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# Cumulative inequality and housing insecurity severity among renters in later life

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**Cumulative inequality and housing insecurity  
severity among renters in later life**

by

**Arielle True-Funk**

A thesis submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

**MASTER OF SCIENCE**

Majors: Sociology and Gerontology

Program of Study Committee:  
Susan Stewart, Major Professor  
Jennifer Margrett  
Mack Shelley

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2018

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**ABSTRACT**

Housing insecurity, lack of access to safe and affordable housing, has become a national public health crisis, especially among vulnerable populations such as renters and the aged. For everyone, housing insecurity is associated with poorer mental and physical health and shortened lifespans. With data from the 2014 Health and Retirement Study and ordered logistic regression models, this study examined housing insecurity severity among renters age 50 and older using a CI framework providing explanation of systemic and individual forces result in differential and unequal outcomes dependent on exposure to risk and opportunity. Over half of respondents experienced any level of housing insecurity. Of housing insecure respondents, three out of five were observed as severely housing insecure. Those from urban areas, less than a high school diploma, widows, and over the age of 80 had enhanced odds of experiencing more severe housing insecurity. Additional research is needed to identify other aspects of cumulative inequality that may be related to housing insecurity to better guide policy change with respect to this important issue.

## CHAPTER 1. INTRODUCTION

Lack of access to safe and affordable housing, referred to as housing insecurity, has become a national public health crisis. Since the Great Recession of 2008, homeownership rates in the U.S. are the lowest they have been in 25 years, falling to under 65% (Harvard JCHS, 2015). Housing insecurity is most often measured in terms of cost burden, defined as spending more than 30% of household income on housing costs (Harvard JCHS, 2017). In 2009, 36% of homeowners over age 50 with a mortgage spent more than 30% of income on housing costs. Housing insecurity is even more of a problem among renters. Fifty percent of renters in America are housing insecure (Harrell & Houser, 2011). Among housing insecure renters, 27% are “severely” housing insecure, meaning that they spend more than 50% of household income on housing (Harvard JCHS, 2017). For people of all ages, experiencing long-term housing insecurity is associated with poor health, shortened life spans, and mental health problems (Bor, Cohen, & Galea, 2017). Moreover, individuals who are housing insecure often face other hardships, such as food insecurity and work-limiting health conditions (Kushel, Gupta, Gee, & Haas, 2006). Having excessively high housing costs raises the risk of postponing accessing medical care, postponing the purchase of medications, and increased emergency room use (Kushel et al., 2006). These health-related aspects are particularly salient for people in later life, as they have higher rates of chronic illness requiring significant medical intervention.

In the next 50 years, the United States will see a remarkable demographic shift as the population ages. Currently, one in seven Americans is 65 or older. By 2030, which includes all Baby Boomers, one in five will be over the age of 65. By 2060, that figure

will rise to nearly one in four (U.S. Census Bureau, 2014). As people age, they become more at risk for experiencing housing insecurity. Income falls by about 50% following retirement and continues to fall as aging continues (Purcell, 2012; SSA, 2014). This is especially true for renters in later life. Within the Joint Center for Housing Studies' tabulations of the 2012 American Community Study (ACS), they found that among those age 50 to 64 nearly half were housing insecure, as were nearly three in five people over age 80 (Baker et al., 2014). Vulnerable populations, such as older adults and individuals with disabilities, are particularly at-risk for housing insecurity. It is projected that by 2035, over 17 million Americans 65 and older will be housing insecure, representing approximately 5% of the American population (Colby & Ortman, 2015; Harvard JCHS, 2016). In fact, between 2015 and 2035, households headed by someone over age 65 are projected to see an increase of housing insecurity of 175% (Harvard JCHS, 2016).

Using data from the 2009 ACS, the AARP Public Policy Institute found that renters over age 50 were more likely than homeowners of the same age to be housing insecure (Harrell & Houser, 2011). Among people over age 50 approximately 50% of renters are housing insecure, versus 36% of homeowners who have a mortgage and 14% of homeowners without a mortgage (Harrell & Houser, 2011). The main reason for higher housing insecurity among renters is that renters have 60% lower median incomes than people who own their homes. Among those over age 65, renters earned only half of what owners did in 2014 (Harvard JCHS, 2016).

Two factors underlying growing housing insecurity are that rent is increasing faster than incomes and the demand for rental housing is growing faster than the supply. Adjusted for inflation, the gross median rent in the U.S. was \$479 in 1940 compared to

\$843 in 2015 (U.S. Census Bureau, 2000, 2015b). Rising rents are especially problematic for those in later life as household income drops sharply following retirement and savings and assets are spent down. The poverty rate among renters aged 50 and older is 23%, compared to 6% of homeowners of that age (Harrell & Houser, 2011). In addition to being more likely to be housing insecure than homeowners, renters also have fewer legal protections, which puts them at risk of losing their homes through eviction. In fact, landlords have a financial interest in evicting residents because they then are legally entitled to keep any and all deposits following a court-ordered eviction (Desmond, 2016).

The United States has the highest rate of housing insecurity in the industrialized world. Other countries, such as Ireland, approach home ownership remarkably differently. In 2006, nearly 90% of individuals owned their homes, most of them owning them outright. Less than 10% of older adults rent their homes from public housing, so researchers have turned their focus to the quality of housing rather than basic access and affordability (Nolan & Winston, 2011). Nolan and Winston (2011) studied housing deprivation in Ireland along four axes: poor housing quality, a lack of household durables (such as refrigerators, stoves, or washing machines), housing cost problems, and issues with the neighborhood. Unlike housing in the United States, they found fewer deprivation issues as people aged, with the youngest age groups experiencing more housing deprivation on all measures (Nolan & Winston, 2011).

In the United States, no studies have examined life course factors and their relationships with housing insecurity in later life. This is problematic because the number of renter households over the age of 65 is expected to grow by 80% between 2025 and 2035 and because there is a high level of housing insecurity within this group (Harvard

JCHS, 2016). Among researchers who have examined patterns of housing insecurity among those in later life, no studies have examined how the accumulation of social and structural disadvantages across the lifecourse, referred to as cumulative inequality (CI), affects the risk of experiencing housing insecurity in later life.

Based on The Health and Retirement Survey, a nationally representative longitudinal study of individuals over the age of 50 and their spouses/partners (UMISR, 2016), I examined the relationship between early lifecourse factors and housing insecurity among older renters in the U.S. Specifically, I examine how CI affected the risk of housing insecurity in this population. The results of this study can be used to develop programs and policies to address an issue facing one of the nation's largest and most vulnerable populations.

### **Conceptualizing and Measuring Housing Insecurity**

Housing insecurity has been measured in different ways. The most common among researchers is housing affordability or cost-burden, defined as spending more than 30% of household income on rent. Cost-burden housing insecurity is also measured in terms of its severity. Moderate housing insecurity refers to spending more than 30% of household income on rent. The severely housing insecure are those living in households spending in excess of 50% (U.S. Department of Housing & Urban Development, 2017). This threshold was codified into law by the United States Housing Act of 1937, which spurred many housing affordability programs. Unfortunately, according to the Congressional Budget Office's (CBO) report, "Federal Housing Assistance for Low-Income Households," only a quarter of eligible households receive any form of housing assistance nationally (CBO, 2015).

Housing insecurity has also been measured in terms of poor housing conditions (e.g., no running water, leaking roof, or no climate control) or housing instability such as making frequent moves (U.S. Department of Housing & Urban Development, 2017; Warren & Font, 2015). Additionally, some definitions of housing insecurity include high-crime neighborhoods, unsafe physical condition of the structure, and overcrowding (defined as having more than one person per room excluding bathrooms; Rector et al., 1999; Siebens, 2013).

For the purpose of this study, I examined cost-burden, defined as spending more than 30% of household income on housing costs (Harvard JCHS, 2017). I also measured the severity of housing insecurity using three indicators of severity: not housing insecure, moderately housing insecure (30-50% of household income spent on housing), and severely housing insecure (greater than 50% of household income spent on housing). Both 30% and 50% of household income spent on housing are typical thresholds used in prior research (Harvard JCHS, 2017; U.S. Department of Housing & Urban Development, 1999, 2017). Because my focus is on renters, housing cost was measured in terms of monthly rent without the inclusion of other costs such as utilities.

### **CI Theory and Housing Insecurity**

People who experience social, emotional, and economic problems in later life generally have dealt with a lifetime of challenges and disadvantages. Cumulative advantage/disadvantage theories were developed to understand how relationships between early experiences and events affect trajectories across the lifecourse. In 2009, Ferraro, Shippee, and Schafer produced a multi-level theory synthesizing various

cumulative advantage/disadvantage theories into a middle-range theory they termed Cumulative Inequality (CI). CI refers to how systemic forces build up across the lifecourse (e.g., minority status, unemployment, divorce) leading to poor outcomes as people age such as poverty, worse health, and lower life expectancies.

CI traces its roots to Merton's Mathew Effect, which supposes that individuals who already have advantages will accumulate more advantage at a greater rate than those with less (Merton, 1968). Combining the theoretical works of many different researchers, Ferraro et al. (2009) synthesized CI into five axiomatic statements that explain micro to macro forces (Dannefer, 2003; Elder, 1998; Merton, 1968; Neugarten, Moore, & Lowe, 1965; O'Rand, 1996, 2002). The following sections discuss these axioms summarize in Table 1.

### **Axiom 1**

Ferraro et al.'s first axiom is, "Social systems generate inequality, which is manifested over the lifecourse through demographic and developmental processes" (2009, p. 337). They explain that as demographic and developmental process interact, the conditions individuals are born into and grow up in place them on a trajectory of advantage or disadvantage. CI theory uses cohorts as a division between groups who experience historical, financial, and other events on the systemic level together. An example would be the Baby Boomers.

They make the point that aging occurs throughout the lifecourse and begins at birth despite the common assumption that aging occurs only late in life. They also point out that intergenerational resource flows reproduce inequality.

Resources include not only tangible objects such as real estate but also social and human capital. Putnam (1995, p. 5) defines social capital as “features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.” Having a rich social network leads to greater social capital and in turn access to more resources. Human capital is a “resource that is created from the emergence of individuals’ knowledge, skills, abilities, or other characteristics” (Ployhart & Moliterno, 2011, p. 127). Family lineage provide individuals the starting point of their lives or the supply of resources from which their lives will stem. Some families have more resources to provide the next generation, so those within more resource-rich lineages will start with more advantages than others.

## **Axiom 2**

The second axiom focuses on the mechanism that leads to the accumulation of disadvantage or advantage. The terms risk and disadvantage are often used interchangeably, but this is not entirely accurate. Ferraro et al. (2009, p. 422), specifically provided the interactional nature of risk and disadvantage, defining disadvantage as, “an unfavorable position in a status hierarchy due to structural determinates and/or behavior that reflects the past and the present circumstances in one’s life” and risk as, “the probability of a hazard or negative event occurring in the future.” In a complex interaction, disadvantage leads to exposure to risk and negative outcomes, which in turn causes more disadvantage. Conversely, advantage leads to exposure to opportunity, and positive outcomes, which produces further advantage. It should be noted that advantage and disadvantage is not a zero-sum game. Individuals find themselves in places of advantage and disadvantage at the same time. For example, a Caucasian man with a high

school diploma may be unable to find employment because of his lack of higher education but when he is stopped by police for a traffic violation he is not treated as if he was a threat to police because he's white.

Exposure to risk in one aspect of life and the resulting disadvantage often spills over into other aspects of the individual's lives. For example, people who lose their job may consume more alcohol and in turn get charged with drunk driving and lose their driver's license. Not having a license makes it much harder to find another job. This process is discussed at length in Elder's exploration of the cohort of children during the Great Depression. Elder examined the lifecourse trajectory impact of the Depression depending on where individuals were located within their cohort (Elder, 1974). Early cohort members who matured at the height of the depression started their lives with more disadvantage than younger members. These individuals experienced less advantage across their lifecourse.

### **Axiom 3**

The third axiom states that, "Lifecourse trajectories are shaped by the accumulation of risk, available resources, and human agency (Ferraro et al., 2009, p. 423). The authors of CI describe the interactive nature of risk and opportunity. That is, to measure the effect of CI, researchers must test for the multiplicity of both risk and opportunity. One example is resource utilization. Resource utilization means accessing any type of resource such as human capital or social capital. Resource utilization at earlier times in the lifecourse has been shown have a larger effect on individual lifecourse trajectory than resource utilization later in life (O'Rand, 1996). For example, if a child lives in a locale with a poor educational system and the family relocates to another school

district with better schools, the impact of this move will be greater if it occurs earlier in the child's life than later.

People are not completely at the mercy of accumulated disadvantage and resulting inequalities. Human agency allows individuals to limit and/or overcome inequalities (Thoits, 2017). Human agency is the ability for individuals to set goals in their lives and find the means to complete them. This ability exists in individuals with experience, abilities, and specifically optimism. Some refer to this concept as resilience or the ability to remain competent during or after experiencing exposure to risk (Conger & Conger, 2002).

#### **Axiom 4**

The fourth axiom focuses on how individual perceptions of life circumstances influence lifecourse trajectories (Ferraro et al., 2009). How individuals perceive their status and well-being in relation to others around them strongly influences not only their trajectories, but their health as well (Sapolsky, 2004). Individuals who believe there exists a fairness to success and upward mobility report higher subjective well-being (Bjørnskov, Dreher, Fischer, Schnellenbach, & Gehring, 2013). On the other hand, individuals who perceive a lack of fairness or that their status in relation to others is not as good leads to an unfavorable life review and associated hopelessness and pessimism (Ferraro et al., 2009).

#### **Axiom 5**

The fifth axiom states that CI “may lead to premature mortality; therefore, nonrandom selection may give the appearance of decreasing inequality in later life” (Ferraro et al., 2009, p. 428). Derived from classic demographic theory, this axiom

simplifies Hobcraft, Menken, and Preston's cohort inversion model, which says, "...cohorts experiencing particularly hard or good times early in life will respond inversely later in life" (Hobcraft, Menken, & Preston, 1982, p. 7). Due to ongoing mortality in the cohort, with more disadvantaged people dying earlier, the aging process appears to create less inequality between the surviving members (Ferraro et al., 2009). That longitudinal samples become less representative over time often escapes the notice of researchers. For example, comparing the late life cognitive functioning between Caucasians and African Americans is affected by the higher mortality of African Americans. It may appear there is no difference in cognitive functioning based on race. Housing insecurity often co-occurs with other measures of inequality associated with early mortality such as food insecurity or early onset of chronic disease (Jinyoung Kim & Miech, 2009).

### **Previous Research and Hypotheses**

The CI axioms described above provide researchers with a framework for organizing exposure to risks and opportunities and lifecourse outcomes. To my knowledge there are no studies of CI and housing insecurity specifically among late-in-life renters. I drew upon existing research on the relationship between CI factors, housing insecurity, and related outcomes when formulating my hypotheses. For example, studies using a CI framework have examined health impairment, mortality, and mental health (Burgard, Seefeldt, & Zelner, 2012; Kawachi, Adler, & Dow, 2010; Kochanek, Arias, & Anderson, 2013).

In another example, Curry (2017) examined the relationship between adverse childhood experiences (ACEs) and the likelihood of experiencing housing insecurity

among young adults between the ages of 18 and 26. The more types of ACEs, such as physical, emotional, or sexual abuse, an individual experienced, the higher the risk of housing insecurity (Curry, 2017). In fact, the odds ratio of experiencing housing insecurity in young adulthood went from 50% higher with one type of adverse experience to nearly five times more than with four or more types (Curry, 2017). Although it hasn't been tested, I would expect this effect to persist into later life, especially among vulnerable populations such as later-life renters.

The Health and Retirement Study provides various measures of the axioms of CI. These include gender, race/ethnicity, area type (urban, suburban, ex-urban/rural), region of residence, childhood financial situation (Axiom 1), educational attainment, household size (Axiom 2), number of children, marital status, food insecurity, mental health diagnosis (Axiom 3), perceived current health, perceived childhood health (Axiom 4), and age (Axiom 5). All hypotheses assume these are the independent effects of each variable. That is, I expect the hypothesized relationships even controlling for the other variables listed due to the high likelihood of multicollinearity between variables.

### **Gender**

Women have longer life expectancies than men and generally earn less than men, and previous research shows they are at greater risk of housing insecurity in later life than are men (Harvard JCHS, 2016). One in ten women over 65 lives in poverty compared to only one in 14 men (Semega, Fontenot, & Kollar, 2017). Despite years of forward progress on gender equity, income inequality between men and women persists. In 2016, the Bureau of Labor Statistics estimated female earnings were only 82% of male earnings (Bureau of Labor Statistics, 2011). Even in countries with more equitable income

structures between men and women such as Switzerland, there exists a gendered life outcome in later life with men experiencing less poverty than women (Rainer, Oris, Stüder, & Baeriswyl, 2015). That study found evidence between men and women experiencing poverty in later life being captured primarily by differences in educational attainment. Therefore, I hypothesize that among later-life renters, women are at higher risk of experiencing housing insecurity than are men.

### **Race and Ethnicity**

Research on inequality in later life finds significant differences in experiences of exposure to early life risks by racial/ethnic identity (Baker et al., 2014). In previous research, race and ethnicity are associated with housing insecurity (CITE) One reason is that African Americans and Hispanics earn less than their White Non-Hispanic counterparts, with lower median incomes for African Americans and Hispanic households (36% and 27%, respectively) compared to White Non-Hispanics (Semega et al., 2017). Declining incomes over the lifecourse increases minorities' risk of experiencing housing insecurity in later life. In 2012, 46% of African American households and 43% of Hispanics over the age of 65 experienced housing insecurity in comparison to 29% White Non-Hispanic households (Baker et al., 2014). According to the American Housing Study (2015), the median percentage of income spent on housing costs for individuals between 65 to 74 years old was 30% for African Americans and 32% for Hispanics, compared to 22% for White Non-Hispanics (U.S. Census Bureau, 2015a). Based on the literature discussed above, I hypothesize that African American and Hispanic older renters are at higher risk of experiencing housing insecurity in later life than are White Non-Hispanics.

**Area Type**

The type of community where people live, whether urban, suburban, or rural, can have great effects on their opportunities and risks in life. For example, following World War II, four million African Americans left their rural southern homes and headed to northern cities where there were more financial and educational opportunities available for them (Boustan, 2010). However, over time, as more African Americans moved in cities, White Non-Hispanics fled the cities for the surrounding suburbs taking their money with them and leaving behind a low-income and poor urban population. Moreover, White Non-Hispanic residents continue to flee farther and farther from city centers into exurban areas (Zhang, 2011). Exurban areas are areas outside of urban and suburban areas but on the periphery of the larger metropolitan area (Flippen, 2016). Rents vary depending on the location of one's community. Nationally, rural area renter-occupied median monthly amount for rent is 75% of rental amounts in cities, which can expose urban residents to higher risk of housing insecurity (U.S. Census Bureau, 2016). Suburban areas tend to have lower rental costs than urban areas, but higher than rural areas (Haas, Makarewicz, Benedict, Sanchez, & Dawkins, 2006). Based on the literature discussed above, I hypothesize that individuals who reside in urban and suburban areas are at higher risk of experiencing housing insecurity than those in rural and exurban areas.

**Region of Residence**

The region where individuals reside has a strong effect on the cost of available housing stock (Saiz, 2010). The Western region of the country has the highest housing costs in the country, with the median asking rental price being more than 30% higher than

in the Midwest in 2015 (U.S. Census Bureau, 2015c). This is primarily due to the high cost of rent in California, which claims three out of five of the highest large metropolitan median monthly rental amounts (Barton, 2011). Historically, median rents in the Northeast have been the highest in the country, but this has shifted in the past five years (U.S. Census Bureau, 2015b). Median rent in the Midwest and South are the fourth and third highest, respectively. Based on the literature discussed above, I hypothesize that later-life renters who reside in the Western region are at higher risk of experiencing housing insecurity than those in Midwestern regions.

### **Childhood Financial Situation**

Most research on one's childhood financial situation is measured in terms of childhood poverty. For example, researchers found the length of exposure and severity to poverty as a child had a strong negative effect on the mental health on emerging adults (Evans & Cassells, 2014). Other research has examined children's financial management. Young adults who had bank accounts as children and who had parents who monitored their spending habits were more likely as adults to have more assets and ability to manage their finances than those who did not (Jinhee Kim & Chatterjee, 2013). Similarly, young adults who had parents with poor financial behaviors are much more likely to exhibit similar patterns of poor self-control and money management (Tang, 2017). Poor financial behaviors and knowledge placed people at risk of predatory loans and foreclosures during the recession of 2008, putting them at risk of frequent moves, the necessity of renting, and subsequent housing insecurity (Ross & Squires, 2011). However, no research has examined the effect of *perceptions* of one's financial situation as a child. Based on the literature discussed above, I hypothesize that renters in later life

from poorer perceived childhood financial situations are at higher risk of experiencing housing insecurity than those who considered themselves more well-off financially.

### **Educational Attainment**

Educational attainment and earnings are closely related, as median income and employment rises with education (U.S. Bureau of Labor Statistics, 2016).

In 2014, the median weekly wage for an African American with a bachelor's degree was \$895 compared to a White Non-Hispanic person's wage of \$1,132 (U.S. Bureau of Labor Statistics, 2015). Lower earnings directly impact the risk of housing insecurity. In addition to higher incomes, education provides protective effects during economic downturns, resulting in reduced occupational and financial losses to those with higher attainment (Cutler, Huang, & Lleras-Muney, 2015). Based on the literature discussed above, I hypothesize that later-life renters with lower educational attainment are at higher risk of experiencing housing insecurity than those with greater educational attainment.

### **Number of Persons in Household**

The number of people in one's household may have a relationship with the risk of housing insecurity. More people in the household likely means the need for a larger apartment. However, not all members of the household, many of them children, contribute to the household income. Crowding, meaning more individuals in the household than there are rooms, is common among those who are housing insecure (Warren & Font, 2015). Research has shown negative impact on children's academic performance and behavior for children who reside in households with high proportions of persons per room (Solari & Mare, 2012). Parents often feel pervasive helplessness and

lack of privacy (Campagna, 2016). Based on the literature discussed above, I hypothesize that later-life renters with higher numbers of people residing in the household are at higher risk of experiencing housing insecurity than those in smaller households.

### **Number of Children**

Having children during one's life can present opportunities to some and risks to others. The relationship between housing insecurity and one's number of children has not been tested. Having children might lead to greater risk of experiencing housing insecurity in later life. Researchers have established women often experience what they have termed the "motherhood penalty," whereas men receive the "fatherhood premium" (Budig & Hodges, 2010; Bygren & Gähler, 2012; Glauber, 2008; Knoester & Eggebeen, 2006). These means that married men who have dependent children experience an increase to their wages, which increases with each additional child (Glauber, 2008). For women having children is associated with decreased wages (Bygren & Gähler, 2012). The motherhood penalty affects women more harshly at lower incomes than at higher incomes (Budig & Hodges, 2010). Even when a marriage remains intact, women experience penalties for choosing caregiving over traditional employment. In fact, women who leave the workforce to care for children experience significant hurdles to even receive a call back from potential employers (Weisshaar, 2018). Research on the effect of number of children on male renters is not readily available, but it is unlikely that men with children who rent reap the same benefits of children than do male homeowners. Based on the literature discussed above, I hypothesize that overall, later-life renters with more children are at greater risk than those with fewer children.

**Marital Status**

The effect of marital status on housing insecurity has not been tested. However, in later life, marital status represents one of the strongest predictors of poverty. For example, following the death of a spouse, a new widow's or widower's income can fall by more than 30% (Sevak, Weir, & Willis, 2004). Women have higher life expectancies than do men, so single women must stretch their incomes across more years. Half of women between the ages of 75 and 84 are widows and after the age of 85 this rises to three out of four women (U.S. Census Bureau, 2010). Another common event in the lifecourse is the dissolution of a financially-tied relationship, either a marriage or a long-term cohabitation. Both women and men experience a loss of income after a divorce, but the reduction of women's incomes is greater and they are less likely to recover financially. Based on the literature discussed above, I hypothesize that, overall, later-life renters who are divorced, never married, or widowed are at a higher risk of experiencing housing insecurity than those who are married.

**Food insecurity**

Individuals who experience food insecurity often experience housing insecurity concurrently (Liu, Njai, Greenlund, Chapman, & Croft, 2014; Parish, Rose, & Andrews, 2009). Food insecurity has been defined as the ability of an individual to obtain and afford adequate and nutritious foods. Poverty status and food insecurity have a strong relationship (Liu et al., 2014). Those who are housing insecure often use local food pantries or other services to obtain food resources to address their immediate needs (Shinn et al., 2007). Nevertheless, food resources are often more available and accessible than long-term housing assistance. According to the national Feeding America Network,

there are more than 200 food banks in the U.S., not including religious-affiliated pantries (Mills, Weinfield, Borger, Gearing, & Macaluso, 2014). Although the causal relationship between food and housing insecurity cannot be addressed with cross-sectional data, the relationship between these variables has been well-documented. Based on the literature discussed above, I hypothesize that later-life renters who experience food insecurity are at a higher risk of experiencing housing insecurity than those who don't.

### **Mental health**

Previous research indicates that poor mental health has a positive relationship with housing insecurity (Burgard et al., 2012). Poor mental health negatively impacts individual income and educational attainment, which in turn exposes individuals to risk housing insecurity. Among people of all ages, those with poor mental health are twice as likely to be housing insecure than those with better mental health (Liu et al., 2014). Based on the literature discussed above, I hypothesize that later-life renters with poorer mental health are at higher risk of experiencing housing insecurity than those with better mental health.

### **Childhood and Current Physical Health**

Worse physical health in childhood affects health in later life. Perception of one's health situation, in childhood or adulthood, relative to others has implications for later life outcomes. Using the Michigan Recession and Recovery Study researchers found renters aged 19-64 with poor physical health are more likely to be housing insecure than those do not (Burgard et al., 2012). As individuals age, they become much more likely to experience a health-based disability such as inability to climb stairs or walk (Baker et al., 2014). There is a positive relationship between experiencing housing insecurity and self-

rated poor health (Pollack, Griffin, & Lynch, 2010). However, researchers have not examined the effect of poor childhood health on housing insecurity, nor have studies examined physical and housing insecurity among later-life renters. Based on the literature discussed above, I hypothesize that later-life renters with more negative perception of childhood and current physical health are at higher risk of experiencing housing insecurity than those with more positive perceptions.

### **Age**

Age is the most important predictor of morbidity and mortality. However, how age affects this process occurs is different for some than others (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010). In fact, there can be as much as a six-year difference in life expectancies based on various socioeconomic factors such as race and educational attainment. Regardless of socioeconomic status, as individuals age their income falls dramatically (Social Security Administration, 2014). In fact, the median income of those over 80 is 40% lower than those aged 65-69. Compounding falling incomes, the average cost of living outpaces increases in Social Security benefits by 2% (SSA, 2017). Coupled with the average increase of 3% of median rent in the U.S., those at advanced ages experience housing insecurity at greater rates than those who are at younger ages (Baker et al., 2014; U.S. Census Bureau, 2015c). Based on the literature discussed above, I hypothesize that older later-life renters are at higher risk of housing insecurity than those at younger ages.

## CHAPTER 2: METHODS

The following chapter discusses the data source, sample design, and variable construction, and the analytic strategy used in the study.

### **Data**

This study is based on data from the 2014 Core Health and Retirement Study (HRS), an ongoing nationally representative panel study of retirement and health for individuals aged 50 and above and their spouses/partners. Spouses or partners of eligible participants were included regardless of their age (Health and Retirement Study, 2016). The HRS receives funding from the National Institute on Aging (NIH U01 AGO9740) and the Social Security Administration (SSA). This dataset is ideal for the purposes of this study because it contains extensive information on participants' demographics, income, assets, health, cognition, family structure, health care utilization and costs, housing, job status and history, expectations, and insurance (Chien et al., 2015). The data have been designed to capture the transition from active employment into full retirement and exit from the study through death (Servais, 2010).

In 1992, the HRS identified a cohort born between 1931 and 1994, referred to as the HRS cohort, who have been interviewed every two years since (UMISR, 2017c). In 1993, a second study, the Asset and Health Dynamics Among the Oldest Old, or AHEAD, began capturing data from those born before 1924. These studies were merged in 1998 as the HRS and added two additional cohorts, the Children of the Depression Era (CODA) and the War Babies (WB; UMISR, 2017c).

In 2004, recognizing the need to replenish the earlier cohorts to reflect pre-retirement ages, the HRS adopted a steady state design, thereby adding new cohorts every

six years (UMISR, 2017c). The Baby Boom generation has been divided into three cohorts: Early, Mid, and Late. Further information regarding cohort division is shown in Appendix A. Late Baby Boomers (LBB) are slated to be included into the sample starting with the 2016 wave. Cohort recruitment takes place by a two-stage process (UMISR, 2017b). Six years prior to inclusion into the study, cases receive initial screening to confirm their eligibility. During the wave interview period, cases that met the inclusion criteria were contacted for the baseline interview. In 2014, the response rate for all cohorts was 87%, continuing an extraordinarily high rate of response common throughout all waves of the study. For further information regarding the cohorts, see Appendix A, Table 1A.

The HRS explores a wide variety of topics including employment, health status, demographics, health status, income, life and health insurance, and familial structure (Servais, 2010). The public data are free and readily available for researchers and analysts at their website <https://hrs.isr.umich.edu>. The data are presented in various levels of analysis from respondent to household. The levels of analysis for this study included only information at the household and respondent levels. The HRS core questions are asked of all participants still living and participating in the study. If a participant dies between waves, the surviving spouse or other informant is presented with an exit interview to collect morbidity and mortality data. The participant's death information including date and cause is logged into the cross-wave tracker file with additional information from the National Death Index.

Household-level files contain information obtained by asking questions of the coversheet respondent (the first respondent interviewed), family respondent, or

designated financial respondent. These respondents provided all information for the entire household, one record exists per household. Respondent-level files contain information provided by all participants about themselves, and there is one record per participant within the file. All files start with “H14,” standing for HRS 2014, then a letter indicating the module, an underscore, and then a letter indicating the level of the file. For example, the file H14Q\_H contains information from the 2014 HRS section Q and is at the household level.

The data are organized by modules containing variables with a common theme, such as housing, employment, and income. Each variable follows a naming convention indicating the wave, module, and number of question within the module. Each wave of the study followed the naming convention of starting with the letter D for the first wave and E for the next, skipping letter I until the latest wave, which is the 12<sup>th</sup> for which all variables start with the letter O. For example, the question presented in the income and assets module named OQ010 represents the first question asked in the 12<sup>th</sup> wave regarding income and assets. This information can be derived from the O and the Q.

Created to use data across waves, the HRS provides a Tracker file that has a record for every individual eligible to participate in any wave (UMISR, 2017a). Included in this file are all basic demographic information and cross-sectional weights. The weight variable OWGTR was used for all analysis as advised by the HRS. For further information regarding the construction of the weight variable visit (<https://hrs.isr.umich.edu/sites/default/files/biblio/dr-013.pdf>). Additionally, the tracker file contains information on if a respondent is known to have died, date of death, and

cause of death. Merging this file into the core data files provides vital information on participants in the study.

In addition to the Tracker file, many demographic variables in Section B of the core survey are only obtained once upon initial inclusion in the study. Unchanging data such as place of birth and number of biological children born to the respondent are not updated each wave. The available information in the data download contains only information for new respondents. To obtain this information on earlier participants, prior wave equivalents of Section B were downloaded and merged into a separate dataset. The data were sorted and coalesced into new variables from current and older demographic sections. The question concordance available online at the HRS website (<https://hrs.isr.umich.edu/documentation/question-concordance>) provided Cross-Wave equivalents of all current variables. Following data cleaning, specific variables were picked from the demographic dataset and merged into the primary dataset using the same identification variables discussed below.

Information regarding urban, suburban, and rural residences of respondents in the Cross-Wave Census Region/Division and Mobility File was downloaded and merged into the main dataset using identification variables discussed below. These data use the Beale Rural-Urban Continuum to measure the respondent's residence urbanicity value. The continuum creates a classification system by population and its location in relation to metropolitan areas. For further information regarding the continuum, visit the U.S. Department of Agriculture's website at <https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/documentation.aspx>.

The HRS provides unique identification variables for all participants that when used together allow us to identify each respondent (UMISR, 2016). The primary identification variables are the Household Identification Number (HHID), Sub-household Identifier (OSUBHH), Person Number (PN), and the Other Person Number (OPN). The HHID is assigned to a household upon inclusion in the study and is a unique six-digit number carried throughout all waves regardless of changes of familial structure. In cases of divorce or death and remarriage, a different OSUBHH is provided to denote this change and these can change from wave to wave. Everyone in the household is provided with a three-digit PN number that they carry across waves. The first individual in a household participating in the survey receives the PN of 010 and the spouse or partner receives a PN of 020. For non-related individuals in the home, they are assigned a three-digit OPN, which they keep across waves if they continue to be part of the household. Examples of OPN individuals would be a non-related live-in helper to the older person or a friend who resides within the household but is not a partner or spouse to the eligible participant.

The secondary identification variables across different levels of modules are the family and financial respondents. Most questions were designed to ask every member of a household, but questions regarding assets and income were answered by a financial respondent who was designated as the member of the household most knowledgeable in these matters.

### **Analytic Sample**

The following section provides description and justification of the exclusion and inclusion criteria for the analytical sample used in the analysis. The total number of

participants in the original HRS core study was 18,747. Figure 1 provides a summary of how participants were selected into the sample.

The sample inclusion criteria were participants age 50 and over who are the “financial respondent,” who rent their homes, do not have missing data on income and rental amounts, and do not have any other missing data on independent variables.

### **Age**

The first inclusion criterion is based on age. Respondents must be 50 years of age or older. Participant age at the time of interview was calculated by converting the variables, month of birth *BIRTHMO* and year of birth *BIRTHYR* into century month age at interview. The equation for this calculation was:

$$BDATECM = ((BIRTHYR - 1900) * 12) + BIRTHMO$$

The interview date was converted to century months using variables *OA500*-date of interview-month and *OA501*-date of interview-year. The equation for this calculation was:

$$INTDATECM = ((OA501 - 1900) * 12) + OA500$$

The century month interview date and age were converted back into years as the unit of measurement with this equation:

$$AGEINT14 = (INTDATECM - BDATECM) / 12$$

Older adults for the purpose of this research are defined as individuals age 50 and older, as the Joint Center for Housing Studies used this threshold in their study of housing for older adults (Baker et al., 2014). Placing the age threshold at 50 allows the data to be examined for current and future risk of experiencing housing insecurity. Respondents for whom information on their age was not available were omitted from the sample as well.

Sixty-six participants were under age 50, so their observations were removed. Twenty-one participants did not provide information on their age and therefore were omitted from the sample as well.

The variable *AGEGROUP* was created for data analysis with the following coding strategy: 1. 50-59 2. 60-69. 3. 70-70 4. 80+. Four dummy variables were also created for analysis.

### **Financial Respondent**

While examining the data during the cleaning process, it became apparent there was an issue with merging respondent and household data files. In 5,342 households, two records existed for participants who would have the same income and rental amounts, which violates the assumption of independence for regression analyses (Gailmard, 2014). The financial respondent variable *OFINR* provides a way to sort out the duplicates from the household data. Within the data, *OFINR* coding followed this strategy 1. *Yes* 3. *2<sup>nd</sup> financial respondent, answer not retained* 5. *No*. Excluding those who were not the financial respondent reduced the sample by 5,232.

### **Renters and Rental Amounts**

The variable *OH004* provides information on whether a participant owns or rents their home. This information was obtained with this question: *Do you [and your] [husband/wife/partner] own your home, rent it, or what?* The coding strategy for this variable is as follows: 1. *own (or buying)* 2. *rent* 3. *lives rent-free with relative/employer/friend* 7. *other (specify)* 8. *DK (don't know); NA (not ascertained)* 9. *RF (refused)*. For clarity in analysis, *OH004* was recoded to the variable *OWNRENT* with the following coding strategy: 0. *own (or buying)* 1. *Renting*. Excluding those who own

their home, living rent-free, other, or any missing value were excluded, reducing the sample by 7,909.

As part of one of the most important variables for this study, *OH079* monthly rental amount received considerable examination. The question collection rental amount was as follows: *About how much rent do you pay?* The following codes were used for missing data: 99998 DK (Don't Know) or NA (Not Ascertained) and 99999 (Refused). The maximum value for monthly rent was \$65,000 and the minimum was \$0. When examined closer, there were two observations of \$65,000. This was deemed to be an erroneous entry with one household having two financial respondents and a reported monthly rental amount. These two observations were excluded. There was an additional observation of \$15,000 per month in rent, which was more than twice the next-lowest reported monthly rent amount. This observation was assumed to be a result of an error in the data. The variable *OH079* was renamed RENTMOAMT for analysis and exclusion of missing values. Those participants who had missing or refused rental amounts led to the removal of 71 observations.

### **Income**

Perhaps one of the more challenging aspects of this study was the construction of a total household income variable. Income data were at the Last Calendar Year (LCY) amount and at monthly amounts, which were summed separately and then combined to provide total household income amounts at annual and monthly levels. Within the data, there were 31 LCY and 13 monthly income variables for the financial respondent, their spouse, and other household members. For further information regarding income variables, see the codebook for section Q in the 2014 Core Dataset provided with data

download or at the HRS website

([http://hrsonline.isr.umich.edu/modules/meta/2014/core/codebook/h14q\\_hi.html](http://hrsonline.isr.umich.edu/modules/meta/2014/core/codebook/h14q_hi.html)). Income questions were constructed in a multi-stage approach with questions like the following examples:

*We are interested in how people are getting along financially these days. The next questions are about income you [or your] [husband/wife/partner] receive. Let's start with income from work. Did you do any work for pay last year, in [Last Calendar Year]? 1.*

*Yes 5. No 8. DK (Don't Know); NA (Not Ascertained) 9. RF (Refused)*

*Did your [husband/wife/partner] do any work for pay last year, in [Last Calendar Year]?*

*1. Yes 5. No 8. DK (Don't Know); NA (Not Ascertained) 9. RF (Refused)*

Each of these questions elicited follow-up questions to obtain as much information as possible regarding incomes of those within the household. Financial respondents who indicated receipt of income from a source were provided the opportunity to share this amount in questions like this one about income from self-employment:

*About how much did your self-employment income amount to in [Last Calendar Year], including any profits left in the business before taxes and other deductions? Provided Actual Amount or 99999998. DK (Don't Know); NA (Not Ascertained) 99999999 RF (Refused).*

These questions collected information for all income for all household members. Monthly income questions followed the above format, with a multi-stage approach to data collection and the same coding strategy of the reported amount: 99999998 for DK or 99999999 for RF. To exclude these missing data, a frequency analysis for all income

variables was conducted to find the maximum reported value, then the variable was renamed excluding values above the maximum reported value. For example, financial respondent reported self-employment amount from variable *OQ015* was renamed *SELFEMP*, which had a maximum value of \$375,000 LCY. *SELFEMP* was initially assigned a value of “.” to differentiate between a not applicable value and a zero.

Amounts above the maximum reported value were excluded to address both DK and RF codes.

After removal of all missing data for both LCY and monthly income, the amounts were summed into two variables *HHANINC* and *HHMONINC*. The process was as follows:

Monthly income calculation:

$$MONINCTOT=(HHANNINC/12) \text{ and}$$

$$CALMONINC= (MONINCTOT + HHMONINC)$$

As part of the key dependent variable, participants missing on income were dropped from the analysis (456 participants).

Other independent variables

Additional respondents were removed as a result of missing data on key social and demographic variables: (a) race/ethnicity variable (N=749); (b) educational attainment (N=14); (c) region of residence (N=8); (d) marital status (N=21); (e) current physical health (N=1); (f) number of children (N=5); (g) food insecurity (N=8); (h) childhood financial situation (N=25); and (i) location of residence (N=191). This yielded a final analytic sample of 2,096 respondents.

### **Housing Insecurity**

Housing insecurity was constructed from income and rental amount information.

Housing insecurity was measured as the percentage of monthly income spent on rent. This was completed with the following calculation:

$$\text{RENTPERC} = ((\text{RENTMOAMT} / \text{CALMONINC}) * 100)$$

A binary variable, HIBIN was constructed using RENTPERC. Observations lower than 30 received a 0 and if 30 or higher received a 1. A measure of housing insecurity severity also was constructed. To measure the severity of housing insecurity, the variable HISEVERE was created by recoding RENTPERC to identify observations that are not housing insecure, are moderately insecure, and are severely insecure. If the value of RENTPERC under 30 received a code of 0, indicating they were not housing insecure. If RENTPERC was between 30 and 49 they received a code of 1, indicating moderate housing insecurity. If RENTPERC was 50 or over the observation received a 2, indicating severe housing insecurity.

### **Gender**

Gender information was obtained from the core dataset with the following question: *What is your sex?* The coding strategy was *1. Male 2. Female*. For analysis, this variable was recoded to *0. Male 1. Female*. There were no missing observations on this variable. The reference category is male.

### **Race and Ethnicity**

Racial and ethnic information was obtained from the Tracker version 1.0 from two separate variables, *RACE* and *HISPANIC*. Racial data is collected in the baseline interview with the following question: *What race do you consider yourself to be: White,*

*Black or African American, American Indian, Alaska Native, Asian, Native Hawaiian, Pacific Islander, or something else?* The options were: 1. *White/Caucasian* 2. *Black/African American* 97. *Other* 98. *DK (don't know)*; *NA (not ascertained)* 99. *RF (refused)*. The interviewer had instructions to probe before accepting refusal. This information then was entered into the Tracker file within the *RACE* variable. The 2014 sample *RACE* variable has the following codes: 0. *Not obtained* 1. *White/Caucasian* 2. *Black or African American* 7. *Other*. Those in the category of 98 *DK (don't know)*; *NA (not ascertained)* were excluded. The category *other* was problematic because it was unclear what racial identities are included within this group. One could reasonably assume that Asian/Pacific Islander and Native American/Indian are part of the 1,590 observations, but without knowing this for sure it wasn't advisable to keep them within the sample. This category was excluded from the study.

In this sample, 963 participants identified as other on the *RACE* variable and identified as 1, 2, or 3 on the *HISPANIC* variable. This reduced the number of missing data on the *RACETH* variable to 749 and clarified confusion regarding the questions of race and ethnicity. For analysis, the *RACE* and *HISPANIC* variables were combined into one variable, *RACETH*, using the following codes: 1. *White/Caucasian* 2. *Black/African American* 3. *Hispanic*. Participants who said they were (1) *White/Caucasian* on the *RACE* variable and (5) on the *HISPANIC* variable were coded 1. within the *RACETH* variable. Participants who said they were (2) *Black/African American* on the *RACE* variable and (5) on the *HISPANIC* variable were coded 2. within the *RACETH* variable. Participants who said they were (1), (2), or (3) on the *HISPANIC* variable were coded 3. within the *RACETH* variable. Not obtained (0) and other (7) from *RACE* were excluded. If

observations didn't fit into this coding strategy, they received a (0) for missing for the *RACETH* variable. The advantage of combining these variables became apparent when examining the racial/ethnic identity frequencies: 1,489 participants responded that they were White/Caucasian on the *RACE* variable, but identified as 1, 2, or 3 on the *HISPANIC* variable; 72 participants identified as Black/African American on the *RACE* variable and as 1, 2, or 3 on the *HISPANIC* variable. The reference category for this variable is White Non-Hispanic.

### **Area Type**

From the Cross-Wave Census Region/Division and Mobility File the variable *BEALE2013\_14* indicates the respondent resides in an urban, suburban, or exurban area. This variable uses the rural-urban continuum codes and collapses all continuum codes into three categories to protect respondent confidentiality (UMISR, 2014). Exurban includes all areas that were not urban or suburban and therefore includes rural residents. The coding scheme for this variable was *1. Urban (Beale Rural-Urban Continuum code 1) 2. Suburban (Beale Rural-Urban Continuum code 2) 3. Exurban (Beale Rural-Urban Continuum codes 3,4,5,6,7,8,9)*. For this study, exurban is used to refer to all areas of Beal Rural-Urban Continuum codes 3-9. Exurban is the reference category. There were no missing data for this variable.

### **Region of Residence**

For data concerning region of the U.S. the respondent resides in, the variable *OX026M* was used with the following coding scheme: *1. Northeast Region: New England Division (ME, NH, VT, MA, RI, CT) 2. Northeast Region: Middle Atlantic Division (NY, NJ, PA) 3. Midwest Region: East North Central Division (OH, IN, IL, MI,*

WI) 4. *Midwest Region: West North Central Division (MN, IA, MO, ND, SD, NE, KS)* 5. *South Region: South Atlantic Division (DE, MD, DC, VA, WV, NC, SC, GA, FL)* 6. *South Region: East South Central Division (KY, TN, AL, MS)* 7. *South Region: West South Central Division (AR, LA, OK, TX)* 8. *West Region: Mountain Division (MT, ID, WY, CO, NM, AZ, UT, NV)* 9. *West Region: Pacific Division (WA, OR, CA, AK, HI)* 11. *Foreign Country: Not in a Census Division (includes U.S. territories)* 98. *DK (Don't Know); NA (Not Ascertained)* 99. *RF (Refused)*. For simplicity, coding for the variable REGION was reduced from twelve categories into four: 1. North (combining 1 and 2), 2. Midwest (combining 3 and 4), 3. South (combining 5, 6, and 7), and 4. West (combining 8 and 9). All other categories were excluded including those residing in U.S. Territories. Eight missing observations were excluded from the sample on this step. For the regression analysis the reference category was Midwest.

### **Perceived Childhood Financial Situation**

From the variable OB020 and cross-wave equivalents from the demographic dataset mentioned in the data description, how respondents perceived their childhood health was obtained with the following question: *Would you say your family during that time was pretty well off financially, about average, or poor?* The original coding was 1. *Pretty well off financially*, 3. *About average*, and 5. *Poor*. For simplicity, these categories were recoded as: 1. *Pretty well off financially*, 2. *About average*, and 3. *Poor*. Three indicator variables were created: FINWELL, FINAV, and FINPOOR. Twenty-five observations were excluded due to missing data. For analysis, the reference category was pretty well off.

### **Educational Attainment**

The variable DEGREE was obtained from the question *What is the highest degree you have earned?*, coded as 0. *No degree*, 1. *GED*, 2. *High school diploma*, 3. *Two-year college degree*, 4. *Four-year degree*, 5. *Master's degree*, 6. *Professional degree*, and 9. *Degree unknown/some college*. For analysis, DEGREE was recoded to the variable DEGREE1 using this coding strategy: 1. *No degree*, 2. *High school*, and 3. *Bachelor's degree or higher*. Those with unknown degrees/some college were coded to the mode, high school degree. Fourteen missing observations were excluded from the sample. For analysis, the reference category was four-year degree or higher.

### **Number of Persons in Household**

Household size was derived from the variable OA098, which is a count of household members obtained from multiple variables, with a range of 0-11. HHSIZE was recoded from OA098, by adding one to all observations assuming the respondent represents one person. HHSIZE used this coding strategy: 0. *Zero* 1. *One* 2. *Two* 3. *Three or more*. There were no missing observations on this step. For analysis, the reference category was a household size of one.

### **Number of Children**

From the variable NUMCHILD, the number of children the individual has ever had was obtained from the following question: *How many children [have you fathered/have you given birth to]?* The responses reflected the actual number of children born to the respondent not counting stillbirths, adoptions, or step-children. The variable NUMCHILD was recoded into an ordinal variable called CHILDREN with the following coding strategy: 1. *No children*, 2. *One child*, 3. *Three children* 4. *Four or more children*.

Five missing observations were excluded from the sample on this step. For analysis, the reference category was zero children.

### **Marital Status**

Marital status was obtained using the variable OMARST from the Tracker file and the following question to verify marital status. *Just to clarify, are you currently separated, divorced, widowed, or have you never been married?*, coded as 1. *Married*, 2. *Separated/Divorced*, 3. *Widowed*, and 4. *Never Married*. Four dummy variables were created from these four categories. Two missing observations were excluded from the sample. For analysis, the reference category for this variable was married.

### **Food Insecurity**

An index was constructed to operationalize food insecurity severity using three separate variables, OQ400, Q415, and OQ516. The data for the variable OQ400 were obtained using the following question: *Did you or other family members who may have been living there receive government food stamps, also known as SNAP benefits, at any time in the last two years?*, coded 1. *Yes*, 5. *No*, 8. *DK (Don't Know)*, NA (*Not Ascertained*), and 9. *Refused*. The data for OQ415 were obtained with the following question: *In the last two years, have you always had enough money to buy the food you need?*, coded 1. *Yes*, 5. *No*, 8. *DK (Don't Know)*, NA (*Not Ascertained*), and 9. *Refused*. The data for OQ516 were obtained from the following question: *In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?*, coded 1. *Yes*, 5. *No*, 8. *DK (Don't Know)*, NA (*Not Ascertained*), and 9. *Refused*.

An index of food insecurity was constructed by creating three indicator variables, FOOD1, FOOD2, and FOOD3. The variable FOODINDEX was constructed by adding

the three variables. This provided the range of zero through three for the index. Those scoring near the lower end of the index indicated lower food insecurity. Eight missing observations were removed on this step. For analysis, the reference category was not food insecure.

### **Mental Health Diagnosis**

The variable MHEALTH was obtained from the variable OC065 with the following question: *Have you ever had or has a doctor ever told you that you have any emotional, nervous, or psychiatric problems?*, coded 1. *Yes*, 3. *Disputes previous wave record, but now has condition*, 4. *Disputes previous wave record, does not have condition*, and 5. *No*. In recoding the variable, MHEALTH, responses of 1 or 3 were given a code of 1 indicating the individual had a mental health diagnosis and responses of 4 or 5 were coded indicating the individual did not have a mental health diagnosis. There were no missing data on this variable, so no exclusions were made. For analysis, the reference category was no mental health diagnosis.

### **Perception of Current Physical Health**

From the variable OC001, respondent's perception of current health condition was obtained from the following question: *Would you say your health is excellent, very good, good, fair, or poor?*, coded 1. *Excellent*, 2. *Very good*, 3. *Good*, 4. *Fair*, 5. *Poor*, 8. *DK (Don't Know)*, *NA (Not Ascertained)* and 9. *RF (Refused)*. The variable OC001 was recoded in reverse, renamed to PHEALTH, and compressed into three categories of 1. *Poor/Fair*, 2. *Very good/Good*, and 3. *Excellent*. One missing observation was excluded from the sample. For analysis, the reference category was excellent.

### **Perception of Childhood Health**

From the variable OB019 and cross-wave equivalents from the demographic dataset mentioned in the data description, how respondents perceived their childhood health was obtained from the following question: *Would you say that your health during that time was excellent, very good, good, fair, or poor?*, coded 1. *Excellent*, 2. *Very good*, 3. *Good*, 4. *Fair*, 5. *Poor*, 8. *DK (Don't Know)*, *NA (Not Ascertained)*, and 9. *Rf (Refused)*. This variable was renamed and recoded into the variable CHILDHEALTH, coded 1. *Excellent*, 2. *Very good/Good*, and 3. *Fair/Poor*. Three indicator variables were created for analysis: EXCELLENT, GOOD, and FAIRPOOR. Eight missing observations were removed from the sample on this step. For analysis, the reference category was excellent.

### **Analytical Plan**

The analysis includes three parts. First, descriptive information is provided about the extent of housing insecurity in the sample and information on the sociodemographic characteristics of participants. Second, bivariate relationships between CI and housing insecurity severity are presented. Third, the hypothesized relationships between CI and housing insecurity severity are tested in a multivariate context. An ordered logistic regression is used to test the relationship between severity of housing insecurity and CI measures. Ordered logistic regression is the appropriate method when the dependent variable is ordinal (Demaris, 1995; Long, 1997), that is, (a) not housing insecure, (b) moderately housing insecure, and (c) severely housing insecure. First, I entered each set of variables (Axiom 1, Axiom 2, etc.) into the model separately. Second, I included all the Axiom measures together in a final model to measure the independent effect of each

CI measure on severity of housing insecurity. As recommended by the HRS, all analyses are weighted using the respondent level weight variable OWGTR to account for the complex sampling design of the HRS and oversampling of minorities. Using a weighting variable provides me the ability to apply the results to all renters aged 50 and older in the U.S.

## CHAPTER 3: RESULTS

This chapter presents the results of the analysis outlined in Chapter 2.

### Descriptive Results

Table 3 provides the distribution of the independent and dependent variables used in the study. Approximately half (51%) of sample respondents were housing insecure and half were not. Among the housing insecure, over half (27% of total) were severely housing insecure. Approximately equal proportions of males and females were represented in the sample (45% male and 55% female).

Two-thirds of the sample was White Non-Hispanic, 23% African-American, and 15% Hispanic. Over 50% of respondents reside in urban areas, 25% reside in suburban areas, and less than 20% reside in exurban areas (including rural). About two-thirds in the sample identified their childhood financial situation as being average. Only 8% identified their situation as well-off and 30% reported their childhood financial situation as poor. About one in five respondents reported that they did not have a high school degree, 61% reported having a high school diploma, and 17% reported having a bachelor's degree or higher. Two-thirds in the sample lived by themselves, 17% lived with one other person, and 18% lived with three or more persons. About one in five respondents reported having no children, 15% reported having one child, 25% reported two children, and 42% reported having three or more children. Nearly 65% of the sample was not food insecure, with the remainder reporting some food insecurity. Roughly one-third reported having a mental health diagnosis, with two-thirds reporting no mental health diagnosis. Nearly 60% reported they were in very good or good health, 11% reported excellent perceived current health, and 30% reported fair or poor health. Half of the sample reported excellent

childhood health, 42% reported very good or good childhood health, and approximately 10% reported fair or poor childhood health. Approximately 13% of the sample was aged 80 or greater, 17% were in their seventies, 36% were in their sixties, and 34% were in their fifties.

### **Bivariate Analysis**

The bivariate analysis reports (a) the relationship between each CI measure and whether the respondent is housing insecure and, (b) the relationship between each CI measure and severity of housing insecurity (Table 4 and Table 5).

As seen in Table 4, just over half of men and just under half of women were housing insecure. Approximately half of both White Non-Hispanic and African Americans were Housing insecure, but those of Hispanic ethnicity of whom 63% were housing insecure. This is similar to the location of residence variable, region of residence, childhood financial situation, number of people in the household, number of children, food insecurity, mental health diagnosis, perceived current health, and perceived childhood health. The exceptions of this were highest attained degree, marital status, and age.

Among those with no degree about 60% were housing insecure. Among those with a bachelor's or higher only 40% were housing insecure, and among those with a high school degree 47% were housing insecure. Among those who were widowed, 62% were housing insecure. Among those who were divorced or never married, about 50% were housing insecure compared to 40% of those who were married. Over two-thirds (66%) of those age 80 and older were housing insecure. Housing insecurity rose with

each decade of age. For example, only 41% of those who were in their fifties were housing insecure.

To capture variation in the relative level of housing insecurity, an ordinal measure of housing insecurity was constructed (not housing insecure, moderately housing insecure, and severely housing insecure). Table 5 provides information on the relationship between each CI measure and severity of housing insecurity. Men and women did not differ in being moderately and severely housing insecure. With respect to race and ethnicity, nearly 40% of Hispanics were severely housing insecure. In contrast, only 22% of White Non-Hispanic participants and 31% of African Americans were severely housing insecure. Over 30% of those living in urban areas were severely housing insecure, in contrast to only 16% in exurban areas and 25% in suburban areas. Nearly 40% of those with no degree were severely housing insecure, which is nearly twice the rate for those with high school diploma and a bachelor's degree or higher respectively. Those with three or more children had much more moderate and severe housing insecurity than those with fewer children. For those whose marital status was widowed, 36% were severely housing insecure as compared to only 22% of those who were married. Just over 30% of those experiencing food insecurity experienced severe housing insecurity. Nearly half (46%) of those aged 80 and older experienced severe housing insecurity. Within this measure, the percentage of those experiencing severe housing insecurity again rose with each decade of age.

Table 6 shows the results of a bivariate ordered logistic regression analysis that provides regression coefficients (Column 1), standard errors (Column 2), and odds ratios (Column 3). All relationships were statistically significant, although in some cases the

magnitude of the effects was small. Therefore, my focus will be on a comparison of the relative size of the effects.

With respect to gender, counter to my hypotheses that women would have higher odds of housing insecurity, women had slightly lower odds of experiencing more severe housing insecurity versus less. Those of Hispanic ethnicity were nearly twice as likely to experience more versus less severe housing insecurity than White Non-Hispanics. Similarly, over a third of African Americans were severely housing insecure. Regarding area types, those in urban areas had six times the odds of experiencing more severe housing versus less housing insecurity than those from exurban areas. Those residing in the West had 57% higher odds of experiencing more severe housing versus less insecurity than those from the Midwest. Individuals whose marital status was widowed were 80% more likely to be more housing insecure than those who were married. Respondents aged 80 and over were 2.5 times more likely to experience more severe housing versus less insecurity than respondents in their fifties.

### **Multivariate Analysis**

The multivariate analysis examined the relationship between each Axiom's CI measures and housing insecurity severity. All relationships were statistically significant, but some results were not in the hypothesized direction.

Table 7 shows the relationship between the Axiom 1 measures and housing insecurity severity. Females have lower odds of experiencing more severe housing insecurity versus less compared to males. This is opposite of my hypothesis that females would experience greater odds of experiencing more severe housing versus less than males. African Americans and Hispanics identity was associated with increased odds of

severe housing insecurity versus less compared to White Non-Hispanics. In fact, those from Hispanic ethnicities were 90% more likely to experience more severe housing insecurity versus less compared to White Non-Hispanics. This provides support for my hypothesis that African American and Hispanic later-life renters are at higher risk of experiencing housing insecurity than are White Non-Hispanics.

Those living in urban and suburban areas had enhanced odds of experiencing more severe housing insecurity versus less compared to those in exurban areas (which includes rural residents). This provides support for my hypothesis that those who reside in urban and suburban areas will be at higher risk of experiencing housing insecurity than those in rural areas. Those from the West region had higher odds of experiencing more severe housing insecurity versus less compared to those residing in the Midwest. This outcome supports my hypotheses that later-life renters who reside in the Western region are at higher risk of experiencing housing insecurity than those in other regions. Those who reported a poor childhood financial situation had greater odds of experiencing more severe housing insecurity. However, those reporting average childhood financial situations had higher odds of experiencing housing insecurity than those from poor childhood financial situations, 20 % and 10% higher respectively. This does not provide adequate support for my hypotheses that renters in later life from poorer childhood financial situations will be at higher risk of experiencing housing insecurity than those from more well-off situations. However, the magnitude of the difference is very small.

Table 8 presents result regarding the relationship between Axiom 2 measures and housing insecurity severity. Those who reported no degree, or a high school degree had enhanced odds of severe housing than those with a bachelor's degree or higher. It should

be noted those with no degree were over two times more likely to experience more severe housing insecurity compared to those with bachelor's degrees or higher. Those with high school degrees had slightly higher odds (20%) of experiencing more severe housing insecurity compared to those with bachelor's degree or higher. This provides support for my hypothesis that later-life renters with lower educational attainment would be at higher risk of housing insecurity than those with greater educational attainment.

Household size had an interesting relationship with housing insecurity. Two persons in the household having similar odds of severity of housing insecurity as one person in the household. However, having three or more persons in the household was associated with enhanced odds of experiencing more severe housing insecurity versus less. This provides partial support for my hypothesis that later-life renters with more people residing in the households will be at higher risk of experiencing housing insecurity compared to those with smaller households.

Table 9 presents the relationship between Axiom 3 measures and housing insecurity severity. Having children was associated with enhanced odds of experiencing more severe housing insecurity versus having no children. This provides support for my hypothesis that later-life renters with more children would be at higher risk of experiencing housing insecurity than those with fewer children.

Being widowed, divorced, and never married was associated with enhanced odds of experiencing more housing insecurity compared to being married. Specifically, late life renters who were widowed were 2.39 times more likely to experience more severe housing insecurity compared to those who were married. This provides support for my

hypothesis that later-life renters who are widowed, never married, or divorced will be at higher risk of experiencing housing insecurity than those who are married.

Being food insecure was associated with enhanced odds of experiencing more severe housing insecurity. This provides support for my hypothesis that later-life renters who experience food insecurity will be at a higher risk of experiencing housing insecurity than those who do not. Later-life renters who reported a mental health diagnosis had lower odds of experiencing housing insecurity compared to those who did not. This was the opposite of my hypothesis that later-life renters with mental health diagnosis will be at higher risk of experiencing housing insecurity compared to those without.

Table 10 presents results regarding the relationship between Axiom 4 measures and housing insecurity severity. Perceived current health had a mixed relationship with housing insecurity. Perceived “good” current health was associated with slightly enhanced odds of experiencing more severe housing insecurity compared to those with “excellent” health. However, “fair/poor” health was associated with lower odds of experiencing more severe housing insecurity versus less. Thus, my hypothesis that later-life renters with negative perceptions of their current health situation would be at higher risk of experiencing housing insecurity was only partially supported.

Fair or poor perceived childhood health was associated with enhanced odds of experiencing more severe housing insecurity compared with those who perceived excellent childhood health. Respondents who said their childhood health was good had slightly higher odds of greater housing insecurity compared to those who rated their childhood health fair or poor. These results provide partial support for my hypothesis that

later-life renters with negative perceptions of childhood health situation will be at higher risk of experiencing housing insecurity than those with more positive perceptions.

Table 11 presents results regarding the relationship between Axiom 5 measures and housing insecurity severity. All age categories above 60 had greater odds of more severe housing insecurity than those under 60 years of age. In particular, those aged 80 and over were three times more likely to have experienced more severe housing insecurity versus less compared to those age 50 to 59. This provides support for my hypothesis that later-life renters who are age 60 and over will be at a higher risk for experiencing housing insecurity than those aged 50 to 59.

Table 12 presents results regarding the relationship between CI measures and housing insecurity severity with all CI variables included together in one model. This allows assessment of the independent effect of each CI variable on housing insecurity severity, controlling for all other CI variables in the model. The effect of all variables was statistically significant. These results largely mirrored the result presented above. Some odds ratios were slightly different in size but with similar direction as the individual Axiom models. For example, females were 73% less likely than males to experience more severe housing insecurity in the composite model compared to 96% in the previous model. In another example, the number of persons in the household in the Axiom 2 model provided ambiguous results, with two in the household having an odds ratio of 0.99 compared to one person. In the composite model the odds ratio rose to 1.12, providing support for the hypothesis that more people residing in the households will be at higher risk of experiencing housing insecurity than smaller households. The odds ratios for educational attainment were different were lower in in the composite model than in

the Axiom 2 model. In the Axiom 2 model, having no degree had an odds ratio of 2.35, but this fell to 1.61 in the composite model. Interestingly, the effect of the number of children was in the opposite direction compared to the composite model but the difference was small. African Americans and Hispanics had increased odds of experiencing more severe housing insecurity versus less. This finding continues to provide support for the hypothesis that African American and Hispanic later-life renters are at higher risk of experiencing housing insecurity in later life than are White Non-Hispanics. The relationship between marital status and housing insecurity was similar to the previous model. The strong relationship between being widowed and experiencing increased odds of experiencing more severe housing insecurity remained. Those experiencing food insecurity continued to have enhanced odds of experiencing more severe housing insecurity versus less.

The effect of age on housing insecurity was similar to the previous model except the effects were larger. For those aged 80 and over the odds ratio rose from 3.04 to 3.51. For those in their seventies odds ratios rose from 1.69 to 1.94 in the composite model. The change for those in their sixties rose marginally, but maintained the direction supporting the hypothesis that later-life renters who are age 60 and over will be at a higher risk for experiencing housing insecurity than those aged 50 to 59.

## CHAPTER 4: DISCUSSION

Given the recent housing crisis (such as a record number of foreclosures, lack of affordable housing, and poor-quality housing) occurring in the U.S., it is important to identify and understand factors associated with housing insecurity especially among vulnerable populations. Long-term housing insecurity is associated with poor health, shortened life spans, and mental health problems (Bor et al., 2017). Having excessively high housing costs raises the risk of postponing accessing medical care, postponing the purchase of medications, and increased emergency room use (Kushel et al., 2006).

Housing insecurity is particularly high among renters. In 2009, 36% of homeowners over 50 with a mortgage spent more than 30% of income on housing costs compared to 50% of renters (Harrell & Houser, 2011). Coupled with this, the U.S. population is aging rapidly, with higher percentages of the population age 65 and older (U.S. Census Bureau, 2014). Understanding housing insecurity among renters in later life is vital to the health and well-being of this demographic.

This study of later-life renters, defined as adults 50 years of age and older, was based on the Health and Retirement Survey, a nationally representative, longitudinal dataset of older Americans. My analysis of housing insecurity among this population mirrors housing insecurity figures based on other national data sets. Similar to Harrell & Houser (2011), who used the 2009 American Community Survey and found that 50% of renters are housing insecure, I found that 51% of renters in later life were housing insecure. Moreover, I found that 27% of later-life renters were severely housing insecure, meaning that they spend more than 50% of their income on housing. The percentage of renters in the 2014 American Community Survey is the same as reported in previous

research (Harvard JCHS, 2016). My results show that housing insecurity among renters continues to be a problem across the lifecourse, affecting younger and older Americans alike.

This study applied Cumulative Inequality (CI) theory to examine housing insecurity severity in later life. CI theory is a relatively recent addition to gerontological theoretical work and has not been previously used to understand housing insecurity. CI, which provides explanations of how individual life trajectories accumulate advantage or disadvantage resulting in unequal life outcomes, draws upon concepts developed by theorists such as Robert Merton, Glen Elder, Angela O’Rand, and Dale Dannefer (Dannefer, 2003; Elder, 1974; Merton, 1968; O’Rand, 2002). This study adds to the literature examining how factors across the lifecourse can lead to unequal later life outcomes.

CI proved to be a fruitful framework for understanding housing insecurity among renters in later life. Most of my hypotheses were supported by the data. For example, those who identified as African American or Hispanic had enhanced odds of severe housing insecurity compared to White Non-Hispanics. As the number of people residing in a household rose, so too did their odds of experiencing more severe housing insecurity. My hypothesis regarding the relationship of marital status and housing insecurity was also supported. In fact, those who were widowed were over twice as likely to experience more severe housing insecurity versus less than those who were married. As was predicted by the literature, food insecurity was correlated with housing insecurity. Age was positively associated with severity of housing insecurity, with risk of housing insecurity rising with advancing age. For example, those aged 80 and over were more

than three times more likely to experience more severely housing insecurity than those in their fifties. This could be from the spending down of life savings, the depletion of retirement funds, and a possible increase in the cost of housing needs such as more intensive supportive living.

However, several hypotheses were not supported. For example, the relationship between gender and housing insecurity severity was opposite from my hypothesis that women would have a higher risk than would men. Many factors could contribute to the direction of this relationship. One possibility is selectivity of men into the status of later-life renter. Men are more likely to be homeowners than women, especially in later life. Thus, male renters may be a particularly disadvantaged group. Further exploration of this relationship is warranted to understand the gender differences in housing insecurity severity.

The effect of number of children on housing insecurity was opposite of my hypothesis. In fact, those with more children had lower odds of severe housing insecurity than those with fewer. This could be the result of intergenerational financial transfers from adult children to aging parents such that those with more children would receive more economic support. However, these differences were not large. Exploring intergenerational effects on housing insecurity could provide valuable information about lifecourse impacts.

The hypothesis regarding perceived current health was not supported. Those in fair or poor health had lower odds of housing insecurity than those in excellent health. Similarly, the relationship between perceived childhood health and housing insecurity was opposite of what was hypothesized. These relationships of perceived health and

housing insecurity might provide more information if explored over a longer period. Additionally, adults in later life who ever had a mental health diagnosis had lower odds of experiencing housing insecurity than those who did not. It is possible that a mental health diagnosis is an indicator of access to health care, greater social support, and other benefits associated with less severe housing insecurity.

### **Limitations**

There were some limitations of this study. Based on the literature, I would have liked to have included additional CI variables. For example, only limited information on incarceration is contained in the HRS (Ahalt, Binswanger, Steinman, Tulsky, & Williams, 2012). Yet, nearly 20 million Americans have a felony conviction. This information is important for studies of housing because individuals convicted of felonies are ineligible for housing assistance, leaving them vulnerable to housing insecurity and homelessness (U.S. Department of Housing & Urban Development, 1984). As the population ages further, information on this relationship will become vital (Shannon et al., 2017). Additionally, the HRS contains very limited data on minorities other than African Americans and those of Hispanic ethnicity. The only categories for racial/ethnic identities provided were White Non-Hispanic, African American, Hispanic, and Other. “Other” was collapsed to protect confidentiality of participants. This lack of information limited the scope of this study considerably.

Ideally, this study would have tested how the CI measures interacted with one another, such as between gender and number of children. Because the results were based on cross-sectional data, this study does not provide evidence of causality between CI measures and housing insecurity.

### **Policy Implications**

This study has policy implications on multiple levels. The negative relationship between educational attainment and housing insecurity suggests the need for greater investment in education systems from elementary schools through institutions of higher learning such as universities and trade schools. Those residing in urban and suburban areas had higher odds of experiencing more severe housing insecurity. These locales could provide incentives for developers to invest in more low-income housing availability, especially within western regions where housing insecurity incidence is higher. Additionally, low-interest loans or grants could provide needed capital to maintain or update existing housing stock. At the federal level, greater fiscal investment in subsidizing housing programs could provide relief to these vital programs. Additionally, the federal housing voucher program could reexamine its market rate structure to provide those in the program greater access to housing in more desirable neighborhoods. To address late life housing insecurity, providing greater fiscal assistance to assisted living facilities as more supportive housing options are much more costly than independent living situations. Additionally, those who are widowed experience a drop in their income, which could be addressed through social security benefit eligibility changes.

### **Future Research**

This study identified numerous factors associated with housing insecurity in later life. However, exploring the relationship between interactive CI measures and later life housing insecurity severity would provide a clearer picture of how, when, and which

individuals have greater odds of experiencing more severe housing insecurity. Also, the relationship between marital status and housing insecurity severity could warrant further exploration to better understand individual experiences in later life. Conducting longitudinal research to establish long-term trends could explore lifecourse factors that have the strongest associations with housing insecurity among those in later life. Additionally, research regarding the relationship between advancing age and housing insecurity could produce vital knowledge due to the projected increased portion of the population over 65. This research could guide current and future policymakers to better address housing insecurity in later life.

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## TABLES

Table 1. Axioms, Interpretation, and Measures of Cumulative Inequality Theory

Axioms	Interpretation	Study Measures
1. "Social systems generate inequality, which is manifested over the lifecourse through demographic and developmental processes."	a. Forces outside individual control impacts exposure to risk and opportunity by ascribed statuses	Gender; Race/Ethnicity; Region of Residence; Area Type; Childhood Family Financial Situation
2. "Disadvantage increases exposure to risk, but advantage increases exposure to opportunity."	a. Advantage may not be the opposite of disadvantage. b. Position within the hierarchy encounter different social processes	Education; Household Size
3. "Lifecourse trajectories are shaped by the accumulation of risk, available resources, and human agency."	a. Resilient individuals with resources use them to increase their advantage. b. Transition events provide opportunity to alter life trajectories.	Marital Status; Diagnosed Mental Health Condition; Number of Children; Food Insecurity
4. "The perception of life trajectories influences subsequent trajectories."	a. How individuals perceive their lives in comparison to others affects lifecourse outcomes.	Perceived Physical Health; Perceived Childhood Health
5. "Cumulative inequality may lead to premature mortality; therefore, nonrandom selection may give the appearance of decreasing inequality in later life."	a. Some individuals will die earlier due to inequality. b. Outcomes are the balance of the accumulation of advantage or disadvantage in later life.	Housing Insecurity; Age

Source: Ferraro, K. F., & Shippee, T. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49(3), 333–343

Table 2. Summary of Study Hypotheses of Relationships Between Cumulative Inequality and Housing Insecurity

Cumulative Inequality Measure	Hypothesis	Citations
Gender	I hypothesize that later life renters who are women are at higher risk of experiencing HI than are men.	Harvard JCHS, 2016
Race/Ethnicity	I hypothesize that African American and Hispanic later life renters are at higher risk of experiencing HI in later life than are White Non-Hispanics.	Baker et al., 2014
Area Type	I hypothesize later life renters who reside in urban and suburban areas will be at higher risk of experiencing HI than those in rural areas.	US Census Bureau, 2016
Region of Residence	I hypothesize later life renters who reside in the Western region will be at higher risk of experiencing HI than those in the Northeast, South, and Midwestern regions.	Saiz, 2010; Barton 2011
Childhood Financial Situation	I hypothesize that renters in later life from poorer childhood financial situations will be at higher risk of experiencing HI than those from more well-off situations.	Kim & Chatterjee, 2013; Drever et al., 2015; Tang, 2017
Highest Attained Degree	I hypothesize that later life renters with lower educational attainment will be at higher risk of experiencing HI than those with greater educational attainment.	Ryan & Bauman, 2016; Cutler, Huang, & Lleras-Muney, 2015
Number in Household	I hypothesize that later life renters with higher numbers of people residing in the households will be at higher risk of experiencing HI than smaller households.	Campagna, 2016; Solari & Mare, 2012; Warren & Font, 2015

Table 2. (Continued)

Cumulative Inequality Measure	Hypothesis	Citations
Number of Children	I hypothesize that later life renters with more children will be at higher risk of experiencing HI than those with less children.	Budig & Hodges, 2010; Bygren & Gähler, 2012; Glauber, 2008
Marital Status	I hypothesize that later life renters who are widowed, never married, or divorced will be at higher risk of experiencing HI than those who are married.	Sevak, Weir, & Willis, 2004; Angel, Jimenez, & Angel, 2007
Food Insecurity	I hypothesize that later life renters who experience food insecurity will be at a higher risk of experiencing HI than those that don't.	Liu, Njai, Greenlund, Chapman, & Croft, 2014; Parish, Rose, & Andrews, 2009; Shinn et al., 2007
Mental Health Diagnosis	I hypothesize that later life renters with mental health diagnosis will be at higher risk of experiencing HI than those without.	Burgard et al., 2012
Perceived Current Health	I hypothesize that later life renters with negative perception of current health situation will be at higher risk of experiencing HI than those with positive perceptions.	Pollack, Griffin, & Lynch, 2010
Perceived Childhood Health	I hypothesize that later life renters with negative perception of childhood health situation will be at higher risk of experiencing HI than those with more positive perceptions.	Kawachi et al., 2010
Age	I hypothesize that later life renters who are age 60 and over will be at a higher risk of experiencing housing insecurity than those aged 50 to 59.	Baker et al., 2014; Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010

Table 3. Distribution of Variables for Renters Age 50+

Cumulative Inequality Measure	<i>N</i>	Percent
Housing Insecurity		
Not HI	992	51.2
Moderately HI	467	21.9
Severely HI	637	26.9
Gender		
Male	809	44.4
Female	1287	55.6
Race/Ethnicity		
White Non-Hispanic	872	61.8
African American	797	23.0
Hispanic	427	15.2
Area Type		
Urban	1302	56.0
Suburban	461	24.3
Exurban (including Rural)	333	19.6
Region of Residence		
Northeast	417	19.1
Midwest	377	20.3
South	805	34.7
West	497	25.9
Childhood Financial Situation		
Well	162	8.5
Average	1210	62.1
Poor	724	29.4
Highest Attained Degree		
No Degree	538	21.4
High School	1271	61.2
Bachelors or Higher	287	17.4
Number of Persons in Household		
1	1232	63.5
2	424	17.9
3+	440	18.6
Number of Children		
0	289	18.3
1	308	15.3
2	500	24.6
3+	999	41.7

Table 3. (Continued)

Cumulative Inequality Measure	<i>N</i>	Percent
Marital Status		
Married	483	22.5
Divorced	895	42.3
Widowed	439	17.3
Never Married	279	17.8
Food Insecure		
No	1202	63.0
Yes	894	37.0
Mental Health Diagnosis		
No	1202	70.4
Yes	613	29.6
Perceived Current Health		
Excellent/Very Good	260	11.2
Very Good/Good	1282	58.7
Fair/Poor	554	30.1
Perceived Childhood Health		
Excellent	975	48.9
Very Good/Good	895	41.6
Fair/Poor	226	9.5
Age		
50-59	754	33.7
60-69	692	36.3
70-79	372	17.2
80+	278	12.7
Total	2,096	100.0%

Source: 2014 Health and Retirement Study (UMISR)

Note: Numbers are unweighted and percentages are weighted.

Table 4. Percent Housing Insecure by Cumulative Inequality Measures for Renters Age 50+

	Not Housing Insecure (N=992)	Housing Insecure (N=1,104)	Total (N=2,096)
Gender			
Male	49.6	50.4	100.0
Female	52.5	47.5	100.0
Race/Ethnicity			
White Non-Hispanic	55.5	44.5	100.0
African American	49.4	50.6	100.0
Hispanic	36.6	63.4	100.0
Area Type			
Urban	51.9	48.1	100.0
Suburban	52.2	47.8	100.0
Exurban (including Rural)	48.9	51.2	100.0
Region of Residence			
Northeast	52.4	47.6	100.0
Midwest	56.5	43.5	100.0
South	54.4	45.6	100.0
West	41.8	58.2	100.0
Childhood Financial Situation			
Well	51.9	48.1	100.0
Average	52.2	47.8	100.0
Poor	48.9	51.2	100.0
Highest Attained Degree			
No Degree	38.2	61.8	100.0
High School	53.1	46.9	100.0
Bachelors or Higher	60.4	39.6	100.0
Number of People in the Household			
1	52.3	47.7	100.0
2	52.4	47.6	100.0
3+	46.2	53.8	100.0
Number of Children			
0	53.9	46.1	100.0
1	53.2	46.8	100.0
2	51.2	48.8	100.0
3+	49.3	50.7	100.0

Table 4. (Continued)

	Not Housing Insecure (N=992)	Housing Insecure (N=1,104)	Total (N=2,096)
<b>Marital Status</b>			
Married	61.6	38.4	100.0
Divorced	51.1	48.9	100.0
Widowed	37.7	62.3	100.0
Never Married	51.4	48.6	100.0
<b>Food Insecure</b>			
No	53.3	46.7	100.0
Yes	47.6	52.4	100.0
<b>Mental Health Diagnosis</b>			
No	50.0	50.0	100.0
Yes	54.0	46.0	100.0
<b>Subjective Current Health</b>			
Excellent	46.0	54.0	100.0
Very Good/Good	49.2	50.8	100.0
Fair/Poor	57.0	43.0	100.0
<b>Subjective Childhood Health</b>			
Excellent	54.2	45.8	100.0
Very Good/Good	49.0	51.0	100.0
Fair/Poor	45.4	54.6	100.0
<b>Age</b>			
50-59	59.0	41.0	100.0
60-69	52.7	47.3	100.0
70-79	45.4	54.6	100.0
80+	34.0	66.0	100.0

Source: 2014 Health and Retirement Study (UMISR)

Note: Percentages are weighted and may not add up to 100 due to rounding.

Table 5. Severity of Housing Insecurity (HI) by Cumulative Inequality Measures for Renters age 50+

	% Not HI	% Moderately HI	% Severely HI	Total
<b>Gender</b>				
Male	49.6	23.9	26.5	100.0
Female	52.5	20.3	27.2	100.0
<b>Race/Ethnicity</b>				
White Non-Hispanic	55.5	22.2	22.3	100.0
African American	49.4	19.6	31.0	100.0
Hispanic	36.7	24.2	39.2	100.0
<b>Area Type</b>				
Urban	46.5	22.0	31.5	100.0
Suburban	52.9	22.1	25.0	100.0
Exurban (including Rural)	62.6	21.3	16.1	100.0
<b>Region of Residence</b>				
Northeast	52.4	18.2	29.4	100.0
Midwest	56.5	22.5	21.0	100.0
South	54.5	20.7	24.8	100.0
West	41.8	25.8	32.4	100.0
<b>Childhood Financial Situation</b>				
Well	51.9	23.2	25.0	100.0
Average	52.2	21.2	26.6	100.0
Poor	48.9	23.0	28.1	100.0
<b>Highest Attained Degree</b>				
No Degree	38.2	22.1	39.7	100.0
High School	53.1	23.6	23.3	100.0
Bachelors or Higher	60.4	15.8	23.8	100.0
<b>Household Size</b>				
1	53.9	21.0	25.2	100.0
2	52.4	21.0	26.7	100.0
3+	46.3	20.8	32.9	100.0
<b>Number of Children</b>				
0	53.9	22.0	24.1	100.0
1	53.2	17.1	29.7	100.0
2	51.2	25.3	23.4	100.0
3+	40.2	41.2	45.2	100.0

Table 5. (Continued)

	% Not HI	% Moderately HI	% Severely HI	Total
<b>Marital Status</b>				
Married	61.6	16.4	22.0	100.0
Divorced	51.1	22.1	26.8	100.0
Widowed	37.7	26.0	36.3	100.0
Never Married	51.4	24.5	24.1	100.0
<b>Food Insecurity</b>				
No	53.3	22.1	24.5	100.0
Yes	47.6	21.5	30.9	100.0
<b>Mental Health Diagnosis</b>				
No	50.0	20.8	29.1	100.0
Yes	54.0	24.5	21.5	100.0
<b>Perceived Current Health</b>				
Excellent	46.0	30.7	23.3	100.0
Very Good/Good	49.2	21.2	29.6	100.0
Fair/Poor	57.0	20.0	23.0	100.0
<b>Perceived Childhood Health</b>				
Excellent	54.2	20.1	25.7	100.0
Very Good/Good	49.0	22.1	28.9	100.0
Fair/Poor	45.4	30.3	24.3	100.0
<b>Age</b>				
50-59	59.0	19.7	21.3	100.0
60-69	52.7	23.6	23.7	100.0
70-79	45.4	24.2	30.4	100.0
80+	34.0	19.9	46.1	100.0

Source: 2014 Health and Retirement Study (UMISR)

Note: Percentages are weighted and may not add up to 100 due to rounding.

N=2,096

Table 6. Bivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity

	$\beta$	Standard Error	Odds Ratio
Gender			
Male (ref.)			
Female	-0.070***	0.0013	0.94
Race/Ethnicity			
White Non-Hispanic (ref.)			
African American	0.158***	0.0015	1.17
Hispanic	0.688***	0.0018	1.99
Area Type			
Exurban (including Rural) (ref.)			
Urban	0.469***	0.0013	1.60
Suburban	-0.103***	0.0015	0.90
Region of Residence			
Midwest (ref.)			
Northeast	0.017***	0.0016	1.02
South	-0.187***	0.0014	0.83
West	0.452***	0.0014	1.57
Childhood Financial Situation			
Well (ref.)			
Average	0.160***	0.0013	1.17
Poor	0.110***	0.0022	1.12
Highest Attained Degree			
Bachelors or Higher (ref.)			
No Degree	0.185***	0.0025	1.20
High School	-0.294***	0.0013	0.75
Number in Household			
1 (ref.)			
2	-0.043***	0.0017	0.96
3+	0.178***	0.0021	1.20
Number of Children			
0 (ref.)			
1	-0.003***	0.0018	1.00
2	-0.080***	0.0015	0.92
3+	0.154***	0.0013	1.17

Table 6. (Continued)

	<i>B</i>	Standard Error	Odds Ratio
<b>Marital Status</b>			
Married (ref.)			
Divorced	0.006***	0.0013	1.00
Widowed	0.609***	0.0017	1.84
Never Married	-0.066***	0.0017	0.94
<b>Food Insecurity</b>			
No (ref.)			
Yes	0.262***	0.0013	1.30
<b>Mental Health Diagnosis</b>			
No (ref.)			
Yes	-0.235***	0.0014	0.79
<b>Perceived Current Health</b>			
Excellent (ref.)			
Good	0.240***	0.0013	1.27
Fair/Poor	-0.320***	0.0014	0.73
<b>Perceived Childhood Health</b>			
Excellent (ref.)			
Very Good/Good	0.160***	0.0013	1.17
Fair/Poor	0.110***	0.0022	1.12
<b>Age</b>			
50-59 (ref.)			
60-69	-0.150***	0.0013	0.86
70-79	0.253***	0.0017	1.29
80+	0.910***	0.0019	2.48

Source: 2014 Health and Retirement Study (UMISR)

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 7. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - Axiom 1

	Axiom 1		
	<i>B</i>	Standard Error	Odds Ratio
Gender			
Male (ref.)			
Female	-0.041***	0.0013	0.96
Race/Ethnicity			
White Non-Hispanic (ref.)			
African American	0.331***	0.0016	1.39
Hispanic	0.640***	0.0019	1.89
Area Type			
Exurban (including Rural) (ref.)			
Urban	0.523***	0.0019	1.69
Suburban	0.300***	0.0021	1.35
Region of Residence			
Midwest (ref.)			
Northeast	0.074***	0.0021	1.08
South	0.007***	0.0019	1.01
West	0.401***	0.0020	1.49
Childhood Financial Situation			
Well (ref.)			
Average	0.194***	0.0014	1.21
Poor	0.100***	0.0023	1.11

Source: 2014 Health and Retirement Study (UMISR)

*N*=2,096 - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 8. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - Axiom 2

	Axiom 2		
	$\beta$	Standard Error	Odds Ratio
Highest Attained Degree			
Bachelors or Higher (ref.)			
No Degree	0.86***	0.0021	2.35
High School	0.20***	0.0018	1.22
Number in Household			
1 (ref.)			
2	-0.01	0.0017	0.99
3+	0.23***	0.0017	1.25

Source: 2014 Health and Retirement Study (UMISR)

$N=2,096$  - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 9. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - Axiom 3

	Axiom 3		
	$\beta$	Standard Error	Odds Ratio
Number of Children			
0 (ref.)			
1	0.080**	0.0024	1.08
2	0.035**	0.0022	1.04
3+	0.120**	0.0021	1.13
Marital Status			
Married (ref.)			
Divorced	0.367**	0.0023	1.44
Widowed	0.873**	0.0021	2.39
Never Married	0.375**	0.0017	1.46
Food Insecurity			
No (ref.)			
Yes	0.293**	0.0014	1.34
Mental Health Diagnosis			
No (ref.)			
Yes	-0.340**	0.0015	0.71

Source: 2014 Health and Retirement Study (UMISR)

$N=2,096$  - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 10. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - Axiom 4

	Axiom 4		
	$\beta$	Standard Error	Odds Ratio
Perceived Current Health			
Good	0.044**	0.0021	1.05
Fair/Poor	-0.263**	0.0023	0.77
Perceived Childhood Health			
Good	0.170**	0.0014	1.19
Fair/Poor	0.138**	0.0023	1.15

Source: 2014 Health and Retirement Study (UMISR)

N=2,096 - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 11. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - Axiom 5

	Axiom 5		
	$\beta$	Standard Error	Odds Ratio
Age			
50-59 (ref.)			
60-69	0.221**	0.0016	1.25
70-79	0.527**	0.0019	1.69
80+	1.111**	0.0021	3.04

Source: 2014 Health and Retirement Study (UMISR)

N=2,096 - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

Table 12. Multivariate Relationships Between Cumulative Inequality Measures and Housing Insecurity Severity - All Measures

	$\beta$	Standard Error	Odds Ratio
<b>Gender</b>			
Male (ref.)			
Female	-0.310***	0.0015	0.73
<b>Race/Ethnicity</b>			
White Non-Hispanic (ref.)			
African American	0.315***	0.0018	1.37
Hispanic	0.512***	0.0022	1.67
<b>Area Type</b>			
Exurban (including Rural) (ref.)			
Urban	0.580***	0.0019	1.79
Suburban	0.378***	0.0021	1.46
<b>Region of Residence</b>			
Midwest (ref.)			
Northeast	0.015***	0.0022	1.02
South	0.551***	0.0021	1.73
West	0.083***	0.0019	1.09
<b>Childhood Financial Situation</b>			
Well (ref.)			
Average	0.015***	0.0012	1.02
Poor	-0.055	0.0027	0.95
<b>Highest Attained Degree</b>			
Bachelors or Higher (ref.)			
No Degree	0.476***	0.0025	1.61
High School	0.123***	0.0019	1.13
<b>Number in Household</b>			
1 (ref.)			
2	0.111***	0.0019	1.12
3+	0.275***	0.0019	1.32
<b>Number of Children</b>			
0 (ref.)			
1	0.068***	0.0025	1.07
2	0.015***	0.0024	1.02
3+	-0.095***	0.0023	0.91

Table 12. (Continued)

	$\beta$	Standard Error	Odds Ratio
<b>Marital Status</b>			
Married (ref.)			
Divorced	0.485***	0.0019	1.62
Widowed	0.753***	0.0023	2.12
Never Married	0.412***	0.0025	1.51
<b>Food Insecurity</b>			
No (ref.)			
Yes	0.359***	0.0016	1.43
<b>Mental Health Diagnosis</b>			
No (ref.)			
Yes	-0.234***	0.0016	0.79
<b>Perceived Current Health</b>			
Excellent (ref.)			
Good	0.044***	0.0022	1.04
Fair/Poor	-0.187***	0.0025	0.83
<b>Perceived Childhood Health</b>			
Excellent (ref.)			
Very Good/Good	0.069***	0.0025	1.07
Fair/Poor			
<b>Age</b>			
50-59 (ref.)			
60-69	0.231***	0.0016	1.26
70-79	0.661***	0.0021	1.94
80+	1.255***	0.0025	3.51

Source: 2014 Health and Retirement Study (UMISR)

$N=2,096$  - weighted

\*  $p < .05$ ; \*\* $p < .001$ ; \*\*\*  $p < .0001$

## FIGURES

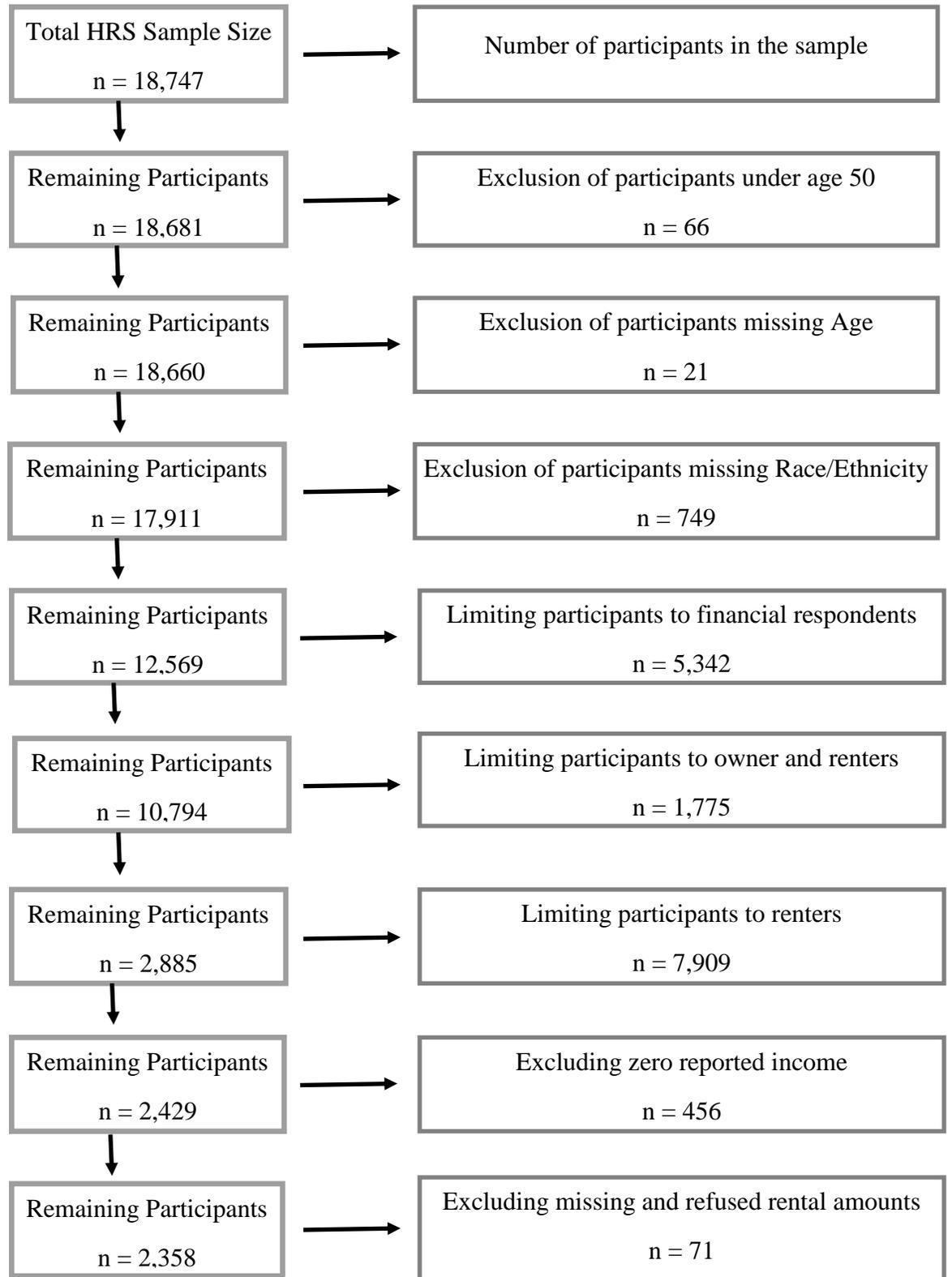


Figure 1. Participant Flow Chart

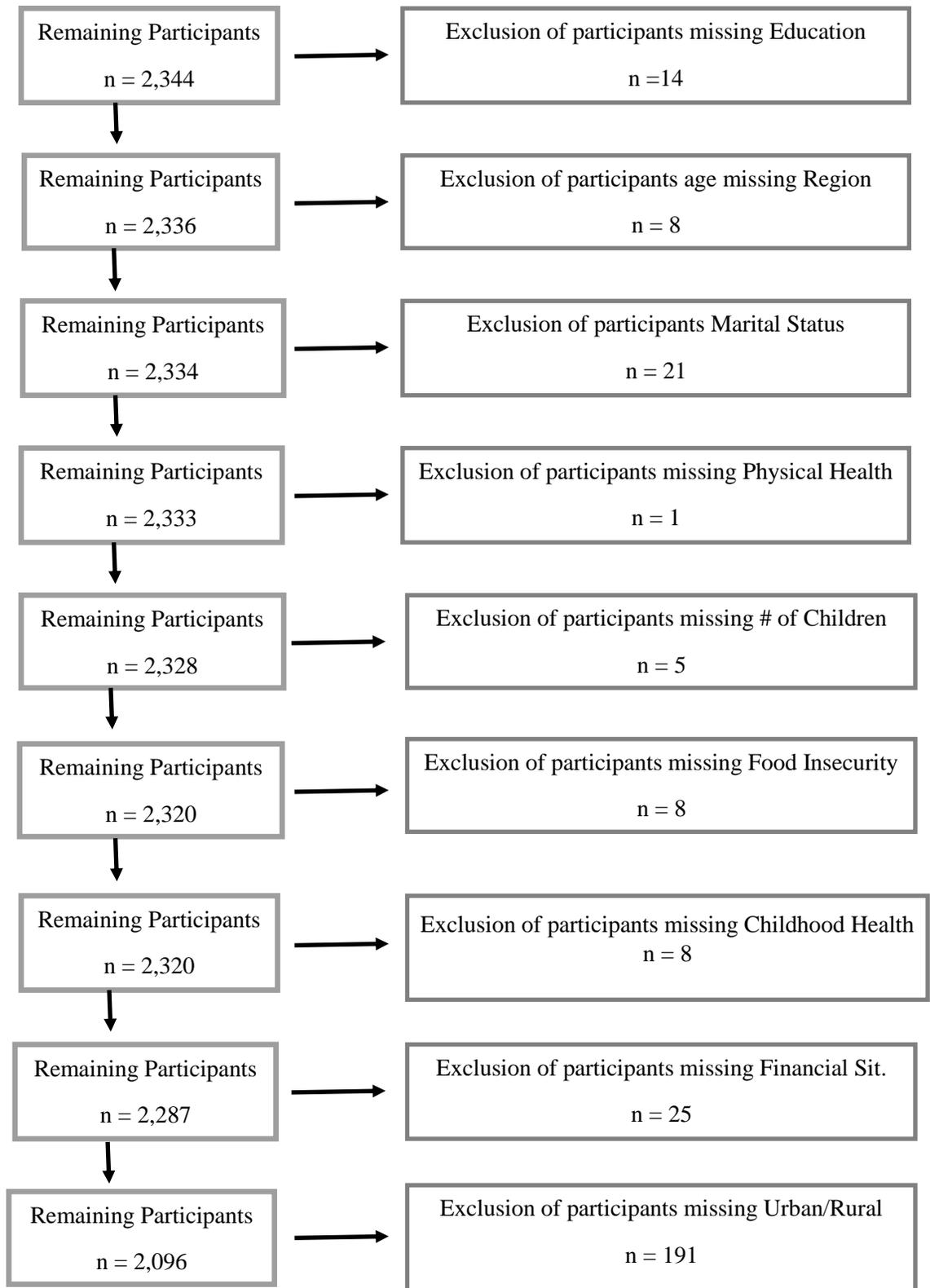


Figure 1. Continued

## APPENDIX COHORT INFORMATION

**Table A1:** Cohorts Within the 2014 HRS Core Data

Cohort Name	Birth Year Range	Added to the Study
HRS	1931 – 1941	1992
AHEAD	Prior to 1924, initially a separate study (The Study of Assets and Health Dynamics Among the Oldest Old)	1993
Children of Depression (CODA)	1924 – 1930	1998
War Baby (WB)	1942 – 1947	1998
Early Baby Boomer (EBB)	1948 – 1953	2004
Mid Baby Boomer (MBB)	1954 – 1959	2010
Late Baby Boomer (LBB)	1960 – 1965	Planned for 2016

The HRS and AHEAD studies were combined in 1998 (UMISR, 2017c)