 21% of my potential sample (took part in both waves of the NSHAP) is excluded because of relocation outside of wave 1 census tracts. These are sizable groups of respondents who are neglected in this dissertation. Furthermore, they are substantively interesting populations whose quality of life might be impacted by city and neighbourhood declines in unique ways.

Research might assess how economic and social differences between initial location and subsequent location impact quality of life. An interesting question is whether moving into an area in decline has different consequences from staying within a worsening area. Length of residence in subsequent location is another variable to consider. Reason for relocation under circumstances of economic decline is another potential moderator of the effects of economic shocks. This is an especially interesting variable to consider as those of higher socioeconomic status are more likely to voluntarily relocate into a city or neighbourhood faring better through the economic shock, while those of lower socioeconomic status might be forced to relocate into a more disadvantaged city or neighbourhood because of home foreclosure, job loss, and/or loss of income and wealth.

Another limitation that spans Chapters 2, 3, and 4 is the five-year time period over which respondents are studied. While this timeframe proved to be adequate for the study of changes in depression and social network turnover, a longer timeframe might reveal additional interesting effects upon quality of life. Burgard and Kalousova (2015) suggest that short spans of time are adequate for assessing effects upon mental health. On the other hand, a longer span of time might be required for assessing how contextual economic declines 'get under the skin' and affect various aspects of physical health (Burgard and Kalousova 2015). Future research might employ longer timeframes to assess how asset losses and worsening city- and neighbourhood-level circumstances affect physical health.

Concerning Chapter 4, given that neighbourhoods change only gradually, it is possible that a longer span of time is required to reveal the full impacts of neighbourhood changes upon social network size and turnover. If this study were to be repeated with a longer span of time, it might show that increased neighbourhood-level disadvantage also hinders the maintenance of earlier close social ties. Very high levels of fear and strong lack of trust might prevent neighbourhood residents from entering the community even to interact with their earlier trusted strong social ties. If stress reaches high enough levels, community residents might lose the motivation to sustain even their earlier close social relationships.

Another limitation applies especially to Chapters 2 and 3. While these two chapters suggest numerous means through which city- and neighbourhood-level declines might impact depressive symptoms, specific policies and programs are not investigated. It is likely that policy responses to contextual declines significantly moderate how those declines affect residents. Whether a city undertakes austerity measures or engages in stimulus spending as economic circumstances turn for the worse is likely to make a big difference in how residents experience those economic changes. Future research should study the impact of policy responses to economic crises, at various contextual levels of analysis (i.e., national, state, city). Scholars should also consider how neighbourhoods' investments in different types of programs during economic shocks might affect how residents' health and social lives are impacted by neighbourhood declines. Research along these lines might provide many valuable recommendations for the development of more effective policies and programs.

Implications for Studies of Contextual Effects

In combination, these three studies hold implications for future investigations of how contexts impact their residents. The value of Bronfenbrenner's (1979:3) ecological theory, which proposed that environments should be "conceived as a set of nested structures, each inside the next, like a set of Russian dolls," is supported by this dissertation. This is because I examine both neighbourhoods and cities, and because Chapter 3 studies moderation effects that cross the neighbourhood-city interface. Other research has considered the embedding of home environments within neighbourhoods (Upenieks, Schafer, and Iveniuk 2016) and within cities (Schafer, Settels, and Upenieks 2019). This dissertation encourages other scholars of contextual effects to adopt a layered contextual framework (Schafer and Upenieks 2015).

If contexts are composed of layers, there might be unique effects emanating from these different layers. Rather than residing within one context, all people are located within a plurality of contexts, all of which potentially impact many quality of life outcomes. This dissertation furthers the idea that a respondent's physical and social surroundings cannot be comprehensively studied through a focus on only one layer of context. Scholars should carefully choose which contextual levels of analysis are most pertinent to the questions they pose and the outcomes they study. Research should also consider how dynamics at one level are affected by what transpires both at more macro and at more micro levels. Finally, as was done in Chapter 3, scholars should question how individual-level outcomes are affected by interactions between variables at multiple contextual levels of analysis.

Concerning urban sociology in specific, this dissertation furthers a conceptualization of city neighbourhoods as interdependent and intertwined (Vogel and South 2016). Circumstances in one neighbourhood can "spill over" into adjacent city neighbourhoods, implying that no city neighbourhoods' residents are entirely shielded from overall city-level declines. Overall changes within a city thus to some extent affect residents within all of its neighbourhoods. This interdependency exists despite substantial demographic and socioeconomic variations between neighbourhoods within the same city; these variations led to the Great Recession having different effects upon neighbourhoods within the same city (Owens and Sampson 2013). While these ideas are implicit in this dissertation's framing and interpretation of results, they are not directly tested. A fruitful path for future research would be to explicitly test how neighbourhoods adapt over time in response to changes within nearby neighbourhoods. Future research should also

address the question of how community residents are affected by those changes within adjacent neighbourhoods.

This dissertation also contributes to urban sociology the understanding that individual neighbourhoods are subject to developments that occur at the higher, city level of analysis. This concurs with numerous scholars who have emphasized that a comprehensive understanding of the influences of cities and neighbourhoods requires research focused on both (e.g., Allen 2013; Baumer, Wolff, and Arnio 2012; van Kempen et al. 2016). As such, scholars of neighbourhood effects who neglect to consider the cities within which neighbourhoods are located are missing important pieces of the puzzle. This dissertation thus furthers Kaplan et al.'s (2000) promotion of scholarship that bridges contextual levels of analysis and thereby integrates causal processes operating at multiple levels. Especially valuable is research, such as Chapter 3 of this dissertation, that tests how neighbourhood influences might mediate and/or moderate the effects of city-level changes.

Future research might address how other potential city- and neighbourhood-level variables interact as they influence other individual-level quality of life outcomes. Additionally, future research should investigate neighbourhood-level variables as mediators of city-level effects. For example, an interesting research question is to what extent city-level changes affect city residents through the mediation of changes within city neighbourhoods.

This dissertation also adapts existing theories to new contextual levels of analysis and temporal processes. Chapter 2 makes extensive use of the ecological stress process model, which "contextualizes" the original stress process model by highlighting how features of contexts can be stressors that can proliferate across spatial levels of analysis. With a focus on stressors at the level of the city, Chapter 2 presents pathways through which city-level stressors can proliferate into city neighbourhoods, and then into the lives of individual residents. Chapter 3 proposes an ecological compound disadvantage model. Whereas the original compound disadvantage model is focused on disadvantaged persons residing within disadvantaged neighbourhoods (Gilster 2014; Wheaton and Clarke 2003; Wodtke, Elwert, and Harding 2016), Chapter 3 displays how this theory can be usefully extended to understanding the outcomes for residents of declining neighbourhoods located within declining cities. In Chapter 4, I show how social disorganization theory can be used to understand the effects of *changes* in neighbourhoods through time. Studies employing social disorganization theory have predominantly focused on static levels of

disadvantage within neighbourhoods (e.g., Bowen, Bowen, and Ware 2002; Browning 2002; Clear et al. 2003; Lowenkamp, Cullen, and Pratt 2003; Osgood and Chambers 2000; Sampson and Groves 1989; Warner 2003). I show how applying this theory to neighbourhood *dynamics* provides unique insights into contextual influences upon social network turnover. Considering the applicability of social theories to different spatial levels of analysis and temporal processes adds nuance to those theories and expands their explanatory potential. This dissertation encourages scholars of contextual effects to test the applicability of social theories to new contextual domains.

The versatility and utility of an ecological compound disadvantage model is worthy of note. In the present study, this theory is developed to understand multiplicative effects between city- and neighbourhood-level variables. These multiplicative effects are explained as outcomes of increased neighbourhood-level need for resources and investment paired with declining city-level capability of providing resources. However, this theory can be usefully adapted for studying questions concerning interactions between variables at other levels of analysis. For example, it is plausible that living in a declining home within a worsening neighbourhood might show multiplicative negative effects for residents' quality of life since neither the home nor nearby areas provide any respite from increasingly disadvantaged circumstances. Additionally, family members and friends might be especially disinclined to visit residents if both their homes and communities are more and more becoming unappealing places to visit. In each application of this theory, scholars should clearly elaborate on possible mechanisms through which multiplicative effects might occur.

Use of ecological compound disadvantage theory might be further refined through elaboration on whether effects are based more on static levels of disadvantage or changes through time. While the original compound disadvantage model, focused on disadvantaged people within disadvantaged neighbourhoods, for the most part addresses static levels of disadvantage, in Chapter 3, I consider multiplicative effects of *changes* in disadvantage. There is also the potential that in some circumstances, static levels of one variable at one level of analysis moderate the effects of changes in another variable at another level of analysis. In each circumstance, scholars should carefully consider the mechanisms they would like to test and thus decide whether they will study static variables or variables based on changes. As such, this theory could be used to develop and shed light upon many questions concerning different types

of multiplicative interactions between variables at different contextual levels of analysis. More extensive use of the ecological compound disadvantage model in the study of population health will thus help reach the goal stated by Kaplan et al. (2000) of achieving a comprehensive understanding of "the complex patterning of disease" through bridging "various levels of explanation and intervention, bringing together theory and empirical work that tie together observations of causal influence and mechanism at multiple levels" (p. 42).

Implications for Studies of Health and Quality of Life

With regards to the sociology of health and well-being, this dissertation encourages a stronger focus on how contexts, including cities and neighbourhoods, affect quality of life outcomes. Studies of the effects of the Great Recession, for example, have predominantly focused on individual-level financial losses (e.g., Boen and Yang 2016; McInerney, Mellor, and Nicholas 2013; Wilkinson 2016; Yilmazer, Babiarz, and Liu 2015). Studies of changing social networks have likewise focused on individual-level significant life course transitions, such as residential relocation (Stacey-Konnert and Pynoos 1992; Walters and Bartlett 2009), retirement (Cornwell and Laumann, 2011), marriage (Ertel, Glymour, and Berkman 2009), death of one's spouse (Cornwell, Laumann, and Schumm 2008; Hatch and Bulcroft 1992), and health decline (Cornwell 2009; Perry and Pescosolido 2012). Aside from some case studies of specific gentrifying neighbourhoods (e.g., Chaskin and Joseph 2013; DeSena 2006; Newman and Wyly 2006), very little research has addressed how changing contexts affect social network size and turnover. Through finding both the mental health and social lives of older respondents to be affected by city- and neighbourhood-level variables, this study furthers contextual understandings of inequalities in health and well-being. This dissertation further prompts questions concerning how other important aspects of quality of life, including various measures of physical, functional, and mental health, as well as the quality of one's social relationships and community engagements, might be affected by diverse socioeconomic variables operating at multiple contextual levels of analysis. Further research that bridges levels of context and thereby reveals how different features of diverse contexts have unique effects upon distinct measures of physical, mental, and social well-being would add great nuance to our understandings of contextual effects upon quality of life.

The three papers of this dissertation also help further a wide and multidimensional conceptualization of 'quality of life.' Chapters 2 and 3 employ a common measure of mental

health, depressive symptoms, while Chapter 4 employs measures based on social networks. This dissertation thus supports the multidimensional definition of 'quality of life' developed by the World Health Organization (1997), which includes psychological and social components. Future research finding that varied measures of health and well-being are uniquely impacted by contextual variables would contribute to more nuanced understandings of predictors of quality of life.

Implications for Studies of Aging

Throughout this dissertation, I have emphasized that the physical and cognitive declines that accompany the process of aging might make older persons more vulnerable to declines in the physical, economic, and social circumstances of their neighbourhoods and cities (Lawton and Nahemow 1973). Furthermore, greater dependency on assets accumulated over their lifetimes might especially further their susceptibility to contextual economic declines (Boen and Yang 2016; Cagney et al. 2014). This dissertation also presents numerous statistics that reveal the extent to which the Great Recession was a difficult experience for America's older population. These facts support the study of an older sample in an investigation of the contextual effects of the Great Recession. Through studying a sample of older Americans, this research furthers our understandings of how older adults are affected by changing socioeconomic contexts. This dissertation also suggests potential mechanisms for these effects.

The interpretations of this dissertation's results are conditional on this older sample. Younger adults might be affected in distinct ways by an economic shock such as the Great Recession of 2007-2009. In Chapter 2, I emphasize that while older adults might be more concerned with retirement timing and savings, younger adults might be more likely to worry about the economic future of their families, challenges in purchasing a home, and damages to their trajectories of paid employment. In Chapter 3, I propose that while older adults might be more affected by how city resources are channeled into social services and programs, institutions, amenities, community centers, and infrastructure, younger adults might be more affected by how resources are dedicated to stimulus spending and the creation of employment opportunities. Concerning Chapter 4, younger adults' social lives might be less affected by increasing neighbourhood-level disadvantage because they are more mobile and less confined to their immediate surroundings (Krantz-Kent and Stewart 2007). Younger adults might thus be more capable of developing and sustaining close social ties with persons not residing within their

neighbourhoods. Furthermore, it is plausible that the benefits of acquisition of new close social ties might differ between older and younger adults. While older adults might profit mostly through the stimulation, support, and resources thus provided, younger adults might benefit most from resultant paid work and other socioeconomic opportunities, such as involvement in community groups. The three papers of this dissertation thus suggest the importance of studying how diverse contexts yield unique effects upon residents that might substantially differ based on residents' ages.

The Value of the Study of Natural Experiments

It should further be noted that this dissertation takes advantage of an effective natural experiment: the Great Recession of 2007-2009. The first two waves (wave 1: 2005-2006; wave 2: 2010-2011) of the NSHAP dataset are ideal for studies of the effects of this economic shock since they are approximately equidistant from the peak of this crisis. Given the extensive socioeconomic declines at the individual, neighbourhood, and city levels through this recession, it is an ideal context within which to study how economic shocks impact quality of life. This research thus furthers our understandings of how contextual changes during major economic shocks affect quality of life.

This dissertation contributes to a body of research that employs economic crises as natural experiments through which to understand influences upon older adults' quality of life. This body of research has employed a wide array of outcomes not considered in the present study. For example, research has found that the recession of the early 1990s caused higher levels of worry, and consequent sleep problems, among older persons (Dregan and Armstrong 2009). This research has also studied how contextual economic changes moderate the impacts of older individuals' own financial and employment changes. For example, using both the early 1990s' recession and the Great Recession as natural experiments, Noelke and Beckfield (2014) found that job losses only affected older Americans' mortality risks when they occurred within times of economic recession. Similarly, Luoto, Poikolainenb, and Uutela (1998) found that unemployment was more strongly associated with high levels of alcohol use during the 1990s economic recession in Finland than during the earlier period of economic expansion. Some qualitative research further identifies processes and mechanisms through which economic crises can affect older persons' quality of life. McMullin and Marshall (2001) studied the effects of the labour costs-reducing restructuring efforts undertaken by firms in response to the early 1980s'

and early 1990s' recessions. Their qualitative interviews revealed how resultant ageist workplace policies caused older garment industry workers to experience frustration and anger due to repeated experiences of unfair treatment. Although it employs different outcomes and study designs, this dissertation concurs with this body of literature through finding that contextual declines through an economic crisis potently negatively affect older individuals' well-being. The present study further contributes rigourous longitudinal analyses of how both city- and neighbourhood-level declines through an economic shock impact psychological and social dimensions of older persons' quality of life.

I urge other scholars of contextual effects to take full advantage of the research opportunities presented by such natural experiments. Economic and cultural transitions (e.g., Oswald et al. 2003), the onset of international conflicts, droughts, famines, and other natural disasters (e.g., Frankenberg, McKee, and Thomas 2005), and epidemics are further examples of natural experiments that can be used to shed light on questions concerning how changing contexts cause changes in diverse aspects of residents' quality of life.

Policy Recommendations

In unison, the three papers of this dissertation offer some policy recommendations. The major argument is that contexts matter, and so any singular focus on maintaining residents' wealth through economic crises is not enough. Most discussions of the effects of economic shocks, including informal, policy-based, and academic conversations, emphasize the need to prevent personal financial losses. However, the contextual effects revealed in this dissertation suggest that focus should also be placed on maintaining and strengthening cities' and neighbourhoods' infrastructure, institutions, social programs, community groups and activities, as well as overall social cohesion and efficacy. Accomplishing this might go a long way towards preventing mental health problems and sustaining residents' ability and motivation to remain socially engaged and develop new strong social ties. Concerning the latter, a virtuous cycle can be achieved. Maintaining the social fabric and integration of a community strengthens that community's capacity to prevent further increases in disadvantage, allowing for further development of the community's social capital and efficacy.

Chapters 3 and 4 further highlight that during economic crises, policies should channel resources into those neighbourhoods undergoing the greatest increases in disadvantage, and thus the greatest increases in need for support and investment. Research has shown that

neighbourhoods that were already disadvantaged pre-recession declined the most through this economic shock (Grusky, Western, and Wimer 2011; Owens and Sampson 2013; van Kempen et al. 2016; Williams, Galster, and Verma 2013). If residents of weakening neighbourhoods are most sensitive to dwindling resources at the city level, and if worsening neighbourhoods face the highest erosion of the social capacity that can prevent further declines, policymakers should focus on channeling resources into those communities.

Conclusion

In different ways, the three papers of this dissertation show how contextual economic declines through the Great Recession of 2007-2009 impacted the quality of life of older residents. I studied city- and neighbourhood-level variables as predictors of important dimensions of quality of life: depressive symptoms, social network size, and social network turnover. Throughout these investigations, I adapted some prominent sociological theories to new contextual levels of analysis and variables. My dissertation encourages other scholars to study the complex mechanisms through which variables at many contextual levels of analysis impact residents' health, well-being, and social lives.

References

Acevedo-Garcia, Dolores, Kimberly A. Lochner, Theresa L. Osypuk, and S. V. Subramanian. 2003. "Future Directions in Residential Segregation and Health Research: A Multilevel Approach." *American Journal of Public Health* 93(2):215–21.

Allen, Ryan. 2013. "The Distribution and Evolution of Physical Neighborhood Problems during the Great Recession." *City and Community* 12(3):260–79.

Baumer, Eric P., Kevin T. Wolff, and Ashley N. Arnio. 2012. "A Multicity Neighborhood Analysis of Foreclosure and Crime." *Social Science Quarterly* 93(3):577–601.

Boen, Courtney and Y. Claire Yang. 2016. "The Physiological Impacts of Wealth Shocks in Late Life: Evidence from the Great Recession." *Social Science and Medicine* 150:221–30.

Bowen, Natasha K., Gary L. Bowen, and William B. Ware. 2002. "Neighborhood social disorganization, families, and the educational behavior of adolescents." *Journal of Adolescent Research* 17(5):468-490.

Bronfenbrenner, Urie. 1979. *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.

Browning, Christopher R. 2002. "The span of collective efficacy: Extending social disorganization theory to partner violence." *Journal of Marriage and Family* 64(4):833-850.

Burgard, Sarah A. and Lucie Kalousova. 2015. “Effects of the Great Recession: Health and Well-Being.” *Annu. Rev. Sociol* 41:181–201.

Cagney, Kathleen A., Christopher R. Browning, James Iveniuk, and Ned English. 2014. “The Onset of Depression during the Great Recession: Foreclosure and Older Adult Mental Health.” *American Journal of Public Health* 104(3):498–505.

Chaskin, Robert J. and Mark L. Joseph. 2013. “‘Positive’ Gentrification, Social Control and the ‘Right to the City’ in Mixed-Income Communities: Uses and Expectations of Space and Place.” *International Journal of Urban and Regional Research* 37(2):480–502.

Clear, Todd R., Dina R. Rose, Elin Waring, and Kristen Scully. 2003. "Coercive mobility and crime: A preliminary examination of concentrated incarceration and social disorganization." *Justice Quarterly* 20(1):33-64.

Cornwell, Benjamin. 2009. “Good Health and the Bridging of Structural Holes.” *Social Networks* 31(1):92–103.

Cornwell, Benjamin and Edward O. Laumann. 2011. “Network Position and Sexual Dysfunction: Implications of Partner Betweenness for Men.” *American Journal of Sociology* 117(1):172–208.

Cornwell, Benjamin, Edward O. Laumann, and L. Philip Schumm. 2008. "The Social Connectedness of Older Adults: A National Profile." *American Sociological Review* 73(2): 185-203.

DeSena, Judith N. 2006. "“What’s a mother to do?” Gentrification, school selection, and the consequences for community cohesion." *American Behavioral Scientist* 50(2):241-257.

Diez Roux, A. V. 2001. “Investigating Neighbourhood and Area Effects on Health.” *Am J Public Health* 91(11):1783–89.

Dregan, Alex and David Armstrong. 2009. “Age, Cohort and Period Effects in the Prevalence of Sleep Disturbances among Older People: The Impact of Economic Downturn.” *Social Science and Medicine* 69(10):1432–38.

Ertel, Karen A., M. Maria Glymour, and Lisa F. Berkman. 2009. "Social networks and health: A life course perspective integrating observational and experimental evidence." *Journal of Social and Personal Relationships* 26(1):73-92.

Frankenberg, Elizabeth, Douglas McKee, and Duncan Thomas. 2005. "Health consequences of forest fires in Indonesia." *Demography* 42(1):109-129.

Galea, Sandro, Nicholas Freudenberg, and David Vlahov. 2005. “Cities and Population Health.” *Social Science and Medicine* 60(5):1017–33.

Gilster, Megan E. 2014. “Neighborhood Stressors, Mastery, and Depressive Symptoms: Racial and Ethnic Differences in an Ecological Model of the Stress Process in Chicago.” *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91(4):690-706.

Grusky, David B., Bruce Western, and Christopher Wimer. 2011. “The Consequences of the Great Recession.” Pp. 3–20 in *The Great Recession*, edited by David B. Grusky, Bruce Western, and Christopher Wimer. New York: Russell Sage Foundation.

Hatch, Laurie Russell, and Kris Bulcroft. 1992. "Contact with friends in later life: Disentangling the effects of gender and marital status." *Journal of Marriage and the Family* 54(1):222-232.

Kaplan, G.A., Everson, S.A. and Lynch, J.W., 2000. “The contribution of social and behavioral research to an understanding of the distribution of disease: a multilevel approach.” *Promoting Health*:37-80.

Krantz-Kent, Rachel, and Jay Stewart. 2007. “How Do Older Americans Spend their Time?” *Monthly Labor Review* 130:8-26.

Lawton, M.P. and Lucille Nahemow. 1973. *Ecology and the aging process*. Washington, DC, US: American Psychological Association.

Lowenkamp, Christopher T., Francis T. Cullen, and Travis C. Pratt. 2003. "Replicating Sampson and Groves's test of social disorganization theory: Revisiting a criminological classic." *Journal of Research in Crime and Delinquency* 40(4):351-373.

Luoto, Riitta, Kari Poikolainen, and Antti Uutcla. 1998. “Unemployment, Sociodemographic Background and Consumption of Alcohol before and during the Economic Recession of the 1990s in Finland.” *International Journal of Epidemiology* 27(4):623–29.

McInerney, Melissa, Jennifer M. Mellor, and Lauren Hersch Nicholas. 2013. “Recession Depression: Mental Health Effects of the 2008 Stock Market Crash.” *Journal of Health Economics* 32(6):1090–1104.

McMullin, J. A. and V. W. Marshall. 2001. “Ageism, Age Relations, and Garment Industry Work in Montreal.” *Gerontologist* 41(1):111–22.

Newman, Kathe and Elvin K. Wyly. 2006. “Gentrification and Displacement Revisited A Fresh Look at the New York City Experience.” *New York City Urban Studies* 43(1):23–57.

Noelke, Clemens and Jason Beckfield. 2014. “Recessions, Job Loss, and Mortality among Older Us Adults.” *American Journal of Public Health* 104(11):e126–34.

Osgood, D. Wayne, and Jeff M. Chambers. 2000. "Social disorganization outside the metropolis: An analysis of rural youth violence." *Criminology* 38(1):81-116.

Oswald, Frank, Hans-Werner Wahl, Heidrun Mollenkopf, and Oliver Schilling. 2003. "Housing and life satisfaction of older adults in two rural regions in Germany." *Research on Aging* 25(2):122-143.

Owens, A. N. N. and Robert J. Sampson. 2013. “Community Well-Being and the Great Recession.” *Pathways* (Spring):3–7.

Pemberton, Simon and Rachel Humphris. 2016. “Locality, Neighbourhood and Health : A Literature Review.” *IRiS Working Paper Series No. 13/2016*.

Perry, Brea L. and Bernice A. Pescosolido. 2012. “Social Network Dynamics and Biographical Disruption: The Case of ‘First-Timers’ with Mental Illness.” *American Journal of Sociology* 118(1):134–75.

Sampson, Robert J., and Byron W. Groves. 1989. “Community Structure and Crime: Testing Social-Disorganization Theory.” *American Journal of Sociology* 94:774-802.

Schafer, Markus H., Jason Settels, and Laura Upenieks. “As Goes the City? Older Americans’ Home Upkeep in the Aftermath of the Great Recession.” Forthcoming 2019. *Social Problems*.

Schafer, Markus H., and Laura Upenieks. 2015. "Environmental disorder and functional decline among older adults: A layered context approach." *Social Science & Medicine* 124:152-161.

Stacey-Konnert, C. and J. Pynoos. 1992. “Friendship and Social Networks in a Continuing Care Retirement Community.” *Journal of Applied Gerontology* 11(3):298–313.

Upenieks, Laura, Markus H. Schafer, and James Iveniuk. 2016. "Does disorder get “into the head” and “under the skin”? Layered contexts and bi-directional associations." *Health & Place* 39:131-141.

van Kempen, Ronald, Gideon Bolt, and Maarten van Ham. 2016. “Neighborhood Decline and the Economic Crisis: An Introduction.” *Urban Geography* 37(5):655–63.

Vogel, Matt and Scott J. South. 2016. “Spatial Dimensions of the Effect of Neighborhood Disadvantage on Delinquency*.” *Criminology* 54(3):434–58.

Walters, Peter, and Helen Bartlett. 2009. "Growing old in a new estate: establishing new social networks in retirement." *Ageing & Society* 29(2):217-236.

Warner, Barbara D. 2003. "The role of attenuated culture in social disorganization theory." *Criminology* 41(1):73-98.

Wheaton, Blair, and Philippa Clarke. 2003. “Space Meets Time: Integrating Temporal and Contextual Influences on Mental Health in Early Adulthood.” *American Sociological Review* 68(5):680-706.

Wilkinson, Lindsay R. 2016. “Financial Strain and Mental Health Among Older Adults During the Great Recession.” *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 71(4):745–54.

Williams, Sonya, George Galster, and Nandita Verma. 2013. “The Disparate Neighborhood Impacts of the Great Recession: Evidence from Chicago.” *Urban Geography* 34(6):737–63.

Wodtke, Geoffrey T., Felix Elwert, and David J. Harding. 2016. "Neighborhood effect heterogeneity by family income and developmental period." *American Journal of Sociology* 121(4):1168-1222.

World Health Organization. 1997. “Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. The WHOQOL Group.” *Psychological Medicine* 28(3):551–58.

Yilmazer, Tansel, Patryk Babiarz, and Fen Liu. 2015. “The Impact of Diminished Housing Wealth on Health in the United States: Evidence from the Great Recession.” *Social Science and Medicine* 130:234–41.